Agrochemicals and Security

A Training Module for the Safe and Secure Storage of Pesticides and Fertilizers

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Florida Cooperative Extension Service, 2005
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The Agrochemical and Security Series is available for download from the Florida Cooperative Extension’s Disaster Handbook Web site <http://disaster.ifas.ufl.edu>. The series comprises six units:

- Why It Matters (An introduction to agrochemical security)
- Chemical Safety
- Homeland Security and Fertilizers
- Homeland Security and Pesticides
- Security and Anhydrous Ammonia
- Developing a Hazard Mitigation Plan

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About Florida AgSafe

Florida AgSafe is a program of the Florida Cooperative Extension Service that provides information and educational materials for agricultural safety and for disaster preparedness and recovery. Materials produced by Florida AgSafe are available on the Web at <www.flagSAFE.ufl.edu> and at the Florida Cooperative Extension publication Web site <edis.ifas.ufl.edu>.

Our Goals

- To inform people about ways to be safe and secure, and thereby reduce the number of deaths, injuries and occupational diseases, particularly for agricultural workers and their families.
- To build a safety infrastructure for Florida through five activities: training of workers, training of students, publications, networks, and linkages.
- To encourage adoption of safe practices among employees and clientele. Every employee or client should be exposed to a safety tip or safety practice on a regular basis.
- To prepare the people of Florida to face disaster of any kind, to mitigate losses, both in life and property, and to promote rapid and effective recovery.
Preface

For many years, producers have been aware of the health hazards of pesticides. These materials are carefully regulated, and the safety requirements for every pesticide product are spelled out in detail. Most fertilizers have been in an opposite category, considered useful, safe and inert. However, in recent years, agricultural chemicals — specifically, fertilizers — have been used in some of the most damaging terrorist attacks around the world.

These attacks have given the general public, agricultural producers and governmental authorities a new point of view. It is important for all to realize that, in the wrong hands, agricultural chemicals, including fertilizers and pesticides, could be used to do great damage.

This module provides several units which address different aspects of this problem. There are six units in this training module (with the page numbers where they can be found in this manual):

Unit 1: Introduction: Agrochemicals and Security — Why It Matters .......... 5
Unit 2: Chemicals and Safety .................................................................... 15
Unit 3: Homeland Security and Fertilizers .................................................. 51
Unit 4: Homeland Security and Pesticides .................................................. 85
Unit 5: Security and Anhydrous Ammonia .................................................. 125
Unit 6: Developing a Hazard Mitigation Plan ............................................. 161

Units can be used separately or in combinations depending on audience needs. Each unit consists of:

- A narrative which gives background material;
- A PowerPoint presentation which parallels the narrative;
- Pre- and post-tests, and an evaluation; and
- Table-top exercises (selected units).

The module is structured to give the presenter plenty of flexibility. Use all six units with table-top exercises to create a day-long workshop on agricultural security, or show only one PowerPoint presentation with a question and answer period for a 20- to 30-minute training session. Reduced images of all PowerPoint slides are included with each unit and can be copied to create a participant workbook.

How to Use Pre- and Post-Tests

The idea of a “pre-post” test is that participants take the same brief quiz before and after the presentation. This gives the presenter and the participants an objective view of how much participants learned and how effective different points in the presentation were. A pre-post test takes just a few minutes before and after the presentation, but it can be a valuable tool for evaluating the presentation and reporting its impact on participants.
Unit 1: Agrochemicals and Security: Why It Matters

Subject
Terrorist attacks of recent years have had a profound impact on Americans’ view of their own vulnerability. Whether from domestic or foreign sources, this situation has important implications for all aspects of American society, including agriculture. Specifically, agricultural chemicals have been used in some of the most serious attacks.

Goal
Inform participants about the potential misuses of agricultural chemicals and explain the need for safety and security in handling these materials.

Objectives
As a result of this session, participants will understand that:

- Agricultural chemicals are an important part of American agriculture.
- Agricultural chemicals can be intentionally misused to deadly effect.
- Producers can play an important role in preventing these misuses through secure storage and handling of agricultural chemicals.

Session Outline
Part 1: Welcome
Part 2: Introduction to Agrochemicals and Security

Learning Environment and Aids
To conduct this training, you will need:

1. “Agrochemicals and Security: Why It Matters” PowerPoint presentation and a means to show it. (Download from the UF/IFAS Disaster Handbook Web site: <http://disaster.ifas.ufl.edu>.)
2. Note paper or workbooks for participants are optional.
Part 1 — Welcome

Begin by welcoming the participants and telling them the name of the workshop they are attending. Pass out any materials you have prepared for them, including an outline of the entire training session they will be participating in.

Review the learning objectives with the participants:

- Agricultural chemicals are an important part of American agriculture.
- Agricultural chemicals can be intentionally misused to deadly effect.
- Producers can play an important role in preventing these misuses through secure storage and handling of agricultural chemicals.

Part 2 — Agrochemicals and Security: Why It Matters

The United States has a remarkably productive agricultural sector. American producers supply more than enough to feed 300 million Americans, and they have made the United States the world’s leading agricultural exporter for many years.

The effectiveness of American agriculture is due to many factors — among the most important are two great revolutions in agricultural practice: the mechanization of agriculture beginning in the 19th century and the use of agricultural chemicals beginning in the 20th century.

Chemicals, in the forms of fertilizers and pesticides, have given producers a powerful means of enhancing growth and defeating pests. Producers are well aware that the benefits of using chemicals must be balanced — most immediately with financial costs, but also with potential impacts on human and environmental health.

Stimulated by recent events, producers now have new concerns about agricultural chemicals.

First, agricultural chemicals have been the basis for weapons used in two of the most horrifying attacks within the United States.

In February 1993, a van loaded with containers full of a fertilizer-diesel fuel mixture entered the underground parking garage of the World Trade Center. When the mixture was detonated, the resulting explosion killed six people and injured 1000.
In the April 1995 attack on the Alfred P. Murrah Federal Office Building in Oklahoma City, Timothy McVeigh and his co-conspirators used fertilizer containing ammonium nitrate and mixed it with racing fuel to create a bomb. The massive explosion they caused killed 168 people and wounded more than 500. Half of the building itself was destroyed and had to be razed.

Second, after the September 11, 2001 attacks, it was found that some of the perpetrators had tried to gain access to crop dusters and other light aircraft in southwest Florida. Crop dusters are designed to spray toxins, and the interest of 9/11 terrorists suggested that these aircraft might be misused to spray pesticides or other toxins or disease agents on a human or animal population. All aircraft used in agricultural operations were grounded after 9/11 until new procedures were put into place for agricultural flights.

Third, a growing problem throughout the United States is the misuse of the fertilizing agent anhydrous ammonia.

This chemical is used in the production of the recreational drug methamphetamine (street terms: speed, crank, crystal meth). Anhydrous ammonia significantly increases the efficiency of producing the drug and therefore increases the drug dealer’s profits. Theft of anhydrous ammonia is a significant law enforcement problem and creates severe health hazards both for the criminal who steals it and for the workers who may be injured when tampered equipment suddenly fails. Failure of this equipment has also caused evacuations of neighborhoods or sheltering in place when a cloud of anhydrous ammonia was released.

The possibility of all these hazards can be reduced with proper application of security and safety programs. With better knowledge of materials, chemicals, and security protocols, we can minimize the role that the agricultural workplace might play in illegal activities. Together, we all play a vital role in protecting ourselves against these ongoing threats.

Before we get into our main subject, let’s get a little background on the subject of terrorism. We will use the following definition of terrorism (based on Title 22 of the US Code, Section 2656f(d)):

Terrorism is the tactic of attacking civilian populations in an effort to affect the decisions of the political leadership of that population.

Terrorism might be employed by domestic groups, as in the Oklahoma City
bombing in 1995, or by foreign groups, as in the World Trade Center bombings of 1993 and 2001. Terrorist acts are often part of an ongoing conflict and so involve both elements of retribution and persuasion.

Terrorism is usually a form of what is called “asymmetric warfare.” In normal warfare, soldiers of opposing groups engage directly in battles to achieve objectives, usually the acquisition of territory and resources. However, when the power of the opposing sides are significantly different, the weaker or smaller forces may choose to attack the stronger forces through sabotage and harassment rather than in direct massed battles (guerilla warfare) or to attack the opposing force’s civilian population (terrorism).

Two terms that the agricultural community should become familiar with are agroterrorism and bioterrorism. Agroterrorism is a special form of terrorism which targets any component of the food or water supply or the agricultural sector. Bioterrorism refers to the use of biological materials, such as disease agents, in terrorist attacks. Bioterrorism and agroterrorism could overlap if a group used a disease agent, such as brucellosis, to harm cattle. Agroterrorism is about the target, and bioterrorism is about the means.

[Note: The three images on the slide under Bioterrorism are (left to right): Yersinia pestis (bubonic plague); Bacillus anthracis (anthrax); and Variola major (smallpox).]

In brief, agroterrorism is about the target. Bioterrorism is about the tools.

On the battlefield, bioterrorism is called biological warfare. A similar form of warfare is chemical warfare, in which poisons and other harmful chemicals are used.

In this brief, introductory unit, we’ve looked at some acts of terrorism and some crimes and how agricultural chemicals can be misused. Further units in this training module will deal with these issues in much more detail, as well as measures agricultural producers and suppliers can take to minimize the chances that dangerous chemicals will fall into the wrong hands.

Keep in mind that secure storage isn’t necessarily safe, and safe storage isn’t necessarily secure. You need to understand both of these ideas.
Agrochemicals and Security: Why It Matters

PowerPoint Slides 1-3

Agrochemicals and Security

Why It Matters

Learning Objectives
As a result of this session, participants will understand:

Agricultural chemicals are an important part of American agriculture.
Agricultural chemicals can be intentionally misused to deadly effect.
Producers can play an important role in preventing these misuses through secure storage and handling of agricultural chemicals.

American agriculture is increasingly productive.
**PowerPoint Slides 4-6**

### The Revolution in Agriculture

**Mechanical**
- 1874: Sack vine introduced
- 1875: Slab saw introduced
- 1877: Potato dandy introduced
- 1878: McCormick reaper introduced
- 1900: Hoe invented
- 1901: Hoe plow invented
- 1902: Hoe harrow invented

**Chemical**
- 1880: Thiram introduced
- 1880: Phentimaleimide introduced
- 1890: EPTC herbicide introduced
- 1900: DDT insecticide introduced
- 1900: DDT insecticide introduced
- 1900: DDT insecticide introduced
- 1900: DDT insecticide introduced
- 1900: DDT insecticide introduced
- 1900: DDT insecticide introduced

### Chemicals – Helpful and Harmful

- Application of anhydrous ammonia.
- High nitrogen fertilizers have significantly increased the productivity of American agriculture.
- Pesticides stored in corroded containers create a health and environmental hazard.

### World Trade Center – 2/26/1993

- The search for the tower bomber.
PowerPoint Slides 7-9

Oklahoma City – 4/19/1995

Oklahoma City Memorial

Memorial dedicated April 19, 2000

World Trade Center 2001

The original 9/11 plan: small planes packed with explosives.

9/11 terrorists sought USDA grants from SW Florida office to purchase small planes (they were turned down – not qualified to apply).
Anhydrous Ammonia

Anhydrous Ammonia and Meth Labs

- Anhydrous ammonia increases methamphetamine yield.
- Meth labs can be small and mobile.

Secure Storage

- Security can be simple and effective.
What is Terrorism?

Terrorism is the tactic of attacking civilian populations in an effort to affect the decisions of the political leadership of that population.

-- based on USC 22, Sec. 2656f(d)

What's the difference?

<table>
<thead>
<tr>
<th>Agroterrorism</th>
<th>Bioterrorism</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Targets</strong></td>
<td>Employs biological materials, especially disease agents, <em>as the tool</em></td>
</tr>
<tr>
<td>some part of the food or water supply or the agricultural sector.</td>
<td></td>
</tr>
</tbody>
</table>

Agrochemicals and Security

Further Topics in this Module...

- Unit 2: Chemicals and Safety
- Unit 3: Homeland Security and Fertilizers
- Unit 4: Homeland Security and Pesticides
- Unit 5: Security and Anhydrous Ammonia
- Unit 6: Developing a Hazard Mitigation Plan
PowerPoint Slides 16
Unit 2: Chemicals and Safety

Subject
Workers pack, distribute, handle, mix and apply all sorts of chemicals. In virtually every occupation, they will come into contact with flammable materials, solvents, toxins, or any of many other categories of chemicals.

Goal
Make workers aware of the different kinds of chemicals they might come into contact with, characteristics of those chemicals, and potential hazards.

Objectives
As a result of this session, participants will:

- Understand that all chemicals present possible hazards.
- Understand that safe storage is an important issue.
- Understand that many chemical injuries result from improper storage.
- Know their rights and responsibilities when working with chemicals.
- Know four basic rules of chemical safety.
- Be aware of the categories of dangerous chemicals and specific safety precautions appropriate to each category.

Session Outline
Part 1: Welcome and Introduction
Part 2: Unit Learning Objectives
Part 3: Pre-Test
Part 4: Module Introduction
Part 5: Learning Sections
  Section 1: Introduction
  Section 2: Chemicals: Helpful and Harmful
  Section 3: Basic Rules of Chemical Safety
  Section 4: “Safe” Storage and Causes of Injury
  Section 5: Right-to-Know and MSDS
  Section 6: Chemical Categories
  Section 7: Summary
Part 6: Questions and Discussion
Part 7: Post-Test
Part 8: Session Evaluation
Part 9: Adjourn
To conduct this training, you will need:

1. “Chemical Safety” PowerPoint presentation, and a means to show it. (Download from the UF/IFAS Disaster Handbook Web site: <http://disaster.ifas.ufl.edu>.)
2. Note paper or PowerPoint slide pages to serve as participant workbooks
3. If desired, sufficient copies of the Pre- and Post Test for all participants to take the test both before and after session
4. Unit 2 evaluation forms.

Part 1 — Welcome and Introduction

Take a moment at the beginning of the lesson to welcome the participants to the session. Introduce yourself as the presenter, and remind participants of the title and subject (above) of the session.

If participants have not covered the Module Introduction in a previous session, present that material now as a general introduction to the importance of agricultural security.

Part 2 — Unit Learning Objectives

Briefly introduce the audience to the learning objectives for this unit:

- Understand that all chemicals present possible hazards.
- Understand that safe storage is an important issue.
- Understand that many chemical injuries result from improper storage.
- Know their rights and responsibilities when working with chemicals.
- Know four basic rules of chemical safety.
- Be aware of the categories of dangerous chemicals and specific safety precautions appropriate to each category.

Part 3 — Pre-Test

If you choose to administer pre- and post-tests, do so now before you do anything else. Explain to the participants that everyone will take a short quiz before the session just to give themselves a clearer idea of what they already know about the subject and some things they will learn during the session. Tell them that they will take the same test at the end of the session and this will help the presenter by giving an idea of the effectiveness of the session. The pre- and post-tests should take only a few minutes each.
Part 4 — Module Introduction

The Chemical Safety Unit is a stand-alone unit. It can be presented without reference to homeland security issues, so the presenter may choose not to use the Module Introduction if the only unit that will be used for an educational program is this Chemical Safety Unit. However, any program that includes one of the security units should begin with the Module Introduction.

Part 5 — Learning Sections

Section 1: Introduction

Before we talk about secure storage of agrochemicals, let’s discuss some ideas about the safe storage and handling of dangerous chemicals in general.

Section 2: Chemicals: Helpful and Harmful

Having the right tool for the job is well-known wisdom about doing a job effectively and efficiently, and it applies to chemicals the same as tools. Hardware and grocery store shelves are filled with products that dissolve, bleach, clean, remove, enhance... there seems to be a specific chemical for just about every task. Chemicals are everywhere in our lives helping us to do our work and live our lives.

However, most chemicals also pose dangers if used improperly, and it is very important to know correct methods for storage, handling, use and disposal. Chemicals can be dangerous for different reasons. A simple example is soap. Applied to skin, soap is very useful and not painful; applied to the eyes, it is usually painful, but not dangerous; if eaten, soap is dangerous, but not likely to be fatal.

There are many chemicals we work with every day, and we feel ourselves to be very familiar with their limitations – chemicals such as bleach, or lye, or gasoline. Nevertheless, every year people are injured by these common chemicals when they are unaware of or ignore standard precautions, such as: Never mix bleach with ammonia (it produces a deadly gas); Never mix lye with acids (the mixture can explode causing serious burns); and Never dispense gasoline in the presence of a spark or open flame.

In this unit, we will look at the different categories of dangerous chemicals.
For each one, basic properties and safe storage and handling procedures will be listed. Some of the chemicals in these lists are very common, and you may use them frequently. Others are quite rare, but should you encounter them, you might remember hearing about them, and have some forewarning about what you are dealing with.

**Section 3: Basic Rules of Chemical Safety**

Before we discuss any other aspect of handling chemicals, it’s a good idea to emphasize four basic rules of chemicals.

**Rule #1**

**Don’t buy or store chemicals you do not need.**

Having chemicals that you never use just adds to possible dangers in your work or home environment. Many chemicals degrade over time, so having them around “just in case” can be a poor idea. When you have a job that needs a chemical, purchase what you need for the job. Write the date of purchase on the label so that when you sort through your garage or workspace (as we all do from time to time) and wonder “How long have I had this?” you’ll know just by looking at the label.

**Rule #2**

**Store chemicals in their original containers.**

There are two very important reasons for this. First, the chemical was sold in a container designed to hold it for a long period of time. You may not be aware of how an unusual chemical or chemical mixture will affect another kind of container. If the container becomes damaged, the chemical may leak out. If the chemical reacts with the container and changes its chemical composition, you will have an unknown substance in the container which may pose serious risks. Of course, avoid storing chemicals in breakable containers.

Second, the original container will have an accurate label. Keeping chemicals in their original containers means that you will always know what was originally in the container. When operations change and certain chemicals are no longer needed, the label is your best information about what chemicals should be disposed of and when to dispose of them. People can be seriously injured when they try to identify unlabeled chemicals by inappropriate means such as smelling or tasting.
Rule #3  
Always wear appropriate safety gear and work in a safe environment.

Always wear eye protection when handling chemicals. Regardless of their toxicity, powdered chemicals can get in your eyes and cause abrasions and liquid chemicals can splash. Your reflex to protect your eyes can cause mishaps. (Learn more about eye safety at the Florida AgSafe Web Site. Look for the Eye Safety PowerPoint under “Publications.”)

Wear appropriate gloves, aprons, masks – whatever you need to prevent inhaling or swallowing chemicals or letting them leach through your skin.

Work in a proper environment for the chemicals you are handling. Ensure proper ventilation. No open flames. No unprotected bystanders.

The Material Safety Data Sheets (MSDS) that come with many chemicals can guide you to the correct safety equipment and environment. Remember: “The label is the law.” However, whatever is specified on the label is the minimum requirement for personal protective equipment (PPE).

Rule #4  
Always dispose of chemicals safely.

Most municipalities have made provisions for proper disposal of toxic waste. Often, one phone call to the fire department or to a waste disposal agency will answer your questions about what is the right thing to do with an old can of acetone or bottle of sulfuric acid. Never pour dangerous chemicals “down the drain” or onto the soil. This often creates long-term contamination problems, which are especially dangerous in areas where food is grown or where water is drawn from local wells. Whether it is a pint can or 55-gallon drum, always dispose of chemicals properly. Many communities offer toxic-waste clean-up days or programs.

Section 4: “Safe” Storage and Causes of Injury

Chemical storage is one of the most important topics to discuss when talking about the use of chemicals. Fire and explosion are probably the most familiar hazards associated with improper storage, but chemicals can pose other dangers. Thousands of incidents resulting from improper storage are reported every year across the United States. A review and analysis of storage-related incidents identified the following principal causes:
1. Improper or non-existent labeling of chemicals in storage
2. Storage of chemicals beyond the recommended shelf life
3. Degradation of chemical storage containers.

Following the Basic Rules of Chemical Safety will help assure that you, your family or your workers are never injured in these ways.

Chemicals cause injuries in a variety of ways:

1. Chemical Burns (strong acids, strong bases)
2. Heat Burns (flammable materials)
3. Poisoning (many chemicals are damaging or fatal if taken internally, whether by swallowing, injection, or leaching through skin)
4. Chronic illness (long-term exposure to even low doses of certain chemical agents can lead to chronic health conditions).

It’s very easy to dismiss the danger of working with chemicals when they are a normal part of an operation. Learn good habits for working with chemicals from the beginning and practice these habits every day.

**Section 5: Right-to-Know and MSDS**

The Occupational Safety and Health Administration (OSHA) has created guidelines under which workers have a right to know what chemicals they might be exposed to in their work environment and what the dangers and appropriate precautions are for working with those materials. Many states have adopted these guidelines in the form of “Right-to-Know” laws. Under these laws, both employers and employees have obligations. Employers are required to inform employees (or make information available) about any chemicals they work with. Employees are required to follow established procedures when handling dangerous chemicals.

Which chemicals are covered by Right-to-Know laws? The Federal Register contains a long list of chemicals which are covered by this law. Individual states also have right-to-know laws and lists of hazardous chemicals. For these chemicals, employers must maintain records, including information about their dangers and safety precautions.

When a listed chemical is purchased, the manufacturer is required to supply information about the chemical, including its name, chemical properties,
dangers, modes of injury, safety precautions, and medical response. These forms are called Material Safety Data Sheets (MSDS), and employers are required to have current MSDS on file for all listed registered chemicals in their facility. Many MSDS are available on the Internet.

Section 6: Chemical Categories

For the purposes of this unit, we divide dangerous chemicals into seven categories. Categories 1-6 are based on the chemical properties of substances, and Category 7 is based on the effect of chemicals on human bodies. Based on its properties, a chemical might fit into more than one of these categories. The seven categories are:

1. Acids
2. Bases
3. Flammable
4. Oxidizers
5. Pyrophoric Substances
6. Light-Sensitive Chemicals
7. Carcinogens

In the following information, for each category, specific topics are covered: a general description of the category; some example chemicals; and safe storage requirements.

1. Acids

Acids come in several varieties. Some weak acids are often found in foods or in household cleaners. Examples are acetic acid in vinegar and citric acid in lemon juice. Note that pure acetic acid is a strong organic acid. Strong acids are very powerful substances that can cause severe burns, and acids can react violently with other substances. Strong acids are often used in industrial settings for cleaning, cutting, etching or for specific chemical reactions. Strong acids are especially destructive to metal.

Here are some pointers for safe storage of strong acids:

- Store large bottles of acids on a low shelf or in acid cabinets.
- Segregate oxidizing acids from organic acids, flammables and combustible materials.
• Segregate acids from bases and active metals such as sodium, potassium, etc.
• Use bottle carriers for transporting acid bottles.
• Have spill control pillows or acid neutralizers available in case of spill.

Some examples of strong acids are:

**Strong Oxidizing Acids**
- Chromic Acid
- Nitric Acid
- Hydrobromic Acid
- Perchloric Acid
- Iodic Acid
- Sulfuric Acid

**Organic Acids**
- Acetic Acid
- Phenol
- Benzoic Acid
- Trichloracetic Acid

2. Bases

In many ways, bases are the chemical opposites of acids, and bases will react strongly if not violently with acids. Never combine strong acids and strong bases. The intense heating caused by the reaction can cause the mixture to explode and cause serious injury. Strong bases are often used in industrial settings for cleaning and production of other chemicals and products.

Here are some pointers for safe storage of strong bases:

• Store bases and acids separate from one another.
• Store solutions of inorganic hydroxides in polyethylene containers.
• Have spill control pillows or caustic neutralizers available for spills. (Spill control pillows are widely available. These pillows have cases of loosely woven polymer and are usually filled with highly absorbent materials. A particular pillow may not be appropriate for all spills. Check manufacturer specifications.)
Some examples of strong bases are:

- Ammonium Hydroxide
- Calcium Hydroxide
- Bicarbonates
- Potassium Hydroxide
- Carbonates
- Sodium Hydroxide

3. Flammable Chemicals

Many materials are flammable, but some chemicals are dangerously flammable, either because they are easy to ignite, generate intense heat when ignited, or may explode if ignited. Common chemicals in this category are fuels and solvents, such as paint thinners, acetone, gasoline, or acetylene.

Workers and managers should also be aware of conditions that can lead to spontaneous combustion. This is a danger in many situations where a flammable material, such as hay, grain, flour, coal, or oil- or solvent-soaked rags or filters, are stored in bulk with too high a moisture content. Decomposition within the bulk of these materials, aggravated in some cases by solar heating, can raise internal temperatures to well above the flash point for the material, leading to spontaneous fires.

Here are some pointers for the storage of flammable materials:

- Store in approved safety cans or cabinets.
- Segregate from oxidizing acids and oxidizers.
- Keep away from any source of ignition: flames, heat or sparks.
- Know where fire fighting equipment is stored and how to use it.
- If volatile flammable liquids are stored in a refrigerator, it must be in an explosion-proof (lab-safe) refrigerator which is labeled “Not for Food Use.”

Some examples of flammable materials are:

- Flammable Solids
  - Benzoyl peroxide
  - Phosphorous, yellow
  - Calcium Carbide
  - Picric Acids
4. Oxidizers

This may be an unfamiliar category to you, however, oxidizers are powerful chemicals, and can react violently with common substances, possibly causing fires or explosions. Perchlorates and dichromates are especially dangerous if mishandled. Some of these chemicals can become less stable and more dangerous if stored for long periods of time. Strong oxidizers can react violently with organic materials, including latex, some plastics and skin.

Here are some pointers for storage of oxidizers:

- Store in a cool, dry place.
- Keep away from flammable and combustible materials, such as paper or wood.
- Keep away from reducing agents, such as zinc, alkaline metals, and formic acid.

Here are some examples of oxidizers:
5. Pyrophoric Substances

This is another less well-known category of chemicals. Pyrophoric substances tend to ignite when exposed to air. Due to their nature, their use is limited to very specialized operations, nonetheless, you should be aware of this kind of hazardous chemical. We can also include in this category many common substances in fine powder form. Such substances such as fine metal powders or finely ground flours can spontaneously ignite and produce significant explosions.

Here are some safety pointers for pyrophoric substances:

- Store in a cool place.
- Store in containers that omit air.
- Beware of low humidity circumstances in which static electricity may be high.
Here are some examples of pyrophoric substances:

- Boron
- Cadmium
- Calcium
- Phosphorus, Yellow
- Diborane
- Dichloroborane
- 2-Furaldehyde

6. Light-Sensitive Chemicals

Light-sensitive chemicals may change their composition if exposed to natural light. Often these changes lead to less stable and more dangerous substances.

Here are some safe storage tips for light-sensitive chemicals:

- Avoid exposure to light.
- Store in amber bottles in a cool, dry place.

Here are some examples of light-sensitive chemicals:

- Bromine
- Oleic Acid
- Ethyl Ether
- Potassium Ferricyanide
- Ferric Ammonium Citrate
- Silver salts
- Hydrobromic Acid
- Sodium Iodide
- Mercuric Salts
- Mercurous Nitrate

7. Carcinogens

Carcinogens are chemicals that may cause cancer in humans. These chemicals can upset the normal growth of human tissues. Unlike the previous categories of chemicals, which can have immediate injurious effects, carcinogens often cause damage over a long period of time, usually through repeated, perhaps daily exposure. A single, intense exposure to
some of these chemicals can also have long-term consequences.

Cancer is not the only disease that chemicals can cause. You should be aware of the possible health effects of any chemical to which you may be exposed on a regular basis.

Here are some safe storage tips for carcinogens:

- Label all containers as Cancer Suspect Agents.
- Store according to hazardous nature of chemicals, e.g., flammable, corrosive.
- When necessary, store securely.

Some examples of carcinogens are:

- Antimony compounds
- Acrylonitrile
- Arsenic compounds
- Benzene
- Benzidine
- Chloroform
- Beryllium
- Dimethyl Sulfate
- Cadmium compounds
- Dioxane
- Chromates, Salts of Ethylene Dibromide
- Beta-Naphthylamine
- Hydrazine
- Vinyl Chloride
- Nickel Carbonyl

Section 7: Summary

1. Basic Rules of Chemical Safety

Rule #1: Don’t buy or store chemicals you do not need.
Rule #2: Store chemicals in their original containers.
Rule #3: Always wear appropriate safety gear and work in a safe environment.
Rule #4: Always dispose of chemicals safely.
2. Storage Issues that Cause Chemical Injury
   a. Improper or non-existent labeling of chemicals in storage.
   b. Storage of chemicals beyond the recommended shelf life.
   c. Degradation of chemical storage containers.

3. Health Effects of Chemicals
   a. Chemical Burns (strong acids, strong bases)
   b. Heat Burns (flammable materials)
   c. Poisoning (many chemicals are damaging or fatal if taken internally, whether by swallowing, injection, or leaching through skin)
   d. Chronic illness (long-term exposure to even low doses of certain chemical agents can lead to chronic health conditions)

4. Right-to-Know and MSDS
   Employees have a right to know what chemicals they may encounter in their work, and they have the responsibility to follow all appropriate safety precautions.

   Precautions and safe handling information are provided on the Material Safety Data Sheets (MSDS) that must be on file for every chemical used in that operation.

5. Chemical Categories
   1. Acids
   2. Bases
   3. Flammable
   4. Oxidizers
   5. Pyrophoric Substances
   6. Light-Sensitive Chemicals
   7. Carcinogens
Part 6 — Questions and Discussion

You may wish to have a discussion period where your audience can talk about what they have just learned. Be alert for misinformation that may be shared during this discussion. Here are some suggestions to start the discussion.

- Ask participants to share about chemicals they work with and precautions they take normally. Emphasize personal protective equipment (PPE) and a correct “safety attitude.”
- Ask participants to share stories about chemical injuries they are aware of.
- Ask the participants how what they have just learned will change their work habits.

Part 7 — Post-Test

If you choose to administer the post-test, do so now. You have already prepared the audience for this when you administered the pre-test. Just remind them that it will take only a couple of moments.

Part 8 — Session Evaluation

An evaluation form is supplied in this booklet. Ask participants to take a few minutes to fill out this form and turn it in. If you allow participants to fill these forms out at home and return them to you at a later time – even later in the workshop – the chances of getting any evaluations are greatly reduced.

Part 9 — Adjourn

Thank the participants for their attention and encourage them to work safely with chemicals.
Additional Resources

Farm*A*Syst and Home*A*Syst Risk Assessments

Farm*A*Syst can help you determine what risks – whether from livestock waste disposal, pesticide management or petroleum storage – could threaten your family’s health and financial security. A system of step-by-step fact sheets and worksheets helps you to identify the behaviors and practices that are creating those risks. The complete program is at: <http://www.uwex.edu/farmasyst/>.

In every home – large or small, new or old, city or country – there are potential risks to your family’s health and the environment. Home*A*Syst helps you identify these risks and take action. The complete program is at: <http://www.uwex.edu/homeasyst/>.

“Protect the Eyes from Harm” — An Eye Safety Power Point

This presentation reviews possible eye hazards and means of eye protection and their relative benefits. Available at the Florida AgSafe Web site: <http://wwwflagsafe.ufl.edu>, click on “Publications.”
Agrochemicals and Security: Chemical Safety — Pre-test

This pre-test is intended to gauge your level of knowledge before participating in the Chemical Safety training. Please answer all the following questions to the best of your ability.

1. All chemicals present possible _________________.

2. Preventing chemical injuries results from safe...
   1) ________________________________
   2) ________________________________
   3) ________________________________

3. Name one or more of the major ways that unsafe storage can cause chemical injuries.
   __________________________________________
   __________________________________________
   __________________________________________

4. ________________ provide safety information and appropriate precautions.

5. What is the most basic personal protective equipment that should always be used when handling any kind of chemical? ________________________________

6. List one or more rules of chemical safety.
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

7. Name one or more categories of dangerous chemicals.
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
Agrochemicals and Security: Chemical Safety — Post-test

This post-test is intended to gauge your level of knowledge after participating in the Chemical Safety training. Please answer all the following questions to the best of your ability.

1. All chemicals present possible ____________________________.

2. Preventing chemical injuries results from safe...
   1) _______________________________________
   2) _______________________________________
   3) _______________________________________

3. Name one or more of the major ways that unsafe storage can cause chemical injuries.
   _________________________________________
   _________________________________________
   _________________________________________

4. _________________ provide safety information and appropriate precautions.

5. What is the most basic personal protective equipment that should always be used when handling any kind of chemical? ________________________________

6. List one or more rules of chemical safety.
   _______________________________________
   _______________________________________
   _______________________________________
   _______________________________________
   _______________________________________

7. Name one or more categories of dangerous chemicals.
   _______________________________________
   _______________________________________
   _______________________________________
   _______________________________________
   _______________________________________
   _______________________________________
1. All chemicals present possible hazards.

2. Preventing chemical injuries results from safe...
   1) storage
   2) handling
   3) disposal

3. Name one or more of the major ways that unsafe storage can cause chemical injuries.
   1. Improper or non-existent labeling of chemicals in storage.
   2. Storage of chemicals beyond the recommended shelf life.
   3. Degradation of chemical storage containers.

4. Material Safety Data Sheets (MSDS) provide safety information and appropriate precautions.

5. What is the most basic personal protective equipment that should always be used when handling any kind of chemical? Whatever is specified on the label

6. List one or more rules of chemical safety.
   Rule #1: Don’t buy or store chemicals you do not need.
   Rule #2: Store chemicals in their original containers.
   Rule #3: Always wear appropriate safety gear and work in a safe environment.
   Rule #4: Always dispose of chemicals safely.

7. Name one or more categories of dangerous chemicals.
   1. Acids
   2. Bases
   3. Flammable
   4. Oxidizers
   5. Pyrophoric Substances
   6. Light-Sensitive Chemicals
   7. Carcinogens
Participant’s Evaluation of Chemicals and Safety

Please circle the number that best expresses your opinions for each of the following statements. Circle only one number per question for questions 1 through 4.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The training unit’s format was easy to follow.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. The information presented is useful to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. The time it took to complete the training session was acceptable.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. As a result of this session, I understand better how to work with chemicals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

5. We welcome your comments about this program:

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

Please use the back of this sheet for any further comments.

Thank you for your time!
Learning Objectives

- Understand that all chemicals present possible hazards.
- Understand that safe storage is an important issue.
- Understand that many chemical injuries result from improper storage.
- Know that employees have rights and responsibilities when working with chemicals.
- Know four basic rules of chemical safety.
- Be aware of the categories of dangerous chemicals and appropriate safety precautions.
PowerPoint Slides 4-6

Sample Pesticide Label

Chem-Safe-04

Directions
Personal Protective Equipment
Re-entry Statement
Storage & Disposal
Registry No.

Ingredients
Formulation

Child Warning

“The Label is the Law.”

Chem-Safe-05

Basic Rules of Chemical Safety

Be Aware!
Be Alert!
Be Alive!

Chem-Safe-06

Chemical Labels
Basic Rules of Chemical Safety

Rule #1
Don't buy or store chemicals you do not need.

Rule #2
Store chemicals in their original container.

- The original container was designed to hold the chemical without degrading.
- The original container will have an accurate label.
- Serious injury can result when people try to identify chemicals with missing or uncertain labels by smelling, tasting or touching.
Basic Rules of Chemical Safety

Rule #3
Always wear appropriate safety gear and work in a safe environment.

Basic Rules of Chemical Safety

Rule #4
Always dispose of chemicals safely.

“Safe” Storage and Causes of Injury
“Safe” Storage and Causes of Injury

Poor storage practices can cause injury:
1. Improper and non-existent labeling of chemicals in storage.
2. Storage of chemicals beyond the recommended shelf life.
3. Degradation of chemical storage containers.

Principle modes of chemical injury:
1. Chemical Burns (strong acids, strong bases)
2. Heat Burns (flammable materials)
3. Poisoning (many chemicals are damaging or fatal if taken internally, whether by swallowing, injection, or leaching through skin)
4. Chronic Illness (long-term exposure to even low doses of certain chemical agents can lead to chronic health conditions)

Learn good habits for working with chemicals from the beginning and practice these habits every day.
PowerPoint Slides 16-18

Right-to-Know

Right-to-Know laws mandate that employers:

- Inform employees about toxic chemicals they might be exposed to in their workplace.
- Provide training about safe handling practices and emergency procedures.
- Maintain MSDS for immediate access in the workplace/job site.

Material Safety Data Sheets (MSDS)

Section 1 - Product and Company Identification
Section 2 - Composition/Information on Ingredients
Section 3 - Hazards Identification Including Emergency Overview
Section 4 - First Aid Measures
Section 5 - Fire Fighting Measures
Section 6 - Accidental Release Measures
Section 7 - Handling and Storage
Section 8 - Exposure Controls & Personal Protection
Section 9 - Physical & Chemical Properties
Section 10 - Stability & Reactivity Data
Section 11 - Toxicological Information
Section 12 - Ecological Information
Section 13 - Disposal Considerations
Section 14 - MSDS Transport Information
Section 15 - Regulatory Information
Section 16 - Other Information

Chemical Categories

- Irritant
- Oxidizer
- Corrosive
Chemical Categories

1. Acids
2. Bases
3. Flammable
4. Oxidizers
5. Pyrophoric Substances
6. Light-Sensitive Chemicals
7. Carcinogens

Some pointers for safe storage of strong acids:
- Store large bottles of acids on low shelf or in acid cabinets.
- Segregate oxidizing acids from organic acids, flammables and combustible materials.
- Segregate acids from bases and active metals such as sodium, potassium, etc.
- Use bottle carrier for transporting acid bottles.
- Have spill control pillows or acid neutralizers available in case of spill.
Chemical Categories: Acids

Examples of strong acids:

<table>
<thead>
<tr>
<th>Strong Oxidizing Acids</th>
<th>Organic Acids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromic Acids</td>
<td>Acetic Acid</td>
</tr>
<tr>
<td>Nitric Acid</td>
<td>Phenol</td>
</tr>
<tr>
<td>Hydrobromic Acid</td>
<td>Benzoic Acid</td>
</tr>
<tr>
<td>Perchloric Acid</td>
<td>Trichloroacetic</td>
</tr>
<tr>
<td>Iodic Acid</td>
<td></td>
</tr>
<tr>
<td>Sulfuric Acid</td>
<td></td>
</tr>
</tbody>
</table>

Chemical Categories: Bases

Some pointers for safe storage of strong bases:

- Store bases and acids separate from one another.
- Store solutions of inorganic hydroxides in polyethylene containers.
- Have spill control pillows or caustic neutralizers available for spills.
Chemical Categories: Bases

Examples of strong bases:
- Ammonium Hydroxide
- Calcium Hydroxide
- Bicarbonates
- Potassium Hydroxide
- Carbonates
- Sodium Hydroxide

Chemical Categories: Flammable

Some pointers for storage of flammable materials:
- Store in approved safety cans or cabinets
- Segregate from oxidizing acids and oxidizers.
- Keep away from any source of ignition: flames, heat or sparks.
- Know where fire fighting equipment is stored and how to use.
- If volatile flammable liquids are stored in a refrigerator it must be in an explosion-proof (lab-safe) refrigerator.
Chemical Categories: Flammable

**Examples of flammable chemicals:**

<table>
<thead>
<tr>
<th>Flammable Solids</th>
<th>Flammable Gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzoyl peroxide</td>
<td>Acetylene</td>
</tr>
<tr>
<td>Phosphorus (yellow)</td>
<td>Ethylene Oxide</td>
</tr>
<tr>
<td>Calcium Carbide</td>
<td>Butane</td>
</tr>
<tr>
<td>Picric Acids</td>
<td>Hydrogen</td>
</tr>
<tr>
<td></td>
<td>Ethane</td>
</tr>
<tr>
<td></td>
<td>Propane</td>
</tr>
<tr>
<td></td>
<td>Ethylene</td>
</tr>
</tbody>
</table>

- **Store in a cool, dry place.**
- **Keep away from flammable and combustible materials, such as paper or wood.**
- **Keep away from reducing agents such as zinc, alkaline metals, formic acid.**

Chemical Categories: Oxidizers

**Some examples of oxidizers:**

- **Store in a cool, dry place.**
- **Keep away from flammable and combustible materials, such as paper or wood.**
- **Keep away from reducing agents such as zinc, alkaline metals, formic acid.**
Chemical Categories: Oxidizers

**Examples of oxidizers:**
- Ammonium Dichromate
- Nitrates
- Ammonium Perchlorate
- Periodic Acid
- Ammonium Persulfate
- Permanganic Acid
- Benzoyl Peroxide

Chemical Categories: Pyrophoric Substances

**Safety pointers for pyrophoric substances:**
- Store in a cool place.
- Store in containers that omit air.
- Beware of low humidity circumstances in which static electricity may be high.
Chemical Categories: Pyrophoric Substances

Some examples of pyrophoric substances:
- Boron
- Cadmium
- Calcium
- Phosphorus (yellow)
- Diborane
- Dichloroborane
- 2-Furaldehyde

Chemical Categories

Light-Sensitive Chemicals

Composition can change if exposed to light

Chemical Categories: Light-Sensitive Chemicals

Safety pointers for light-sensitive chemicals:
- Avoid exposure to light.
- Store in amber bottles in a cool, dry place.
Some examples of light-sensitive chemicals:

- Bromine
- Oleic Acid
- Ethyl Ether
- Potassium Ferricyanide
- Silver Salts
- Hydrobromic Acid
- Sodium Iodide

Safe storage pointers for carcinogens:

- Label all containers as Cancer Suspect Agents.
- Store according to hazardous nature of chemicals, e.g., flammable, corrosive.
- When necessary, store securely.
Some examples of carcinogens:

- Antimony compounds
- Acrylonitrile
- Arsenic compounds
- Benzene
- Chloroform
- Dimethyl sulfate
- Dioxane
- Vinyl chloride

Summary

1. Basic Rules of Chemical Safety
   
   **Rule 1.** Don’t buy or store chemicals you don’t need.
   
   **Rule 2.** Store chemicals in their original containers.
   
   **Rule 3.** Always wear appropriate safety gear and work in a safe environment.
   
   **Rule 4.** Always dispose of chemicals safely.
Storage Issues That Cause Chemical Injury

a. Improper or non-existent labeling of chemicals in storage.
b. Storage of chemicals beyond the recommended shelf life.
c. Degradation of chemical storage containers.

2. Health Effects of Chemicals

a. Chemical Burns (strong acids, strong bases)
b. Heat Burns (flammable materials)
c. Poisoning (many chemicals are damaging or fatal if taken internally, whether by swallowing, injection, or leaching through skin)
d. Chronic illness (long-term exposure to even low doses of certain chemical agents can lead to chronic health conditions)

3. Right-to-Know and MSDS

- Employees have a right to know what chemicals they may encounter in their work, and they have the responsibility to follow all appropriate safety precautions.
- Precautions and safe handling information are provided on the Material Safety Data Sheets (MSDS) that must be on file for every chemical.
PowerPoint Slides 46-48

Chemical Categories

1. Acids
2. Bases
3. Flammable
4. Oxidizers
5. Pyrophoric Substances
6. Light-Sensitive Chemicals
7. Carcinogens

Agrochemicals and Security: Chemicals and Safety

Questions and Discussion

Agrochemicals and Security: Chemicals and Safety

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Carol J. Lehtola, Ph.D.
John Robbins

The Agrochemicals and Security Training Module was produced in part with support from the United States Department of Agriculture (Award 2002-41210-01440) and the Extension Disaster Education Network (EDEN).
Unit 3: Homeland Security and Fertilizers

Subject
Fertilizers are critical to modern agriculture, but they are chemicals that have other uses. One of these uses is as explosives. Appropriate security measures on the farm and among fertilizer distributors can reduce the possibility of misuse.

Goal
Make participants aware of the potential misuses of fertilizers and explain security and awareness measures that can prevent fertilizers from falling into the wrong hands.

Objectives
As a result of this session, participants will:
- Be aware that agricultural fertilizers can be used to make explosive mixtures.
- Understand behaviors that may indicate suspicious activity.
- Understand that specific security measures can prevent unlawful access to fertilizers.

Session Outline
Part 1: Welcome and Introduction
Part 2: Unit Learning Objectives
Part 3: Pre-Test
Part 4: Module Introduction
Part 5: Learning Sections
  Section 1: What is a fertilizer?
  Section 2: What are fertilizers made of?
  Section 3: Why do terrorists want fertilizers?
  Section 4: Improving Security
    4A. Security: Storage
    4B. Security: Transportation
    4C. Security: Personnel
    4D. Security: Disposal
    4E. Security: Response
  Section 5: Identifying Suspicious Behavior
  Section 6: Who should you contact if you suspect theft?
  Section 7: Summary
Part 6: Questions and Discussion
Part 7: Post-Test
Part 8: Table-top Exercise and Handout “Recognizing Suspicious Behavior”
Part 9: Session Evaluation
Part 10: Adjourn
To conduct this training, you will need:

1. “Homeland Security and Fertilizers” PowerPoint presentation, and a means to show it. (Download from the UF/IFAS Disaster Handbook Web site: <http://disaster.ifas.ufl.edu>.)
2. Note paper or PowerPoint slide pages to serve as participant workbooks
3. If desired, sufficient copies of the Pre- and Post Test for all participants to take the test both before and after session
4. Unit 3 evaluation forms.

**Part 1 — Welcome and Introduction**

Take a moment at the beginning of the lesson to welcome the participants to the session. Introduce yourself as the presenter, and remind participants of the title and subject (above) of the session.

**Part 2 — Unit Learning Objectives**

Briefly introduce the audience to the learning objectives for this unit:

- Be aware that agricultural fertilizers can be used to make explosive mixtures.
- Understand behaviors that may indicate suspicious activity.
- Understand that specific security measures can prevent unlawful access to fertilizers.

**Part 3 — Pre-Test**

If you choose to administer pre- and post-tests, do so now before you do anything else. Explain to the participants that everyone will take a short quiz before the session just to give themselves a clearer idea of what they already know about the subject and some things they will learn during the session. Tell them that they will take the same test at the end of the session and this will help the presenter by giving an idea of the effectiveness of the session.

The pre- and post-tests should take only a few minutes each.
Part 4 — Module Introduction

If participants have not covered the Module Introduction in a previous session, present that material now as a general introduction to the importance of agricultural security.

Part 5 — Learning Sections

Section 1. What is a fertilizer?

A fertilizer is defined as a material that primarily adds nutrients to the soil. There are two main types of fertilizers: organic and synthetic. Organic fertilizers contain only substances derived from processing natural materials, while synthetic fertilizers contain manufactured chemicals. The chemicals in synthetic fertilizers are used more efficiently by plants and are therefore widely used.

Many people use fertilizers on a small scale on their lawns and in backyard gardens. Such fertilizers are purchased in small quantities and are usually mixtures of many ingredients, including minerals and herbicides. These fertilizers are not of concern in this unit. They are impractical for use in making explosives.

For large-scale agricultural producers, fertilizers are usually large quantities of a single fertilizer chemical, such as ammonium nitrate or urea. Large quantities of these relatively pure chemicals can be used in making explosives, and these are the kinds of fertilizers that will be discussed in this unit.

Section 2. What are fertilizers made of?

Fertilizers can supply a number of nutrients, especially nitrogen, phosphorus and potassium. The potential of a fertilizer for making explosives depends on the amount of nitrogen and the kind of nitrogen the fertilizer contains. Therefore, people wishing to make fertilizer-based explosives seek out high-nitrogen fertilizers.

There are three principal high-nitrogen chemicals used in the production of fertilizers: ammonium nitrate, potassium nitrate and urea.
Ammonium nitrate is a colorless salt of ammonia and nitric acid, which is crystalline in form. Commercial grade ammonium nitrate contains about 34% nitrogen, all of which is utilizable by plants, therefore, it is the most common nitrogenous component of fertilizers. Heating ammonium nitrate may cause violent combustion or explosion. The nitrate molecule, pictured on the right above, is a strong “oxidizer,” which means that under the right circumstances, it reacts readily with combustible materials like fuel, or so-called “reducing” materials like metals.

Potassium nitrate is a colorless transparent crystal or white powder. When heated, it decomposes and releases oxygen. Like ammonium nitrate, it is also a strong oxidizer. Potassium nitrate is more stable than ammonium nitrate, nevertheless, it can enhance the burning of organic materials, possibly producing an explosion. Besides fertilizers, an important use of potassium nitrate is in the manufacture of gunpowder.

The third important nitrogen fertilizer is urea, which is also used as an additive in animal feeds. Urea is also a white, crystalline substance. For fertilizer uses, urea is usually sold in the form of granules. It is often comparable in price to ammonium nitrate, and pound for pound provides more nitrogen. Urea can also be used in combination with other materials to make explosive compounds, however, the mixture can be very unstable.
Section 3. Why do terrorists want fertilizers?

Bombs made from fertilizers and fuel oil are attractive to terrorists because there are so many sources of the base materials, and they are easily purchased in the quantity needed. The weight of the bombs used in our previous examples gives an indication of the amount of fertilizer required: the total weight of the 1993 World Trade Center (WTC) bomb was about 1300 pounds; the Oklahoma City bomb was estimated at 5000 pounds, and as much as 4000 pounds of it was ammonium nitrate fertilizer. Clearly, these bombs were capable of significant destruction.

The problem of fertilizer bombs is world-wide. Many groups see fertilizer bombs as a simple means to a devastating result. These bombs have caused thousands of deaths and injuries around the world. Many countries have created controls that prevent nitrate fertilizers from falling into the wrong hands. Although the 2001 attacks on the World Trade Center and Pentagon did not involve fertilizer bombs, those attacks drew new attention to the activities of terrorists, and a number of plots involving fertilizer bombs have been thwarted. Nevertheless, terrorist groups continue to seek out sources of nitrate fertilizers, and internationally, there have been thefts of significant amounts of ammonium nitrate.

Fertilizer bombs are also appealing tools for terrorists because the logistics of making a fertilizer bomb are simple. The materials are relatively cheap and accessible; they can be prepared in a short amount of time; and only simple tools are needed to create and detonate them (the “detonator” for the 1993 WTC bomb was a length of fuse and a cigarette lighter). In these factors, a fertilizer bomb far outweighs the production of sophisticated electronic bombs, where more complexity means more opportunities for failure.

Section 4. Improving Security

[Note: This security section appears in the Pesticides and Anhydrous Ammonia units, as well as this one. If more than one unit is being presented to the same audience on the same program, the presenter may wish to use the security section in only one unit.]

Most people would think of fertilizers as harmless bulk chemicals, but now that you understand how fertilizers can be misused, you can understand the need for an attitude of security in dealing with them. Virtually everyone who uses fertilizers – especially bulk suppliers and bulk users – needs to increase security so that these materials do not fall into the wrong hands.
Good security begins with an effective security plan. A good security plan has several parts. The parts you use depend on the size and activities of your operation. An effective plan does not need to be complicated, but it should take into account each of the following areas.

- Storage
- Transportation
- Personnel
- Disposal
- Response

For each of these areas, we provide tips to improve security. Consider these tips. Decide which ones apply to your operation and make some notes about actions you can take.

**4A. Security: Storage**

Key question: How easy would it be for fertilizer to “disappear” from your facility?

Suggested tips:

- Maintain inventories so that you always know the exact quantities of fertilizer you have.
- Use logbooks to keep track of who removes fertilizers from your facility.
- Store fertilizers in a building which can be locked or in a fenced enclosure with a locked gate.
- If appropriate, provide a second security perimeter, such as a fence with a locked gate surrounding your storage facility.
- Perform a walk-through and walk-around daily to check for attempted entry, vandalism, and structural integrity.
- Provide good lighting on all sides of your storage facility.
- For some facilities, install security systems, such as alarms and camera systems, and make sure they are properly maintained.

**4B. Security: Transportation**

Is transportation the weak link in your security? Once materials leave your
facility, you may feel that your job is done, but it is important that fertilizers you sell make it all the way to the end user. The following tips will help you in developing a simple, effective security approach to transporting fertilizers.

Suggested tips:

- Create a paper-trail for any fertilizer you ship.
- Ship fertilizer in a locked vehicle.
- Go directly to the delivery point when possible, taking the best route available to avoid high population areas, tunnels and bridges.
- Exercise extreme caution if it becomes essential to stop. Avoid unguarded and unlighted areas where theft is a substantial risk and be on your way as soon as possible.
- Be alert to vehicles following your truck, strangers asking questions, or anyone snooping around your cargo.
- Do not pick up hitchhikers; do not talk about your cargo on CB radio; and do not discuss your cargo with those not involved.
- Always telephone your customer if you find you will be late for a delivery.
- Check your load at delivery to ensure no product is missing. Do not leave product at field site unless it is well attended or secured within buildings.
- Always obtain a signed delivery ticket.
- Carefully check background of all new drivers. Every driver should be properly licensed and trained in good practices for handling fertilizer and pesticide chemicals that may be hazardous in the hands of suspicious and/or dangerous people. Include criminal history background checks.

4C. Security: Personnel

Do you know your employees? Do you know who has access?

Suggested tips:

- Develop effective hiring and labor relations policies.
- Consider background checks for current/new employees, particularly if the person handles hazardous materials.
- Consider fingerprinting and photographing employees who handle hazardous materials.
• Be aware of personal identity theft, such as stolen Social Security Numbers, references, etc.
• Request employees to watch for suspicious activities and ask persons they don’t recognize to identify themselves and state their reasons for being at the facility.
• Adopt a company security whistleblower protection policy.
• Know who has keys and access to hazardous material storage areas.
• Retrieve keys and employment identification cards from an employee and change computer access passwords when their employment ends.
• Assess a worker’s violence potential and take appropriate security precautions when terminating or disciplining an employee.

4D. Security: Disposal

Do you have a plan for safe and secure disposal?

Suggested tips:

• Maintain security over material which is being disposed of until it is claimed by appropriate authorities.
• Arrange for prompt and safe disposal of materials.
• Look for programs, such as Clean Sweep (Florida Department of Community Affairs) or periodic community hazardous waste programs.

4E. Security: Response

Do you have a formal response plan? Do your employees know it?

Suggested tips:

• Develop an emergency plan for your facility. Train your workers in the plan and rehearse it with them.
• Post emergency response numbers, including fire, law enforcement, medical contacts, and poison control in several locations in your facility. Make all employees aware of these response numbers. Include your facility address and locations for easy reference during an emergency phone call. Post information in all languages needed by your workforce.
• Report to appropriate authorities any suspicious activities, vehicles, persons, threats to personnel or facilities, sabotage/vandalism to facilities or equipment, and thefts, inventory shortages, or missing products that could pose a risk to public health or safety.

Section 5. Identifying Suspicious Behavior

People who are buying chemicals for illegal purposes usually look just like everyone else. However, for many criminals, it takes some practice to disguise their motives. Try to use objective criteria in evaluating customers. The following pointers may be useful.

Watch for unusual or suspicious behavior by a purchaser who:

• Seems unfamiliar with details of using fertilizers.
• Acts nervous, seems uneasy or vague, and avoids eye contact.
• Demands immediate possession of purchased material instead of future delivery.
• Asks for material in smaller individual containers rather than in bulk.
• Insists on paying in cash instead of using a check or a credit card.

Section 6. Who should you contact if you suspect theft?

• Notify your manager.
• Report any thefts of fertilizer and/or equipment and any suspicious behavior to your local law enforcement agency.
• In Florida, contact the FDACS Agricultural Law Enforcement Office at 1-800-342-5869. [In other states, the presenter needs to determine the appropriate agency and phone number.]

Section 7. Summary

1. There are three major solid forms of nitrogen fertilizer: ammonium nitrate, potassium nitrate and urea.

2. These three fertilizer products can be used to create simple and powerful explosives.
3. Examine storage and handling procedures and develop a security plan for these five areas:

- Storage
- Transportation
- Personnel
- Disposal
- Response

4. Watch for unusual or suspicious behavior by purchasers.

5. Contact your manager or local law enforcement to report suspicious persons.

Part 7 — Post-Test

If you choose to administer the post-test, do so now. You have already prepared the audience for this when you administered the pre-test. Just remind them that it will take only a couple of moments.

Part 8 — Table-top Exercise

At the end of this lesson plan, there is a scenario which participants can use to further explore the issues and to examine the issues in a different way. The table-top exercise is useful but optional; the presenter may judge that the table-top is not appropriate for the audience or that there is not enough time for it. See the table-top exercise for instructions.

The table-top exercise is helpful for further development and understanding of the issues in this session. However, the presenter may wish to substitute Unit 6 — Developing a Hazard Mitigation Plan in which participants learn about hazard mitigation and are guided in developing a mitigation plan for their operation.
Part 9 — Session Evaluation

An evaluation form is supplied in this booklet. Ask participants to take a few minutes to fill out this form and turn it in. If you allow participants to fill these forms out at home and return them to you at a later time – even later in the workshop – the chances of getting any evaluations are greatly reduced.

Part 10 — Adjourn

Thank the participants for their attention and encourage them to adopt a security program for their fertilizers.

Additional Resources

The Fertilizer Institute (TFI) is an industry organization whose goal is “to bring the viewpoints and interest of our members to bear on public policy issues.” TFI offers information materials related to security issues on the Web at <www.tfi.org>. These materials may be helpful for small to medium operations.

- Security Code of Management Practices – The security code “will assist the industry in keeping fertilizers safe from terrorist activity... [It] recommends use of a risk-based approach to identify, assess and address security vulnerabilities.”

- Guidelines to Help Ensure a Secure Agribusiness – A product of the Agricultural Retailers Association (ARA), CropLife America, and TFI.

- “America’s Security Begins with You” is an awareness campaign produced by TFI which is endorsed by the Department of Homeland Security and the Bureau of Alcohol, Tobacco and Firearms (ATF). The campaign “urges everyone who handles ammonium nitrate to implement security plans, maintain records of all sales of ammonium nitrate and alert law enforcement officials of suspicious activity by utilizing ATF’s toll-free hotline: (800) 800-3855.” The campaign brochure is available at the TFI Web site. Materials can also be located at the ATF Web site <www.atf.treas.gov>under the title “Be Secure for America.”

The National Institute of Justice (a division of the U.S. Department of Justice) has developed a
very thorough and formal program titled “Method to Assess the Vulnerability of U.S. Chemical Facilities.” The twelve-step assessment tool was developed by the National Institute of Justice in partnership with the Department of Energy’s Sandia National Laboratories. Locate this publication at the National Criminal Justice Service Web site <www.ncjrs.org>. Follow the “Publications (alpha list)” link and find “Method to Assess the Vulnerability of U.S. Chemical Facilities.” These materials are likely to be helpful to larger operations.
**Homeland Security and Fertilizers — Pre-test**

This pre-test is intended to gauge your level of knowledge before participating in the *Homeland Security and Fertilizers* training. Please answer all the following questions to the best of your ability.

1. The two main types of fertilizer are ___________ and ___________.

2. Two potentially dangerous chemicals found in Synthetic Fertilizers are ___________ and ___________.

3. What are three factors that make a person seem suspicious?

   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

4. Name three ways you can maximize security as it pertains to fertilizers.

   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

5. Who do you report fertilizer theft to?

   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
**Homeland Security and Fertilizers — Post-test**

This post-test is intended to gauge your level of knowledge after participating in the *Homeland Security and Fertilizers* training. Please answer all the following questions to the best of your ability.

1. The two main types of fertilizer are _______________ and _______________.

2. Two potentially dangerous chemicals found in Synthetic Fertilizers are _______________ and _______________.

3. What are three factors that make a person seem suspicious?
   
   __________________________________________________________________
   __________________________________________________________________
   __________________________________________________________________

4. Name three ways you can maximize security as it pertains to fertilizers.
   
   __________________________________________________________________
   __________________________________________________________________
   __________________________________________________________________

5. Who do you report fertilizer theft to?
   
   __________________________________________________________________
   __________________________________________________________________
   __________________________________________________________________
   __________________________________________________________________
   __________________________________________________________________
   __________________________________________________________________
1. The two main types of fertilizer are organic and synthetic.

2. Two potentially dangerous chemicals found in Synthetic Fertilizers are Ammonium Nitrate and Potassium Nitrate.

3. What are three factors that make a person seem suspicious?
   - People who try to buy large amounts of a fertilizer and are not affiliated with a business
   - People who demand immediate possession of purchased material instead of future delivery
   - Body language
   - Nervousness
   - Lack of eye contact
   - Lack of knowledge about what they are buying
   - Frequency of visits — the person has never been there before but they are making a large purchase
   - Asks for material in smaller, individual containers rather than in bulk
   - Insists on paying with cash instead of using credit or check

4. Name three ways you can maximize security as it pertains to fertilizers.
   - Provide secure storage for fertilizers.
   - Keep all ammonium nitrate fertilizers securely stored.
   - Store away from pesticides.
   - Secure rail, truck, and barge containers with cable seal locks when stored at your location.
   - Maintain a current inventory of ammonium nitrate fertilizer and be able to account for its sale, distribution, and use.

5. Who do you report fertilizer theft to?
   - Report any thefts of fertilizer and/or equipment along with suspicious activity to your local law enforcement agency.
   - In Florida, contact the FDACS Agricultural Law Enforcement Office at 1-800-342-5869. (Varies by state.)
Participant’s Evaluation of Homeland Security and Fertilizers

Please circle the number that best expresses your opinions for each of the following statements. Circle only one number per question for questions 1 through 4.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

1. The training unit’s format was easy to follow.  
2. The information presented is useful to me.  
3. The time it took to complete the training session was acceptable.  
4. As a result of this session, I understand better how to work with fertilizers.  

5. We welcome your comments about this program:

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

Please use the back of this sheet for any further comments.

Thank you for your time!
It had been raining all week. Normally, Thursday morning would be slow at Lundgren’s Agricultural Supply, but with the rain, this particular Thursday was dead. The owner, Kristen, had some errands to run, and she thought maybe this would be a good time. She could leave Luke in charge for a couple of hours.

Luke had one more year of high school, and Kristen had taken him on for the summer to help out around the warehouse. Luke had only been working there for a few weeks, but he could ring a sale, and Kristen felt that probably there wouldn’t be any business at all this morning.

“Luke,” she said, “I’m going into town for a couple of hours. Go by the bank, run a couple errands... I can bring back some lunch. What would you like?” Kristen and Luke talked over lunch ideas.

Kristen asked, “Luke, do you feel comfortable being here on your own for a little while? It’s pretty slow, but if someone comes in, I think you could take care of them.”

Luke agreed. In fact, he was a little proud to be on his own. Yeah, he’d be running the place. He’d be manager for a couple of hours. He also thought chances were good that no one would come in.

“See ya, Luke. Should be back around 12, 12:30,” Kristen shouted back as she left the store. It was around 10:30.

With Kristen gone, Luke felt the emptiness of the place. He turned on the radio and changed it to a favorite station. He got out the broom and started to sweep.

Kristen had been gone about 15 minutes and Luke was singing along with the radio and dancing/sweeping, when a couple of men came through the door. “Morning,” one of them said. He had to speak loudly to be heard over the radio and get Luke’s attention.
Luke looked up and immediately put down the broom. “Good morning. Can I help you?” he asked.

Luke walked over to the men, dusted his hands off on his coveralls, and reached out to shake their hands. The men seemed puzzled by the friendliness of Luke’s gesture, but they shook hands with him.

The taller man answered Luke’s question. “Yeah, we’re - uh - looking to buy some fertilizer.”

Luke moved around behind the counter and turned down the radio. He pulled out a sales form and said, “Well, you’ve come to the right place.” Luke held a pen in writing position, looked up at the men and asked, “All right, now exactly what can I get for you?”

Again, the taller man spoke, “We’re looking for about a 1000 pounds of ammonium nitrate, the high nitrate kind.”

Luke was happy to tell them, “We’ve got plenty. Comes in 100-pound sacks. Fifteen dollars a sack. Copeland’s the brand. That all right?”

“Oh sure, that sounds good. Got it right here? We got a truck outside, we were hoping to take it with us,” the tall man said.

“Sure, we got it. I can bring it up to the front and load it for you or we got free delivery with any order over $100,” Luke said.

The shorter man looked serious and glanced up at the taller man. The tall man spoke, “No, we’ll take it with us. It’ll save us some time, since we’re already here.”


Luke wrote up the sale and told the men. “All right, then, that will be $159. Oh sorry, maybe you have a tax number? I added the sales tax in without even asking.”

The taller man looked closely at Luke for a second, and said, “No. I don’t have a tax number. I mean, I don’t have my card.” He pulled a thick roll of bills out of his jacket and peeled off 8 $20 bills. He handed them to Luke.

Luke counted them, “20-40-60-80-100-120-140-160. All right. Uh, if you find that tax card, just bring it by and Ms Lundgren will probably give you a
refund.” Luke rang up the sale on the register and tucked the 20s in the
drawer and pulled out a one-dollar bill. He handed it to the tall man.

“There you go. Your change is $1 even,” Luke said. He marked the sales
form “Paid” and held out the copy. The taller man took it. Luke added, “If
you gentlemen want to wait out front, I’ll bring your fertilizer around. Are you
under the overhang?”

The men nodded yes and went out the front door. Luke went out the side. He
drove the small pickup they used in the yard over to the shed with the
fertilizer bags and loaded ten on the truck. He could see the men and their
truck. Luke had never seen the men before. He drove over to them with the
bags.

The men were driving a white van that looked brand new. They opened the
back door. Luke stepped over to unload the bags, but they insisted on
loading it themselves. Luke couldn’t see in the back of the van clearly, but
there seemed to be another person inside.

“Shame to load these dirty old bags of fertilizer in this nice van,” Luke
offered.

The men did not reply. They loaded the bags as quickly as possible.

“You guys just startin’ up?” Luke asked.

The tall man glanced over at Luke for a second and said, “No. We’ve been
buying from Kristen for years.”

The bags were loaded.

Luke asked, “So what do you guys grow?” Luke could see that they were in a
hurry now.

The taller man said, “Ferns.” The other man was already in the van starting
the engine. The tall man hopped in and they drove away.

Luke watched them leave and then went back into the store. He turned up
the radio again and looked at the clock. 11:30. He complained to the empty
store, “An hour til lunch! Dang!”

It was quarter of one when Kristen finally got back. She would have been
back early but there was a collision on the main highway that had slowed
everything down.

Kristen handed Luke a sub sandwich and an extra large iced tea. Luke was hungry. He unwrapped his sandwich with one motion and took a bite.

Everything was just as Kristen had left it, but she asked, “Anything happen while I was gone?”

“Nah, not much. Did some sweeping. Some guys bought some fertilizer.” Luke spoke casually through his munching, portraying that whatever had happened, it was just part of his normal day.

“Made your first solo sale, huh? Pretty good. Maybe I ought to leave you alone more often. Sales might pick up.”

After lunch, Kristen looked over the sales form. “This your fertilizer sale this morning?”


“No address? No name?” Kristen said.

“They paid cash and they took it with them,” Luke said.

“Guess that’s okay then. Thousand pounds, huh?” Kristen was reassured, and a sale is a sale.

Luke added, “I didn’t ask their names but they said they been buying here for a long time.”

“Oh yeah? What did they look like?” Kristen asked.


“Did they say anything about their operation? Like what they grow?” Kristen knew that the crop would narrow it down quickly.


think we better call the sheriff.”

“Oh man. Ms Lundgren, did I do something wrong? I mean, maybe I shouldn’t have sold them the fertilizer,” Luke said.

“I don’t know. It’s probably nothing.” Kristen reassured Luke, but she felt very suspicious. Luke’s description of the men, their clothes, the new white van. It was obvious they were not producing ferns, not with straight ammonium nitrate. Kristen just wasn’t sure. Could be legitimate, except that she did not have any customers that grew ornamentals. The fact that they told Luke they had been customers for years just didn’t square. And who picks up that much fertilizer in a van?

Kristen called the sheriff and reported a suspicious purchase of ammonium nitrate fertilizer. Within a half hour, two deputies were at the ag supply operation to ask Kristen and Luke more questions.

Questions/Discussion

1. What factors if any should have made Luke suspicious?
2. What could Luke have done if he had become suspicious of the two men?
3. What should Kristin do since the sale has already been made?
4. How sensitive is your company to the negative publicity that may result from this incident?
5. How aware are your employees of the potential security risks with the products your business handles?
6. Has your company done any training or drills to handle a security risk type of situation?
7. How would Kristen have handled the sale, if she had been there, as an adult and as the owner of the business?
8. Why is it important to know the company’s clientele?
9. What are the possible outcomes of this situation?
10. What additional items need to be considered – for security and liability purposes?

Points for Discussion

1. What factors if any should have made Luke suspicious?

From the scenario, we don’t know what training Luke has had for this situation. Based on the advice in this lesson,
• Luke should have been suspicious when the buyers displayed poor product knowledge. Luke was so eager to help the men that he filled in all the blanks for them. He missed an opportunity to find out if they knew much about what they were looking for.
• The buyers are eager to take the materials with them and they want to pay cash.
• When the men were loading the fertilizer into the van, they said they had been customers of Kristin’s for many years, but they had been very aloof throughout their transaction, not at all like long-time customers.

2. What could Luke have done if he had become suspicious of the two men?

• Luke could have taken more opportunities to get information from the men, such as asking them more questions, attempting to take a name and address on the sale form, or even getting a signature.
• If Luke had been very suspicious of these men, he could have found a way to refuse to sell to them, either by indicating that they were out of stock on this particular product, that he could not make any sales and that the owner would be back shortly, or perhaps that he could not make a sale without a name, address and identification.
• Luke could contact authorities on his own, though under the circumstances, he probably would have discussed doing so with the owner first.

3. What should Kristin do since the sale has already been made?

The fact that the buyers had claimed to be long-time customers, but Kristin did not recognize their description or operation should have made Kristin immediately suspicious. The fact that they identified themselves to Luke as long-time customers indicates that they probably thought Luke would not know if they were or not. In turn, that suggests that they had been watching Lundgren’s and waited for Kristin to leave before attempting to make a purchase from someone they knew to be a new employee.

• Kristin’s only real option is to contact authorities and report the incident, but the experience should show her that she and Luke need some training or information about how best to handle situations like this in the future.

4. How sensitive is your company to the negative publicity that may result from this incident?
Fear of negative publicity – or any publicity at all – can cause business people to be less than forthcoming with the police or the press. It is important not to let such fears compromise reporting the truth to the police and a confrontation with the local press that arises from fear or resentment is likely to cause more interest rather than reduce it. It is unlikely that any seriously negative publicity would result from this sale unless the business already had a negative reputation in the community.

5. How aware are your employees of the potential security risks with the products your business handles?

It is important that employees be aware that there is a small but definite possibility that someone might try to purchase products for the wrong reasons. It is equally important that employees receive good information about detecting suspicious behavior. Arousing people’s suspicions based on their preconceived notions and prejudices may cause more problems than it solves.

6. Has your company done any training or drills to handle a security risk type of situation?

Some employers may feel that training sessions or drills are excessive, and distributing printed materials may be most appropriate in most situations. Nevertheless, bringing in law enforcement for a discussion of security issues may be more helpful for most employees and make the point about security more effectively than printed materials alone.

Also, the real issue here is: What are the security, safety and preparedness attitudes of management and workers in a business or other operation? It is important that management have a plan for each of these areas and that workers adopt appropriate practices.

7. Assume that this sale leads to a bombing. Discuss how such an event might affect Luke? Kristen? How would you feel about Lundgren’s, if you were their customer?

8. What additional items need to be considered for security and liability purposes?
Recognizing Suspicious Behavior

Look for these signs that something may be amiss:

• Stranger — The individual is unfamiliar to the area or to you.

• Doesn’t know much about farming/fertilizer — The individual doesn’t answer questions about acreage, crops, soil composition, etc. in a specific, knowledgeable way.

• Insistent about ammonium nitrate — The individual will not consider other products you recommend. Is only interested in ammonium nitrate.

• Doesn’t want product delivered — The customer insists on taking product now, and possibly asks for it in bags, not bulk.

• Hesitates/hedges when asked for information — The individual is reluctant or refuses to give name, address, signature, photo ID, etc.

• Acts nervous — The individual avoids eye contact, and may seem jittery, uneasy, vague.

• Pays in cash — The individual won’t write a check or use credit, and possibly, has no credit account with your or other ag businesses in the area.

If someone seems out of place, jot down some notes on a piece of paper:

• Note their physical appearance.

• Note the make, model, and color of their vehicle.

• Note the license plate number.

• Save any paper on which they may have written a name or address; minimize handling to help preserve it for fingerprints.

(from South Dakota Cooperative Extension Service)
Learning Objectives

As a result of this session, participants will:

► Be aware that agricultural fertilizers can be used to make explosive mixtures.
► Understand behaviors that may indicate suspicious activity.
► Understand that specific security measures can prevent unlawful access to fertilizers.

What is a fertilizer?

► A fertilizer is defined as a material that primarily adds nutrients to the soil.
► There are two main types of fertilizers: Organic and Synthetic. Organic fertilizers contain only organic materials while synthetic fertilizers contain chemicals, which are more efficiently used by plants.
► Most large-scale crop producers use synthetic fertilizers to increase their economic gain by more efficiently supplying their crops with the nutrients they need.
What are fertilizers made of?

There are three main chemicals used in the production of synthetic fertilizers:

- Ammonium Nitrate
- Potassium Nitrate
- Urea

Ammonium Nitrate – NH₄NO₃

- Colorless, crystalline salt of ammonia and nitric acid
- Strong oxidant that reacts with combustible and reducing material
- Contains 34% nitrogen, all of which is usable by plants
- The most common nitrogenous component of fertilizers

Potassium Nitrate – KNO₃

- Colorless, crystalline salt
- Strong oxidizer that promotes explosive reaction with organic materials
- Decomposes when heated, releasing nitrogen
- Main uses are gunpowder, explosives, fireworks, matches, and fertilizers
Urea – CO(NH₂)₂

- Colorless, crystalline compound
- Strong oxidizer promotes explosive reaction with organic materials
- Decomposes to produce carbon dioxide and ammonia
- Many uses, including fertilizers, plastics, drugs and cosmetics

Synthetic fertilizers can be the basis of powerful explosives.
Compared to electronic bombs, fertilizer bombs are:
- Cheaper to produce
- Materials are more accessible
- Easier to produce
- Simpler and more reliable

Terrorists seek and use fertilizer bombs world-wide...

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<tr>
<th>Year</th>
<th>Location</th>
<th>Event</th>
</tr>
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<td>1993 Feb 26</td>
<td>World Trade Center, New York, New York</td>
<td></td>
</tr>
<tr>
<td>1993 Apr 24</td>
<td>NatWest Bank, London, England</td>
<td></td>
</tr>
<tr>
<td>1995 Apr 19</td>
<td>Murrah Federal Office Building, Oklahoma City</td>
<td></td>
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<tr>
<td>1996 Jun 25</td>
<td>Khobar Towers, Dhahran, Saudi Arabia</td>
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<tr>
<td>1998 Aug 7</td>
<td>US Embassy, Nairobi, Kenya</td>
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<tr>
<td>1998 Aug 7</td>
<td>US Embassy, Dar es Salaam, Tanzania</td>
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<tr>
<td>2000 Oct 12</td>
<td>Café District, Bali, Indonesia</td>
<td></td>
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<tr>
<td>2001 Dec</td>
<td>Singapore. 4000 lbs NH₄NO₃ seized.</td>
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<tr>
<td>2003 Nov</td>
<td>Istanbul Turkey. Four bombings.</td>
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<td>2004 Apr 2</td>
<td>Thailand. 3300 lbs NH₄NO₃ stolen by insurgents.</td>
<td></td>
</tr>
<tr>
<td>2004 May 5</td>
<td>Honfleur, France. 1100 lbs NH₄NO₃ stolen.</td>
<td></td>
</tr>
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</table>
Improving Security

- Storage
- Transportation
- Personnel
- Disposal
- Response

Security: Storage

How easy would it be for fertilizer to “disappear” from your facility?

- Maintain inventories so that you always know the exact quantities of fertilizer you have.
- Use logbooks to keep track of who removes fertilizers from your facility.
- Store fertilizers in a building which can be locked or in a fenced enclosure with a locked gate.
- If appropriate, provide a second security perimeter, such as a fence with a locked gate surrounding your storage facility.
Security: Storage

- Perform a walk-through and walk-around daily to check for attempted entry, vandalism, and structural integrity.
- Provide good lighting on all sides of your storage facility.
- For some facilities, install security systems, such as alarms and camera systems, and make sure they are properly maintained.

Security: Transportation

Is transportation the weak link in your security?

- Create a paper-trail for any fertilizer you ship.
- Ship fertilizer in a locked vehicle.
- Go directly to delivery point when possible, taking the best route available to avoid high population areas, tunnels, and bridges.
- Exercise extreme caution if it becomes essential to stop. Avoid unguarded and unlighted areas where theft is a substantial risk and be on your way as soon as possible.
- Be alert to vehicles following your truck, strangers asking questions, or anyone snooping around your cargo.
PowerPoint Slides 16-18

Security: Transportation

- Do not pick up hitchhikers, do not talk about your cargo on CB radio, and do not discuss your cargo with those not involved.
- Always telephone your customer if you find you will be late for a delivery.
- Check your load at delivery to ensure no product is missing. Do not leave product at field site unless it is well attended or secured within buildings. Always obtain a signed delivery ticket.
- Carefully check background of all new drivers. Every driver should be properly licensed and trained in good practices for handling fertilizer and pesticide chemicals that may be hazardous in the hands of dangerous people.

Security: Personnel

Do you know your employees?
Do you know who has access?

- Develop effective hiring and labor relations policies.
- Consider background checks for current/new employees, particularly if the person handles hazardous materials.
- Consider fingerprinting and photographing employees who handle hazardous materials.
- Be aware of personal identity theft, such as stolen Social Security Numbers, references, etc.
- Request employees to watch for suspicious activities and ask persons they don't recognize to identify themselves and state their reason for being on the premises.
Security: Personnel

- Adopt a company security whistleblower protection policy.
- Know who has keys and access to hazardous material storage areas.
- Retrieve keys and employment identification cards from an employee and change computer access passwords when their employment ends.
- Assess a worker’s violence potential and take appropriate security precautions when terminating or disciplining an employee.

Security: Disposal

Do you have a plan for safe and secure disposal?

Hazmat worker inspects aging chemical drums abandoned in a field.

- Maintain security over material which is being disposed of until it is claimed by appropriate authorities.
- Arrange for prompt and safe disposal of materials.
Security: Response

Do you have a formal response plan?

Do your employees know it?

Develop an emergency plan for your facility. Train your workers in the plan and rehearse it with them.

Post emergency response numbers, including fire, law enforcement, medical contacts, and poison control in several locations in your facility. Make all employees aware of these response numbers.

Report to appropriate authorities any suspicious activities, vehicles, persons, threats to personnel or facilities, sabotage/vandalism to facilities or equipment, and thefts, inventory shortages, or missing products that could pose a risk to public health or safety.

Identifying Suspicious Behavior

Watch for unusual or suspicious behavior by a purchaser who:

- Seem unfamiliar with details of using fertilizers
- Acts nervous, seems uneasy or vague, and avoid eye contact
- Demands immediate possession of purchased material instead of future delivery
- Asks for material in smaller individual containers rather than in bulk
- Insists on paying in cash instead of using a check or credit card
If someone is acting suspicious...

- Notify your manager.
- Notify local law enforcement.
- In Florida, call FDACS Agricultural Law Enforcement at 1-800-342-5869.

Summary

- There are three major solid forms of nitrogen fertilizer: ammonium nitrate, potassium nitrate and urea.
- These products can be used to create simple and powerful explosives.

Summary

Examine storage and handling procedures and develop a security plan.

- Storage
- Transportation
- Personnel
- Disposal
- Response
Summary

- Watch for unusual or suspicious behavior by purchasers.
- Contact your manager or local law enforcement to report suspicious persons.

Questions and Discussion

The Agrochemicals and Security Training Module was produced in part with support from the United States Department of Agriculture (USDA) and the Extension Disaster Education Network (EDEN).
Unit 4: Homeland Security and Pesticides

Subject

Pesticides have played a major role in the agricultural revolution allowing much greater yields and permitting cultivation of crops in new regions. Nevertheless, pesticides are powerful and potentially dangerous chemicals which could be misused to destroy crops, animals or humans.

Goal

Make participants aware of the potential misuses of pesticides and explain security and awareness measures that can prevent pesticides from falling into the wrong hands.

Objectives

As a result of this session, participants will:

- Be aware that pesticides can be used to intentionally harm humans, animals and crops.
- Understand behaviors that may indicate suspicious activity.
- Understand that specific security measures can prevent unlawful access to pesticides.

Session Outline

Part 1: Welcome and Introduction
Part 2: Unit Learning Objectives
Part 3: Pre-Test
Part 4: Module Introduction
Part 5: Learning Sections
  - Section 1: The Connection between Pesticides and Homeland Security
  - Section 2: What is a pesticide?
  - Section 3: Working with Pesticides: MSDS and Right-to-Know
  - Section 4: Pesticide Hazards
  - Section 5: Use and Misuse of Pesticides
  - Section 6: Improving Security
  - Section 7: Identifying Suspicious Behavior
  - Section 8: Who should you contact if you suspect theft?
  - Section 9: Summary
Part 6: Questions and Discussion
Part 7: Post-Test
Part 8: Table-top Exercise and Handout “Recognizing Suspicious Behavior”
Part 9: Session Evaluation
Part 10: Adjourn
Learning Environment and Aids

To conduct this training, you will need:

1. “Homeland Security and Pesticides” PowerPoint presentation, and a means to show it. (Download from the UF/IFAS Disaster Handbook Web site: <http://disaster.ifas.ufl.edu>.)
2. Note paper or PowerPoint slide pages to serve as participant workbooks
3. If desired, sufficient copies of the Pre- and Post Test for all participants to take the test both before and after the session
4. Unit 4 evaluation forms.

Part 1 — Welcome and Introduction

Take a moment at the beginning of the lesson to welcome the participants to the session. Introduce yourself as the presenter, and remind participants of the title and subject (above) of the session.

Part 2 — Unit Learning Objectives

Briefly introduce the audience to the learning objectives for this unit:

- Be aware that pesticides can be used to intentionally harm humans, animals and crops.
- Understand behaviors that may indicate suspicious activity.
- Understand that specific security measures can prevent unlawful access to pesticides.

Part 3 — Pre-Test

If you choose to administer pre- and post-tests, do so now before you do anything else. Explain to the participants that everyone will take a short quiz before the session just to give themselves a clearer idea of what they already know about the subject and some things they will learn during the session. Tell them that they will take the same test at the end of the session and this will help the presenter by giving an idea of the effectiveness of the session.

The pre- and post-tests should take only a few minutes each.
Part 4 — Module Introduction

If participants have not covered the Module Introduction in a previous session, present that material now as a general introduction to the importance of agricultural security.

Part 5 — Learning Sections

Section 1: The Connection between Pesticides and Homeland Security

Because of their ability to affect human and animal health, pesticides have been closely regulated for many years, beginning in the 1960s. However, new concerns were raised about pesticides and crop dusters after the terrorist attacks of September 11, 2001.

During the investigation into the 9/11 attacks, it was learned that the terrorists had looked into a variety of attacks supported by different kinds of equipment. Among these were attacks which could be accomplished using crop dusters and light aircraft, possibly to spray either poisons or disease agents on large gatherings of people, such as the crowds that would be found at a popular attraction like Disneyworld in central Florida, or to poison water supplies. To this end, at least one 9/11 terrorist sought training in the operation of crop dusters in Southwest Florida.

To date, the use of pesticides as weapons has been quite rare, in spite of the fact that some pesticides are closely related to well-known chemical warfare agents. Pesticides have been used by terrorists in Israel/Palestine. Authorities believe that the chemicals have been included in bombs with the idea that the bomb’s deadliness will be increased. However, a bomb is a very ineffective dispersal tool for chemicals like pesticides, and the blast itself can cause significant degradation to the chemicals.

In this unit, we will look at pesticides — what they are, what they are made of and why a terrorist might be interested in them. What a terrorist might do with a pesticide is clearly an intentional misuse. We will examine both intentional and unintentional misuse because there are many areas of overlap. Then we will look at security and response. There is another unit in this module on hazardous material that goes into greater detail about the issues of readiness and response in the event of an unintentional release of pesticides.
Section 2: What is a pesticide?

Many people use the term pesticide as a synonym for “insecticide,” however, herbicides, fungicides, rodenticides and any other substance used to control a pest is a pesticide. All pesticides are poisons, that is, they are designed to be and applied in quantities necessary to cause death to a specific organism or class of organisms. Generally, pesticides are either natural or synthetic chemicals that interfere in some way with the life processes of the pest.

Poisons derived from plants have been used as pesticides for centuries, documented as far back as ancient Egypt. The ancient Greeks used fumes of burning sulfur to drive pests from their homes, and nearly a thousand years ago, we find the first use of arsenic as a pesticide. Over the years, additional botanicals and inorganics were added to the list.

The modern era in pesticides began in the nineteenth century with the development of organic chemistry and the ability to produce synthetic chemicals, which led to the creation of many forms of plastics, medicines, and dyes. The use of chemical warfare in World War I stimulated many countries to search for deadly compounds. DDT had been discovered in 1889, but it was not used as an insecticide until 1939. It was the first of the organochlorines, a family of chemicals that would include lindane (1943) and chlordane (1945). At around the same time, development of two other important categories of pesticides began: the organophosphates, which include parathion (1940) and malathion (1950); and the synthetic pyrethrins, including permethrin, cypermethrin, and deltamethrin.

Since the 1950s, many new pesticides have been introduced. There have also been many bans placed on pesticides as the long-term effects of these chemicals became apparent. Pesticides remain an important — even critical — tool for agricultural producers. Research has focused on pesticides that require lower application amounts or are less persistent. There is also much work being done on biological controls as alternatives to pesticides and on genetic modifications of crop plants so that they can protect themselves against pests.

Section 3: Working with Pesticides: MSDS and Right-to-Know

The Occupational Safety and Health Administration (OSHA) has created guidelines under which workers have a right to know what chemicals they
might be exposed to in their work environment and what the dangers and appropriate precautions are for working with those materials. Many states have adopted these guidelines in the form of “Right-to-Know” laws. Under these laws, both employers and employees have obligations. Employers are required to inform employees (or make information available) about any chemicals they work with. Employees are required to follow established procedures when handling dangerous chemicals.

Which chemicals are covered by right-to-know laws? The Federal Register contains a long list of chemicals which are covered by this law. Individual states also have right-to-know laws and lists of hazardous chemicals. For these chemicals, employers must maintain records, including information about their dangers and safety precautions.

When listed chemicals are purchased, manufacturers are required to supply information about the chemical, including its name, chemical properties, dangers, modes of injury, safety precautions, and medical response. The forms containing this information are called Material Safety Data Sheets (MSDS), and employers are required to have current MSDS on file for all listed chemicals in their facility. Many MSDS are available on the Internet. Specifications for an MSDS can be found on the OSHA Web site at: <http://www.osha.gov/dsg/hazcom/msds-osha174/msdsform.html>. There are many sources of MSDS. Contact the chemical’s manufacturer or distributor. You may also find the MSDS on the Internet. Use any search engine to locate sources of MSDS on the Internet. A particularly useful site is <http://www.msdssearch.com/>.

Section 4: Pesticide Hazards

The challenge of pesticides is that because they can affect the target organisms, they can often also affect non-target organisms. For this reason, it is very important that pesticides be applied only when needed and only in the quantities necessary to do the job. Otherwise, there is a risk that excess pesticides will get into groundwater, the air or food crops and get a free ride on the natural water cycle (hydrological cycle). Once part of this cycle, pesticides can make their way throughout the environment and into the water supply and/or the food chain.

There is also the risk that comes from chronic exposure. Those most at risk for chronic exposure are workers who actually load and apply pesticides or who work with treated crops or environments.
Pesticides that are sprayed on crops, including insecticides, herbicides, and fungicides, can be carried by several mechanisms into every corner of the environment. Fortunately, like many substances, pesticides eventually break down in the environment, however, some pesticides break down very easily (low persistence) and others take years to break down (high persistence).

A famous case of high persistence is the pesticide DDT. This chemical was discovered in the nineteenth century, but it was first used as a pesticide by Dr. Paul Muller in 1939. Use of DDT spread quickly, mainly because of its effectiveness against mosquitoes and therefore malaria. Millions of people die of malaria every year in the tropical regions of the world. DDT was so effective that Muller was awarded the Nobel Prize for Medicine in 1948.

Many Americans have childhood memories of trucks moving slowly through their neighborhoods spraying DDT for mosquito control. Nevertheless, in the early 1960s, researchers began to develop information about the persistence of DDT in the environment and its appearance in animal populations. The researchers especially noticed how DDT became more concentrated as it moved up the food chain from one prey animal to its predator, to its predator, and so on. The American bald eagle became part of the discussion because the fragility of its eggs and therefore its declining numbers were traced to DDT.

Pesticides are able to kill their target organisms by interfering with a specific bodily function. These chemicals can also interfere with the bodily functions of humans and animals, and therefore, when people or animals are exposed to pesticides, they can be injured. As with any poison, this effect is usually dose-related — that is, a bigger dose will have a bigger effect, or a particular dose will have a greater effect on a smaller individual than on a larger one.

It is important to know what you are working with because of the many health effects of pesticides. Workers and others exposed to pesticides can take them in through breathing them in (inhalation), through food and water (ingestion), or through the skin (absorption). It is easy to see the effects of pesticides when someone gets a large dose and immediately gets sick. This is called acute exposure. It can be more difficult to detect the long-term effects that result from exposure to small amounts of pesticides every day. This is called chronic exposure. Work procedures and personal protective equipment should both be designed (and used!) to protect against both kinds of exposure. Consistency in using correct procedures and protective equipment is very important.
Section 5: Use and Misuse of Pesticides

It’s easy to see why using pesticides properly is so important. We can divide misuse of pesticides into three types:

- Unintentional misuse
- Unintentional release
- Intentional misuse

For each of these types of misuse there is a means of prevention. There are also appropriate preparedness plans, so that if any of these incidents occur, you will be ready to respond promptly to minimize the damage.

A. Unintentional Misuse – Because of the dangers that pesticides pose to those who handle them, the sale, distribution and use of pesticides are governed by regulations. Many pesticides may only be purchased from a licensed seller by a licensed user, and then may only be applied by certified personnel. Nevertheless, correct use of pesticides depends on human decisions, and misapplication does occur.

Prevention – The key to preventing unintentional misuse is effective training, certification, and supervision. Sprayers and other machinery that are used to apply pesticides should be in good working order and correctly calibrated.

Response – Once unintentional misuse is detected, a producer will have to decide on the correct response. Response to unintentional misuse may include reassigning or retraining workers or supervisory staff.

Reporting – Authorities should be notified if the misuse has been on such a scale that it causes problems to adjoining operations, worker health, the environment, or the food product itself.

B. Unintentional Release – When pesticides are spilled or released unintentionally, a special, immediate response is called for.

Prevention – As with unintentional misuse, effective training and supervision are important in preventing unintentional misuse. It is especially important that workers be trained in correct procedures for storage, labeling, transferring and dispensing pesticides.

Response – Your storage facility should have a spill kit nearby. The kit should include absorbent materials for liquid spills, hydrated lime for neutralizing
certain spills (organophosphates and carbamates only), a shovel and broom, and heavy-duty plastic bags and waste cans for disposal. Contact authorities in order to dispose of all clean-up materials and waste properly. Clean-up workers must wear appropriate protective equipment.

Reporting – If the scale of the spill exceeds your capacity to respond rapidly and effectively, contact your local fire department immediately so that a HAZMAT team can be sent to your location.

C. Intentional Misuse – Because pesticides are generally quite poisonous, they can be used potentially to injure or kill people, animals or crops. Pesticide researchers have produced pesticides that are more toxic so that smaller quantities can be used in the field. This makes pesticides more efficient but also more deadly.

Many pesticides are formulated for “mass delivery” in the form of sprays, and that is how one might imagine a terrorist using them. Nevertheless, it is not a trivial matter to acquire pesticides, load them into a crop duster and then spray them effectively. Each step in this process requires some expertise. In fact, though we think of chemical weapons as weapons of mass destruction, it is difficult to deliver these weapons effectively against human populations. Effective or not, misusing chemicals in this way is certainly terrifying, and could possibly cause a great deal of illness.

A simpler scenario is the use of pesticides in acts of agroterrorism – to destroy food crops or animals – or in acts of poisoning. These acts are more likely to be motivated by personal revenge than political causes.

Prevention – Whatever a perpetrator may wish to use pesticides for, the key to preventing intentional misuse is a good security program as outlined in this unit.

Prevention, response and reporting are covered in the remaining sections of this unit.

Section 6: Improving Security

[Note: This security section appears in the Fertilizers and Anhydrous Ammonia units, as well as this one. If more than one unit is being presented to the same audience on the same program, the presenter may wish to use the security section in only one unit.]
Now that you understand how pesticides can be misused, you can understand the need for an attitude of security in dealing with them. Virtually everyone who uses pesticides – especially bulk suppliers and bulk users – needs to increase security so that these materials do not fall into the wrong hands.

Good security begins with an effective security plan. A good security plan has several parts. The parts you use depend on the size and activities of your operation. An effective plan does not need to be complicated, but it should take into account each of the following areas.

- Storage
- Transportation
- Personnel
- Disposal
- Response

For each of these areas, we provide tips to improve security. Consider these tips. Decide which ones apply to your operation and make some notes about actions you can take.

Keep in mind that this is not a complete list of storage recommendations for pesticides, and it does not fully address safe storage of pesticides. Contact local authorities to be sure that your pesticide storage facility complies with all regulations and best practices.

6A. Security: Storage

Key question: How easy would it be for a pesticide to “disappear” from your facility? —

Suggested tips:

- Maintain inventories so that you always know the exact quantities of pesticides you have.
- Use logbooks to keep track of who removes pesticides from your facility.
- Store pesticides in a building which can be locked or in a fenced enclosure with a locked gate.
- If appropriate, provide a second security perimeter, such as a fence with a locked gate surrounding your storage facility.
• Perform a walk-through and walk-around daily to check for attempted entry, vandalism, and structural integrity.
• Provide good lighting on all sides of your storage facility.
• For some facilities, install security systems, such as alarms and camera systems, and make sure they are properly maintained.

6B. Security: Transportation

Is transportation the weak link in your security? — Once materials leave your facility, you may feel that your job is done, but it is important that pesticides you sell make it all the way to the intended end user. The following tips will help you in developing a simple, effective security approach to transporting pesticides.

Suggested tips:

• Create a paper-trail for any pesticides you ship.
• Ship pesticides in a locked vehicle.
• Go directly to the delivery point when possible, taking the best route available to avoid high population areas, tunnels and bridges.
• Exercise extreme caution if it becomes essential to stop. Avoid unguarded and unlighted areas where theft is a substantial risk and be on your way as soon as possible.
• Be alert to vehicles following your truck, strangers asking questions, or anyone snooping around your cargo.
• Do not pick up hitchhikers; do not talk about your cargo on CB radio; and do not discuss your cargo with those not involved.
• Always telephone your customer if you find you will be late for a delivery.
• Check your load at delivery to ensure no product is missing. Do not leave product at field site unless it is well attended or secured within buildings.
• Always obtain a signed delivery ticket.
• Carefully check background of all new drivers. Every driver should be properly licensed and trained in good practices for handling fertilizer and pesticide chemicals that may be hazardous in the hands of dangerous people.
**6C. Security: Personnel**

Do you know your employees? Do you know who has access?

Suggested tips:

- Develop effective hiring and labor relations policies.
- Consider background checks for current/new employees, particularly if the person handles hazardous materials.
- Consider fingerprinting and photographing employees who handle hazardous materials.
- Be aware of personal identity theft, such as stolen Social Security Numbers, references, etc.
- Request employees to watch for suspicious activities and ask persons they don’t recognize to identify themselves and state their reasons for being on the premises.
- Adopt a company security whistleblower protection policy.
- Know who has keys and access to hazardous material storage areas.
- Retrieve keys and employment identification cards from an employee and change computer access passwords when their employment ends.
- Assess a worker’s violence potential and take appropriate security precautions when terminating or disciplining an employee.

**6D. Security: Disposal**

Do you have a plan for safe and secure disposal?

Suggested tips:

- Maintain security over material which is being disposed of until it is claimed by appropriate authorities.
- Arrange for prompt and safe disposal of materials.

**6E. Security: Response**

Do you have a formal response plan? Do your employees know it?

Suggested tips:

- Develop an emergency plan for your facility. Train your workers in the plan and rehearse it with them.
• Post emergency response numbers, including fire, law enforcement, medical contacts, and poison control in several locations in your facility. Make all employees aware of these response numbers.

• Report to appropriate authorities any suspicious activities, vehicles, persons, threats to personnel or facilities, sabotage/vandalism to facilities or equipment, and thefts, inventory shortages, or missing products that could pose a risk to public health or safety.

Section 7: Recognizing Suspicious Behavior

People who are buying chemicals for illegal purposes usually look just like everyone else. However, for many criminals, it takes some practice to disguise their motives. Try to use objective criteria in evaluating customers. The following pointers may be useful.

Watch for unusual or suspicious behavior by a purchaser who:

• Seeks unfamiliar with details of using pesticides
• Acts nervous, seems uneasy or vague, and avoids eye contact
• Demands immediate possession of purchased material instead of future delivery
• Asks for material in smaller individual containers rather than in bulk
• Insists on paying in cash instead of using a check or a credit card.

Section 8: Who should you contact if you suspect theft?

• Notify your manager.
• Report any thefts of pesticides and/or equipment and any suspicious behavior to your local law enforcement agency.
• Contact the FDACS Agricultural Law Enforcement Office at 1-800-342-5869 (Florida residents only).

Section 9: Summary

1. Because pesticides are toxic, they could be misused to intentionally harm people, animals, or crops.

2. A pesticide is any substance used to control a pest – including insects,
rodents, and weeds.

3. Employees have a right to know what chemicals they are working with, the hazards of those chemicals, appropriate personal protective equipment, and appropriate first-aid and medical response.

4. We identified three types of pesticide misuse and methods of prevention, response and reporting for each one:

   • Unintentional misuse
   • Unintentional release
   • Intentional misuse

5. Examine storage and handling procedures and develop a security plan that covers the following areas:

   • Storage
   • Transportation
   • Personnel
   • Disposal
   • Response

6. Suspicious Behavior

   • Watch for unusual or suspicious behavior.
   • Contact your manager or local law enforcement to report suspicious persons.

Part 6 — Questions and Discussion

You may wish to have a discussion period where your audience can talk about what they have just learned. Here are some suggestions to start the discussion.

   • Ask participants to talk about why a good security program is important – whether or not they think theft or misuse are likely.
   • Ask participants to share any relevant stories.
   • Ask participants what they learned in the unit that they could implement immediately.
Part 7 — Post-Test

If you choose to administer the post-test, do so now. You have already prepared the audience for this when you administered the pre-test. Just remind them that it will take only a couple of moments.

Part 8 — Table-top Exercise

At the end of this lesson plan, there is a scenario which participants can use to further explore the issues and to examine the issues in a different way. The table-top exercise is useful but optional; the presenter may judge that the table-top is not appropriate for the audience or that there is not enough time for it. See the table-top exercise for instructions.

The table-top exercise is helpful for further development and understanding of the issues in this session. However, the presenter may wish to substitute Unit 6 — Developing a Hazard Mitigation Plan in which participants learn about hazard mitigation and are guided in developing a mitigation plan for their operation.

Part 9 — Session Evaluation

An evaluation form is supplied in this booklet. Ask participants to take a few minutes to fill out this form and turn it in. If you allow participants to fill these forms out at home at return them to you at a later time – even later in the workshop – the chances of getting any evaluations are greatly reduced.

Part 10 — Adjourn

Thank the participants for their attention and encourage them to adopt a security program for their pesticides.
Additional Resources

The Environmental Protection Agency offers a number of materials on its “Homeland Security Measures for Agriculture” Web page <http://www.epa.gov/agriculture/thom.html>. Of particular interest may be “Chemical Accident Prevention: Site Security,” which reviews an overall security plan for a chemical storage site.

The National Institute of Justice (a division of the U.S. Department of Justice) has developed a very thorough and formal program titled “Method to Assess the Vulnerability of U.S. Chemical Facilities.” The twelve-step assessment tool was developed by the National Institute of Justice in partnership with the Department of Energy’s Sandia National Laboratories. Locate this publication at the National Criminal Justice Service Web site <www.ncjrs.org>. Follow the “Publications (alpha list)” link and find “Method to Assess the Vulnerability of U.S. Chemical Facilities.” These materials are likely to be helpful to larger operations.
**Homeland Security and Pesticides— Pre-test**

This pre-test is intended to gauge your level of knowledge before participating in the Homeland Security and Pesticides training. Please answer all the following questions to the best of your ability.

1. What property of pesticides makes them potential weapons?
   ____________________________________________________________________________ .

2. A pesticide is used only to control insects? (Circle one.)  TRUE  FALSE

3. Laws that define what information an employer must supply to employees that work with chemicals are called _______________________________ laws.

4. List three types of pesticide misuse.
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________

5. A security plan for pesticides should cover five aspects of handling. List as many as you can.
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________

6. How should you respond to suspicious behavior or thefts of pesticide?
   ____________________________________________________________________________
Homeland Security and Pesticides—Post-test

This post-test is intended to gauge your level of knowledge after participating in the Homeland Security and Pesticides training. Please answer all the following questions to the best of your ability.

1. What property of pesticides makes them potential weapons?
   ____________________________________________________________________.

2. A pesticide is used only to control insects? (Circle one.)   TRUE   FALSE

3. Laws that define what information an employer must supply to employees that work with chemicals are called ____________________________ laws.

4. List three types of pesticide misuse.
   ____________________________________________________________________
   ____________________________________________________________________
   ____________________________________________________________________

5. A security plan for pesticides should cover five aspects of handling. List as many as you can.
   ____________________________________________________________________
   ____________________________________________________________________
   ____________________________________________________________________
   ____________________________________________________________________
   ____________________________________________________________________

6. How should you respond to suspicious behavior or thefts of pesticide?
   ____________________________________________________________________
Homeland Security and Pesticides—Answer Key

1. What property of pesticides makes them potential weapons?
   
   Toxicity or poisonous nature

2. A pesticide is used only to control insects? True or False

   False

3. Laws that define what information an employer must supply to employees that work with chemicals are called ___________ laws.

   Right-to-Know

4. List three types of pesticide misuse.

   • unintentional misuse
   • unintentional release
   • intentional misuse

5. A security plan for pesticides should cover five aspects of handling. List as many as you can.

   • Storage
     • Transportation
     • Personnel
     • Disposal
     • Response

6. How should you respond to suspicious behavior or thefts of pesticide?

   Contact your manager or local law enforcement
Participant’s Evaluation of Homeland Security and Pesticides

Please circle the number that best expresses your opinions for each of the following statements. Circle only one number per question for questions 1 through 4.

<table>
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<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
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<td>1.</td>
<td>The training unit’s format was easy to follow.</td>
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<td>2.</td>
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<td>3.</td>
<td>The time it took to complete the training session was acceptable.</td>
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<td>4.</td>
<td>As a result of this session, I understand better how to work with pesticides.</td>
<td>1</td>
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5. We welcome your comments about this program:

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

Please use the back of this sheet for any further comments.

Thank you for your time!
Table-Top Discussions

Participants should use the following information in small groups to apply what they have just learned and to brainstorm their responses to this scenario. After the groups have worked separately, it may be useful to bring them back together and have a reporter from each group describe how their group responded to the discussion questions.

Four table-tops for pesticide audiences are included:

- Who’s Bugging Who?
- The Old Way Is the Best Way
- The Case of the Missing B-Gon
- Bad Day at the Flying T

“Who’s Bugging Who?”

Company Background

Green Thumb Sprayers and Pesticides, Inc. was established in 1954, and they are a very upstanding business in the area. They have had no convictions or a record of any prior pesticide misuse. They are a fairly large business, employing over 250 people.

Scenario

Note: “Who’s Bugging Who?” is a work of fiction. Characters in this story are fictional and not intended to represent any real person.

You have recently been employed by Green Thumb Sprayers and Pesticides, Inc. and you notice that pesticides are being mixed in improper proportions. When you approach a pesticide applicator about dosing, he tells you not to tell him how to do his job. He then goes on to explain that the apartment complex he is going to spray has been a long-time client of Green Thumb, and the pests they are spraying for have become more and more resistant to lower doses of the pesticide. He says he has been increasing the mixture bit by bit for about one year. When you looked a little farther into the history of the apartment complex you find that tenants have been complaining of slight headaches and flu-like symptoms for about 6 months.

Questions/Discussion

1. Should you confront upper management before saying anything to officials?
2. Did management know about this before it began happening?
3. What should you do?
4. What are some possible alternatives to mixing products in extreme doses?
As a local Extension agent, you have become familiar with the variety of agricultural producers in your county. You’ve noticed that the producers of one commodity tend to use large amounts of B-Gon, a popular pesticide in the area, early in the growing cycle. Based on your training, this use of pesticide is inappropriate, but when you ask farmers, they tell you that in its early growth stage, this commodity is subject to extensive leaf damage from grasshoppers and beetles. Consulting university experts helps you to understand that this early leaf damage has almost no impact on the eventual harvest and does not require pesticide treatment. Further, your consultants feel that the farmers are unnecessarily putting themselves and the environment at risk by exposure to high levels of B-Gon. When you explain this to farmers, they object with the fact that they have worked this way for years without damaging their harvest. It doesn’t make any sense to them that eliminating a treatment could have any other effect but to reduce their harvest. They also say that you have never seen the kind of damage insects do to the young plants. B-Gon is widely advertised and the B-Gon representative has lived in the community for many years. They can not accept that he would encourage them to do anything that would damage their health or even waste their money. Producers did not credit the health impacts of the pesticide because they did not know anyone who had been harmed.

1. These agricultural producers have entrenched attitudes based on their experience and on “common sense.” What is the best way to convince these producers to adopt a science-based approach?

2. Discuss the ideas of chronic exposure and long-term health effects. Give examples of the chronic exposures, for example chemicals, smoking or repetitive motion, that lead to health impacts. Do you know anyone who has suffered health impacts from chronic exposure?

3. How would you explain chronic exposure and health effects to these producers?

4. What are your basic attitudes toward the health of the environment?
During a monthly inventory, you notice that there is less than you expected of B-Gon, a pesticide you use occasionally. You adjust your inventory to reflect the actual amount on hand. In each of the following months, you notice a similar shortfall. After this period of time, the total amount of B-Gon that has been removed is significant. You have talked to your applicator about how much is being applied to your fields and still you cannot account for the missing pesticide. The amount taken is not really enough to treat a field. You suspect that one of your workers is taking B-Gon home, maybe to treat a garden plot, however, B-Gon is not indicated for home or small-scale use without careful mixing, however, some of your workers may be familiar with how to do this.

1. As an owner, what is the level of your concern about this missing pesticide and what is the basis for that concern?

2. If this producer came to you and asked you how to handle this situation, what would you advise?

3. If you decide to notify the authorities, who would you call and what would you expect them to do? What might you want them not to do?
It was early Wednesday morning. Josh, owner of Flying T Aerial Application Services, was supervising the mixing of pesticide for dusting some large potato fields. This job was for an important client and it was a busy time of year. If these fields did not get dusted within a day or two, the likelihood of serious crop loss was imminent. His regular pilot, Janice, had been out all week with a serious case of the flu, and she would probably be out for another few days. She should have gotten a flu shot, he thought to himself. A lot of his business depended on her, and normally she was 100% reliable.

All of Janice’s regular backups were busy, but after a flurry of early morning phone calls, Josh had located Dan, who had flying experience. Dan seemed serious, maybe sullen, to Josh. Dan volunteered that he had recently fallen on hard times after some kind of run-in with county building inspectors... something about heavy fines and legal fees... something about property he owned downstate. He needed the money. Dan was obviously angry, and Josh sensed that there was more to the story. Dan said that he would be over as soon as possible.

The mixing was finished around 9 and Josh’s technician, Zac, took the job of loading the pesticide mix into the airplane on his own. Josh returned to the office. He had a lot of calls to make.

Josh looked out his window around 10:30 as Dan rolled into the parking lot. It was a little later than Josh had hoped for. When Josh shouted out hello, Dan barely acknowledged him. Josh went over the job with Dan and showed him on a map where the fields to be treated were. Josh left Dan to go through pre-flight routines. Josh told Dan that Zac would have the crop duster ready and could give him any help he needed.

Zac came into Josh’s office around 11:30. He flopped down on the couch next to Josh’s desk. Josh didn’t even look up. He knew Zac had lunch on his mind and any second he would make a suggestion.

“Plane loaded?” Josh said offhandedly.

“You bet.” Zac replied. “So what’s up with Dan?”

“What do you mean?” Josh asked.

“Well, you know how he’s kind of down?” Zac was trying to get more of
Josh’s attention.

“Yeah.” Josh was still focused on the spreadsheets on his computer screen. “Yeah, well I say “down”, but I mean “out of it.” I walked by the chart room a couple seconds ago, and he’s on the phone. I don’t know who he was talking to, but he was furious…” Zac stopped mid sentence.

Zac loved to tell a story without a point, and Josh was never sure how to respond, so he didn’t, except to say, “So…”

Zac continued, “So... I stopped in the doorway for a second. He didn’t really look, but I’m sure he noticed me. He got quiet and very intense on the phone. He’s a strange guy. I think there’s something going on with him.”

Josh glanced over at Zac, “Zac... too much television.”

“No, man, I’m telling you. Something’s going on.” Zac paused for a few seconds. “So, how about Belle’s for lunch? Somehow, playing with pesticide gives me a taste for barbeque.”

Josh chuckled and typed an entry into the spreadsheet. “Sure. Let’s wait til Dan gets off the ground, and then we’ll go. He’ll be gone a couple of hours.”

“Sure. I’ll get washed up.” Zac jumped up and left the room.

* * *

Josh and Zac got back to the office around 2. They were at lunch longer than usual. Once again, Zac had provoked Josh into an argument about college football.

The building was empty. Josh settled down at his desk and started to focus in on his spreadsheets again. The phone rang. Josh picked it up absent-mindedly and spoke.

“Flying T Aerial Application Services. Josh Taylor speaking. How can I help you?”

The voice on the phone said, “Mr. Taylor, this is Sargent Emily Townsend at Patrick Air Force Base. Are you the owner of an AT-802 Air Tractor, N2371?”

Josh was puzzled — almost alarmed. Zac stuck his head in the door with a
question on his mind, but when he saw Josh’s expression, he asked, “What’s up? Who’s that on the phone?”

Josh looked over at him and waved him in. Josh motioned for Zac to sit on the couch. Zac continued to mouth the words, “Who’s on the phone?”

Josh answered, “Yes, that’s my plane.”

The sargent continued, “Mr. Taylor, there’s been an incident with your plane. Basically, it crashed in the parking lot next to the Brevard County Government Center down here.”

Josh was stunned. Zac was gesturing wildly to find out what was going on.

The sargent spoke, “Mr. Taylor?”

Josh responded, “Umm, just a second.” He held his hand over the mouthpiece for a second and said to Zac, “It’s Patrick Air Force Base. This sargent says Dan’s plane is somewhere in Titusville. It crashed or something.”


Josh motioned for Zac to calm down and returned to the phone. “Sargent Townsend, I don’t know what to say. Is this for real? Uh... Where’s the pilot?”

“Mr. Taylor, I know this will seem incredible, but apparently your pilot, Mr. Hawkins, filed a flight plan for some crop dusting this morning, but instead he headed straight down the coast. I’m not sure what he was planning...”

Josh interrupted, “Where is Dan, uh, Mr. Hawkins? Is he alright?”

“Mr. Hawkins is in serious condition in Holmes Memorial Medical Center in Melbourne. I’m amazed he’s even alive. He was flying somewhat erratically. We determined that he was flying without a flight plan when he was about 20 miles north of the Cape. A couple of jets were sent up to intercept him and force him down. He wouldn’t answer any radio communication. We were trying to direct him to an airfield. We think he wanted to crash the plane into the Government Center. Our pilots tell us he came in low, but he misjudged his approach and hit the ground.” Townsend paused.

Josh was now trying to sort out the events and their implications in his mind. “Was anyone else hurt?”
The sargent answered, “No, but we’ve got quite a mess. The wing clipped a truck in the parking lot and the plane tumbled in the crash. Whatever he had in the tanks... well, he had a full load.”

“Oh my god. He hadn’t dumped the pesticide yet...” Josh sat down heavily.

The sargent continued. “I guess not. We’ve got a mixture of pesticide and fuel all over the place. We’ve evacuated the building and traffic has been rerouted. The hazmat teams have the whole area cordoned off.”

“I don’t even know where to start. What do you need from me?” Josh asked.

“At this point, the Air Force doesn’t need anything. I’m calling you because we just happened to be the first to pick up on Mr. Hawkins’ flight, and I became a pivot in the command system. But as I said, we’ve got hazmat teams and DOT on the scene.”

“What’s going to happen to Mr. Hawkins?”

“Well, Mr. Taylor, Mr. Hawkins has broken quite a few laws and caused some fairly serious problems. We’ve already reported all this to the FBI and the FAA. I think the Brevard sheriff’s office will be in touch with you shortly. If Mr. Hawkins recovers, he will face numerous criminal charges. Unfortunately, all that is going to be federal, so he’s in very serious trouble,” Townsend paused again to let Josh take in these new issues.

“That is, if he recovers. The hospital won’t release information to anyone but a family member at this point. I think the local police have probably contacted them by now, if the FBI hasn’t. One thing I can tell you is that if you turn on CNN, you’ll get a little more information with pictures. I work with media quite a bit, and you should be prepared. National and local press are going to start calling as soon as the official report is filed. Probably later this evening.”

Josh thought for a second and then spoke, “Do I need to come get my airplane?”

“No, Mr. Taylor. As far as I know, the airplane is a total loss as far as insurance goes, and because it is at the center of a hazmat incident, there won’t be any salvage. It will be disposed of down here. And I can’t really say what your liability is. There will be charges for the clean-up operation, but how much of that will come back to you, I don’t really know. I probably shouldn’t even get into that... probably shouldn’t even have said that much.”
“I understand. No, that’s fine. I’ll try to contact someone up here about that part of it and I guess I’ll just wait for FBI to call me.” The full impact of the conversation was beginning to settle in.

Townsend spoke, “I’m sorry about all this, Mr. Taylor. I think that’s all I have for you. Do you have any other questions?”

“No. Thanks for calling. I’ve got a lot to think about.” Josh spoke slowly.

“Very well, Mr. Taylor. Good luck. And if there’s anything you need from us, just call the Air Base Command Center and ask for Sargent Emily Townsend.”

“Uh, thank you. Good-bye.”

“Good-bye.” Josh hung up the phone and sat quietly, thinking.

Zac was about to explode, but he held it in as long as he could. Maybe one second?

“FBI?” Zac shouted. “What is going on? Where’s Dan? Where’s the plane?”

Josh slowly reported to Zac everything he had learned from his conversation with Sargent Townsend.

Zac sat in rare silence for a moment to try to take it all in. “So, what? We sit here and wait for the feds to call?” he said quietly.

Josh answered just as quietly, “I guess so.”

Questions/ Discussion

1. a. Make a list of all the crimes and illegal acts committed by Dan Hawkins.

b. Add to the list in (1) agencies you expect to respond/act on those activities.

2. What are Josh Taylor’s personal liabilities?

3. What are Josh Taylor’s corporate liabilities?

4. What signs in Dan Hawkins behavior or attitude warned of the incident he caused?
5. What do you do if you were Josh?

6. How sensitive is your company to the negative publicity that may result from this incident?

7. How aware were you of this individual’s situation and its potential?

8. How do you deal with ‘damage control’ for the customer who needed his potatoes dusted TODAY?

9. What changes might you make in your hiring and disciplinary policies?

1. Make a list of all the crimes and illegal acts committed by Dan Hawkins.
   - Theft of the aircraft
   - Violating restricted airspace
   - Flying too low in a developed area
   - Flying the aircraft outside a filed flight plan
   - Intentionally causing a spill of hazardous materials
   - Public endangerment
   - Others?

2. Add to the list in (1) agencies you expect to respond/act on those activities.
   - Brevard County Sheriff’s Office
   - Titusville Police Department
   - Local Emergency Planning Council
   - Federal Bureau of Investigation
   - Federal Aviation Authority
   - National Transportation Safety Board
   - Emergency Medical Services
   - Fla. Dept. of Agriculture and Consumer Services Law Enforcement

3. What parties could be liable for the incidents in this story?
   First, in a legal sense, when someone is liable, that means they have been formally determined to be responsible for some act or its result. Before that determination is made, a party is only potentially liable. Aviation liability is a very complex area of law. Air travel is possible because of a very extensive system involving regulatory agencies, aircraft
owners, aircraft manufacturers, pilots, mechanics, aviation companies, airports, etc. When an airplane flies, every one of these agencies, corporations or persons are responsible for getting the airplane up and down safely. Liability is often distributed proportionally, that means that each party can be held liable for how much they contributed to the incident. In this case, Dan Hawkins seems most liable for the damages at the crash site, but a case can also be made as to how much Josh Taylor knew about Hawkins’ readiness for flight. To guide discussion of this question, have participants list all the parties that played a role, and then think about who might sue who and why.

4. What signs in Dan Hawkins behavior warned of the incident he caused? Participants must decide whether Josh Taylor should have trusted Dan Hawkins. Josh knew that Dan was upset, but could he have known that Dan might “go nuts” and misuse the aircraft? Guide participants to discuss what assumptions they might make or actions they could take in a similar situation.

5. How would your company handle the negative publicity from this event? Our natural first reaction when we are pressured or under attack is to become defensive --- sometimes in a belligerent way, sometimes in a secretive way. Time and again, it has been shown that the best strategy is to get ahead of the questions, to reach out to media and get your side of the story out there. Secretiveness only suggests that something is being hidden, and being belligerent only makes enemies of the very people who can help you get your story out. Participants could discuss what interactions they have had with media and whether their operation has a plan and/or training in how to handle public relations in the event of a negative incident.

6. How do you deal with ‘damage control’ for the customer who needed his potatoes dusted today? With all the excitement, it would be easy to forget that there is still a customer out there who needed your services on a very time-sensitive basis. This is another case where getting ahead of the situation is important. Though the cause of this situation was unusual, the situation itself is not. Participants could discuss how best to deal with the customer.
PowerPoint Slides 1-3

Agrochemicals and Security

Homeland Security and Pesticides

Learning Objectives

As a result of this session, participants will:

- Be aware that pesticides can be used to intentionally harm humans, animals and crops.
- Understand behaviors that may indicate suspicious activity.
- Understand that specific security measures can prevent unlawful access to pesticides.

Pesticides and Terrorism?

- Investigations after the 9/11 attacks raised the concern that terrorists might use crop dusters to spray pesticides on large crowds.
- Pesticides have not been used often in terrorist attacks.
A pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest.

“Pesticide” includes herbicides, fungicides, insecticides, or any other substance used to control pests.

Pesticides are carefully regulated by the Environmental Protection Agency (EPA), which reviews studies to determine the risks posed by individual pesticides.

Pesticides must be labeled. The “label” includes the actual label on the container and literature that comes with the pesticide.

Employees have a legal right to know what chemicals they may be exposed to and to review the “label” or Material Safety Data Sheets for those chemicals.

A pesticide label is a legal document.
Material Safety Data Sheets

MSDS give the user information needed to use the chemical safely, including:
- Manufacturer contact information
- Components, contaminants, and exposure limits
- Fire and explosion data
- Toxicity data
- Health hazards
- Effects of exposure
- Emergency and first aid
- Appropriate protective equipment

Sample Pesticide Label

Pesticide Hazards

How pesticides get in
- Inhalation
- Through food or water
- Absorption through skin

Exposure levels
- Chronic exposure
- Acute exposure

Health effects (depends on specific pesticide)
- Central nervous system
- Eye irritation
- Hormone imbalance
- Cancer
- Liver damage
- Skin irritation
- Reproductive effects
Misuse of Pesticides

- Unintentional Misuse
- Unintentional Release
- Intentional Misuse

Unintentional Misuse

Results from poor knowledge of correct use of pesticides or equipment...
- Prevent through effective training, certification and supervision.
- Respond by correcting practices through prevention program.
- Report when unintentional misuse could have impacts on health, environment, food products.

Unintentional Release

Happens when large quantities of pesticides are spilled or suddenly released...
- Prevent through effective training, certification and supervision
- Respond with appropriate spill kit (depending on scale of event)
- Report to authorities immediately
PowerPoint Slides 13-15

Happens when pesticides are used in acts of revenge, terrorism, etc....
- Prevention, response and reporting are covered in remaining slides.

Intentional Misuse

Improving Security
- Storage
- Transportation
- Personnel
- Disposal
- Response

Security: Storage
How easy would it be for pesticides to “disappear” from your facility?
Security: Storage

- Maintain inventories so that you always know the exact quantities of pesticides you have.
- Use logbooks to keep track of who removes pesticides from your facility.
- Store pesticides in a building which can be locked or in a fenced enclosure with a locked gate.
- If appropriate, provide a second security perimeter, such as a fence with a locked gate surrounding your storage facility.

Security: Storage

- Perform a walk-through and walk-around daily to check for attempted entry, vandalism, and structural integrity.
- Provide good lighting on all sides of your storage facility.
- For some facilities, install security systems, such as alarms and camera systems, and make sure they are properly maintained.

Security: Transportation

Is transportation the weak link in your security?
Create a paper-trail for any pesticides you ship.  
Ship pesticides in a locked vehicle.  
Go directly to delivery point when possible, taking the best route available to avoid high population areas, tunnels, and bridges.  
Exercise extreme caution if it becomes essential to stop.  
Avoid unguarded and unlighted areas where theft is a substantial risk and be on your way as soon as possible.  
Be alert to vehicles following your truck, strangers asking questions, or anyone snooping around your cargo.  

Do not pick up hitchhikers, do not talk about your cargo on CB radio, and do not discuss your cargo with those not involved.  
Always telephone your customer if you find you will be late for a delivery.  
Check your load at delivery to ensure no product is missing. Do not leave product at field site unless it is well attended or secured within buildings. Always obtain a signed delivery ticket.  
Carefully check background of all new drivers. Every driver should be properly licensed and trained in good practices for handling fertilizer and pesticide chemicals that may be hazardous in the hands of dangerous people.

Do you know your employees?  
Do you know who has access?
Security: Personnel

- Develop effective hiring and labor relations policies.
- Consider background checks for current/new employees, particularly if the person handles hazardous materials.
- Consider fingerprinting and photographing employees who handle hazardous materials.
- Be aware of personal identity theft, such as stolen Social Security numbers, references, etc.
- Request employees to watch for suspicious activities and ask persons they don’t recognize to identify themselves and state their reason for being on the property.

Security: Personnel

- Adopt a company security whistleblower protection policy.
- Know who has keys and access to hazardous material storage areas.
- Retrieve keys and employment identification cards from an employee and change computer access passwords when their employment ends.
- Assess a worker’s violence potential and take appropriate security precautions when terminating or disciplining an employee.

Security: Disposal

Do you have a plan for safe and secure disposal?

Hazmat worker inspects aging chemical drums abandoned in a field.
Security: Disposal

- Maintain security over material which is being disposed of until it is claimed by appropriate authorities.
- Arrange for prompt and safe disposal of materials.

Security: Response

Do you have a formal response plan?
Do your employees know it?

- Develop an emergency plan for your facility. Train your workers in the plan and rehearse it with them.
- Post emergency response numbers, including fire, law enforcement, medical contacts, and poison control in several locations in your facility. Make all employees aware of these response numbers.
- Report to appropriate authorities any suspicious activities, vehicles, persons, threats to personnel or facilities, sabotage/vandalism to facilities or equipment, and thefts, inventory shortages, or missing products that could pose a risk to public health or safety.
Identifying Suspicious Behavior

Watch for unusual or suspicious behavior by a purchaser who:

- Seems unfamiliar with details of using fertilizers
- Acts nervous, seems uneasy or vague, and avoids eye contact
- Demands immediate possession of purchase material instead of future delivery
- Asks for material in smaller individual containers rather than in bulk
- Insists on paying in cash instead of using a check or credit card

If someone is acting suspicious...

- Notify your manager.
- Notify local law enforcement.

Summary 1

1. Because pesticides are toxic, they could be misused to intentionally harm people, animals, or crops.
2. A pesticide is any substance used to control a pest – including insects, rodents, and weeds.
3. Employees have a right to know what chemicals they are working with, the hazards of those chemicals, appropriate personal protective equipment, and appropriate first-aid and medical response.
4. We identified three types of pesticide misuse and methods of prevention, response and reporting for each one:
   - Unintentional misuse
   - Unintentional release
   - Intentional misuse
5. Examine storage and handling procedures and develop a security plan that covers the following areas:
   - Storage
   - Transportation
   - Personnel
   - Disposal
   - Response

6. Suspicious Behavior
   - Watch for unusual or suspicious behavior.
   - Contact your manager or local law enforcement to report suspicious persons.

Questions and Discussion
Unit 5: Security and Anhydrous Ammonia

Subject
Anhydrous ammonia is widely used as a fertilizer, and tanks of the chemical are a common sight in many agricultural operations. Anhydrous ammonia is also widely stolen for use in the clandestine production of the illegal drug, methamphetamine. Appropriate security can reduce illegal access to anhydrous ammonia and prevent serious injury that can result from tampering with tanks and valves.

Goal
Make participants aware of the potential misuse of anhydrous ammonia and explain security and awareness measures that can prevent anhydrous ammonia from falling into the wrong hands.

Objectives
As a result of this session, participants will:
- Be aware that anhydrous ammonia can be used to make illegal drugs.
- Understand behaviors that may indicate suspicious activity.
- Understand that specific security measures can prevent unlawful access to anhydrous ammonia.

Session Outline
Part 1: Welcome and Introduction
Part 2: Unit Learning Objectives
Part 3: Pre-Test
Part 4: Learning Sections
  Section 1: What is Anhydrous Ammonia?
  Section 2: Why is Anhydrous Ammonia Dangerous?
  Section 3: Situations That Might Expose You to Anhydrous Ammonia
  Section 4: Protecting Yourself from NH₃ Exposure
  Section 5: Illegal use of Anhydrous Ammonia
  Section 6: Incidents Resulting from Anhydrous Ammonia Theft
  Section 7: Hazard Reduction and Prevention
  Section 8: Improving Security
  Section 9: Recognizing Suspicious Behavior
  Section 10: Summary
Part 5: Questions and Discussion
Part 6: Post-Test
Part 7: Table-top Exercise
Part 8: Session Evaluation
Part 9: Adjourn
Learning Environment and Aids

To conduct this training, you will need:

1. “Security and Anhydrous Ammonia” PowerPoint presentation, and a means to show it. (Download from the UF/IFAS Disaster Handbook Web site: <http://disaster.ifas.ufl.edu>.)
2. Note paper or PowerPoint slide pages to serve as participant workbooks.
3. If desired, sufficient copies of the Pre- and Post Test for all participants to take the test both before and after session.
4. Unit 5 evaluation forms.

Part 1 — Welcome and Introduction

Take a moment at the beginning of the lesson to welcome the participants to the session. Introduce yourself as the presenter, and remind participants of the title and subject (above) of the session.

Part 2 — Unit Learning Objectives

Briefly introduce the audience to the learning objectives for this unit. As a result of this session, participants will:

- Be aware that anhydrous ammonia can be used to make illegal drugs.
- Understand behaviors that may indicate suspicious activity.
- Understand that specific security measures can prevent unlawful access to anhydrous ammonia.

Part 3 — Pre-Test

If you choose to administer pre- and post-tests, do so now before you do anything else. Explain to the participants that everyone will take a short quiz before the session just to give themselves a clearer idea of what they already know about the subject and some things they will learn during the session. Tell them that they will take the same test at the end of the session and this will help the presenter by giving an idea of the effectiveness of the session.

The pre- and post-tests should take only a few minutes each.
Part 4 — Learning Sections

Section 1. What is Anhydrous Ammonia?

Ammonia is a very important industrial chemical which is used in a wide variety of manufacturing processes, including manufacture of other chemicals, explosives, fibers, plastics, refrigeration, pharmaceuticals, pulp and paper, mining, metallurgy, cleaning, and of course, fertilizers. Farmers use anhydrous ammonia directly as one source of nitrogen fertilizer for crops. All personnel should be familiar with the safe use of this product.

Most people think of ammonia as a liquid that comes in a bottle. It has an unusually sharp odor, but it is useful for cleaning. Ammonia itself is actually a gas; the material in a bottle of “ammonia” is ammonia gas dissolved in water.

Pure ammonia is a colorless gas at room temperature and normal atmospheric pressure. It is usually referred to as “anhydrous” ammonia, which simply means ammonia “without water.” Anhydrous ammonia is a rich source of nitrogen and farmers often inject it directly into the soil as a fertilizer.

Ammonia is manufactured in large quantities from nitrogen taken from air and hydrogen taken from natural gas. It is distributed by tanker trucks to large scale users, including agricultural suppliers, who keep it in large storage tanks. Farmers purchase the ammonia in nurse tanks that often hold several hundred gallons. They tow the tank to the work site where it is towed behind a tractor connected to an applicator which injects the ammonia directly into the soil. In the soil, the anhydrous ammonia immediately combines with soil moisture and becomes a source of available nitrogen.

Although pure ammonia is a gas under normal conditions, at –28 degrees F, it changes to a liquid. Pure ammonia is also liquid at room temperature if it is stored under pressure. This fact allows it to be stored in tanks, like propane or other liquefied gases.

Section 2. Why is Anhydrous Ammonia Dangerous?

Bottle ammonia can be unpleasant, but pure ammonia is quite dangerous – for several reasons.
First, anhydrous ammonia is a powerful base (alkali), and because it is “anhydrous,” it has a powerful appetite for water, whether in the ground, in air, or in living tissues. If it contacts skin, it can cause severe burns. Since it is a gas, it can be inhaled, and if it is, it can seriously damage lungs and the lining of the nose and mouth. It is especially dangerous to the eyes. When acids contact skin tissue, they cause a coagulation reaction that limits the ability of acids to penetrate the skin. Strong bases like anhydrous ammonia act in the opposite way; they react with skin in a way that penetrates the skin, so burns from anhydrous ammonia can be extremely severe resulting in significant tissue loss. Similarly, anhydrous ammonia can penetrate the eye and cause the cornea to become permanently opaque, resulting in blindness.

Second, anhydrous ammonia is stored under pressure. The pressure relief valve of anhydrous ammonia tanks is usually set to open at 250 psig. This pressure will be reached if the tank temperature reaches 116 degrees F. Therefore, any conditions that cause tank temperature to increase significantly, such as being left in direct sunlight on a hot day, should be avoided. If the relief valve is activated, a sudden exposure to anhydrous ammonia could result.

Third, under pressure, anhydrous ammonia is at room temperature, but if released to the atmosphere, the liquid converts almost instantly to gas at about 30 degrees below zero. The volume ratio is 1 to 850, that is, one gallon of anhydrous ammonia liquid becomes 850 gallons (114 cubic feet) of ammonia gas. An anhydrous ammonia release produces huge clouds of freezing cold, bitterly irritating gas. A blast of this gas can cause severe frostbite in addition to the possible chemical burns.

Ammonia dissolved in water will react readily with copper, zinc, brass and many alloys. Only non-galvanized steel or iron should be used for containers, fittings and piping (Schedule 80, pipe or Schedule 40 when welded by a certified welder). All materials used with anhydrous ammonia should conform to recommended standards. Anhydrous ammonia tanks should not be used to store other materials such as propane or liquefied petroleum gas.

**Section 3. Situations That Might Lead to Exposure to Anhydrous Ammonia**

The unintentional release of anhydrous ammonia can create a dangerous situation for both the handler and bystanders. The following situations are dangerous:
• Overfilling the tank
• Handling the hose by the valve handle or hand wheel
• Faulty hitch pin or weakened tongue
• Weakened undercarriage structure
• Moving the tank before disconnecting the hose
• Faulty valves and deteriorated or out-of-date hoses
• Not using personal protective equipment
• Failure to bleed pressurized NH$_3$ from the hose before connecting or disconnecting
• Failure to have sufficient amounts of water available
• Overturning an applicator tank
• External overheating of the storage container.

An estimated eighty percent of reported incidents result from improper procedure, lack of knowledge or training, and failure to follow proper safety precautions. Unintentional releases and injuries can be prevented if all individuals follow safety rules and maintain the equipment properly. It is essential that all equipment be in good operating condition. Only trained individuals should handle and apply anhydrous ammonia.

Section 4. Protecting Yourself from NH$_3$ Exposure

Goggles, rubber gloves, and complete protective clothing are necessary when handling anhydrous ammonia. It is recommended that goggles and a face shield or an approved respirator be used to protect the eyes and face from a direct blast of ammonia that can permanently blind and disfigure an individual.

Water must be available for flushing the eyes and skin in case of exposure. Each vehicle used for anhydrous ammonia must carry a five-gallon container of clean water. Anyone handling NH$_3$ should carry a six- to eight-ounce squeeze bottle of water in their shirt pocket for rapid emergency access.

Washing with water is the emergency measure to use when skin or eyes are exposed to anhydrous ammonia. Time is important! Get water onto the exposed area of the skin or eyes immediately and flush for at least 15 minutes. Never wear contact lenses when handling anhydrous ammonia, since they can trap the gas and freeze the contacts to the eye. Contaminated clothing should be removed quickly but carefully. Thaw clothing frozen to the
skin with water before attempting removal. Wash the affected skin area with abundant amounts of water, and do not apply anything except water for the first 24 hours. Stay warm and get to a physician immediately.

**Section 5. Illegal Use of Anhydrous Ammonia**

The most common illegal use for anhydrous ammonia is in the production of methamphetamine because it increases the speed and efficiency of production, thus increasing the drug maker’s profits. Anhydrous ammonia can be as inexpensive as $200/ton for agricultural purposes, but can sell for as much as $300/gallon on the black market. Anhydrous ammonia is ideal for small-scale production of methamphetamine, often by individuals producing the drug for personal use or limited, local distribution. Large-scale production of illegal methamphetamine – as is carried out by Mexican drug cartels – is usually accomplished with other chemicals.

Anhydrous ammonia is used in a number of industrial processes, but it is most readily available from farms. Large storage tanks and nurse tanks on farms are usually unguarded or unlocked. Thieves often improvise and use small tanks from other applications, such as propane tanks, to transfer anhydrous ammonia from storage tanks or nurse tanks. These transfers are dangerous because the equipment is usually makeshift and does not seal properly. The danger is increased because thieves usually work at night.

For many people, illegal drug use might be associated with urban or suburban settings, however, methamphetamine production is a problem in almost all states. In 2001, 8,290 methamphetamine labs were seized, according to the El Paso Intelligence Center’s National Clandestine Laboratory Seizure System. California has been the site of most, but not all, large-scale seizures, but the Midwest United States has a very high prevalence of small-scale operations. The Midwest states provide plenty of remote locations for setting up meth labs as well as access to anhydrous ammonia.

Because of the chemicals used in methamphetamine production, a large-scale operation can cause significant damage to the environment. For every pound of the chemical produced, five pounds of hazardous waste are generated. The by-products of making methamphetamine are often disposed of by flushing them down toilets, pouring them down drains, or simply dumping them on the ground. In this way, meth lab sites often become highly contaminated. Clean-up costs fall on the land owner. Many houses where small-scale operations have been located become uninhabitable and must be demolished. Property owners can be responsible for high costs of hazard-
ous materials clean-up. These ideas also apply to the so-called “rolling meth labs” built into trailers and trucks.

Section 6. Incidents Resulting from Anhydrous Ammonia Theft

Thieves put not only themselves in danger, but workers and bystanders who may be involved with equipment that has been tampered with or are involved with rescue operations. Note the following examples.

• More than 2,000 pounds of anhydrous ammonia were released from a refrigerated warehouse. A fence was cut to gain entry into the facility and the anhydrous ammonia was removed through a valve on an oil separator. The valve was left open. Fortunately, the release was mitigated by a rain storm that knocked down the anhydrous ammonia vapor as it was being released to the outside air. The warehouse owner replaced the fence, installed a valve lock on the oil separator valve, and requested enhanced police surveillance following the incident.

• An individual attempted to steal anhydrous ammonia from a nurse tank at a retail agricultural dealer in Iowa. The liquid withdrawal valve was left open on the nurse tank and caused ammonia release that quickly vaporized into the air. One passerby was overcome by the anhydrous ammonia fumes and collapsed. Another nearby resident was overcome by ammonia fumes after leaving her home. Both individuals were hospitalized. Several other area residents were evacuated as a precaution. The agricultural dealer installed security lights following the incident.

• One person was killed when a makeshift container of anhydrous ammonia he was holding exploded. The death occurred when two individuals were driving on an interstate highway in Missouri. The driver was severely injured. The ammonia was to be used for methamphetamine production. Since the cause of the smoke emanating from the car was not immediately known, one firefighter, one emergency medical technician, and one member of the general public, all of whom stopped to help and drag the passenger and driver from the car were also injured as a result of the ammonia release.

Section 7. Hazard Reduction and Prevention

• Employees should be properly educated about problems associated
with anhydrous ammonia theft.

- Store tanks in well-lit areas.
- Know your inventory to quickly identify missing chemicals.
- Visually inspect tanks each morning, especially following weekends or other periods where the facility was not occupied.
- Consider auditing your facility and setting up a valve protection plan for critical valves that could cause significant releases if left open.
- Consider installing valve locks or fencing, especially for unattended tanks.
- Consider installing other theft deterrent measures, such as motion detector lights, motion detector alarms, security patrols, and/or video surveillance.

Note that the Clean Air Act (1970) states: “Facilities handling extremely hazardous chemicals (including anhydrous ammonia) have a general duty to assess hazards, design and maintain a safe facility, and minimize the consequences of accidental releases.” [Section 112(r)(1) of the Act]

Users of anhydrous ammonia may benefit from a new product called GloTell. This product was developed by researchers at Southern Illinois University (Carbondale, Illinois) and is distributed by Royster-Clark, Inc. (Norfolk, Virginia). GloTell is an additive which can be combined with anhydrous ammonia. When anhydrous ammonia containing GloTell is exposed to air, it turns fluorescent pink. GloTell will stain whatever it comes into contact with. Methamphetamine made with anhydrous ammonia containing GloTell is a brilliant pink color, and will stain the skin of users bright pink upon contact. Also, the brilliant, unnatural color discourages drug buyers, who prefer a brilliant white product. There are reports that GloTell reduces the efficiency of methamphetamine production. In test markets, GloTell has significantly reduced anhydrous ammonia thefts.

GloTell has the additional benefit of making leaks of anhydrous ammonia from hoses or valves immediately visible. For more information about GloTell, visit the Royster-Clark Web site, <www.roysterclark.com>.

Section 8: Improving Security

[Note: Much of this security section appears in the Fertilizers and Pesticides units, as well as this one. The Transportation Section is specific to anhydrous ammonia. If more than one unit is being presented to the same audience on
the same program, the presenter may wish to adapt this security section accordingly.

Now that you know the hazards and potential misuse of anhydrous ammonia, you can understand the need for an attitude of security in dealing with it. Virtually everyone who uses anhydrous ammonia – especially bulk suppliers and bulk users – needs to increase security so that this material does not fall into the wrong hands.

Good security begins with an effective security plan. A good security plan has several parts. The parts you use depend on the size and activities of your operation. An effective plan does not need to be complicated, but it should take into account each of the following areas.

- Storage
- Transportation
- Personnel
- Disposal
- Response

For each of these areas, we provide tips to improve security. Consider these tips. Decide which ones apply to your operation and make some notes about actions you can take.

**8A. Security: Storage**

Key question: How easy would it be for anhydrous ammonia to “disappear” from your facility? —

Suggested tips:

- Maintain inventories so that you always know the exact quantities of ammonia you have.
- Use logbooks to keep track of who removes ammonia from your facility.
- Store ammonia in a well-ventilated building which can be locked or in a fenced enclosure with a locked gate.
- If appropriate, provide a second security perimeter, such as a fence with a locked gate surrounding your storage facility.
- Perform a walk-through and walk-around daily to check for attempted
entry, vandalism, and structural integrity.

- Provide good lighting on all sides of your storage facility.
- For some facilities, install security systems, such as alarms and camera systems, and make sure they are properly maintained.

### 8B. Security: Transportation

Is transportation the weak link in your security? — A side-trip by an untrustworthy driver or a hijacking could deliver anhydrous ammonia into criminal hands. Consider the following tips for more secure transportation of anhydrous ammonia.

**Suggested tips:**

- Drivers should go directly to the delivery point when possible, taking the best route available to avoid high population areas, tunnels and bridges.
- Drivers should exercise caution if it becomes essential to stop. They should avoid unguarded and unlighted areas where theft is a substantial risk and be on their way as soon as possible.
- Drivers should be alert to vehicles following their truck, strangers asking questions, or anyone snooping around your cargo.
- Drivers should not pick up hitchhikers or talk about their cargo on CB radio; and they should not discuss their cargo with those not involved.
- Drivers should always check in if they find they will be late for a delivery.
- Make sure that nurse tanks are well attended or properly secured.
- Carefully check background of all new drivers. Every driver should be properly licensed and trained in good practices for transporting anhydrous ammonia. Also, it may be appropriate to look into criminal background.

### 8C. Security: Personnel

Do you know your employees? Do you know who has access?

**Suggested tips:**

- Develop effective hiring and labor relations policies.
- Consider background checks for current/new employees, particularly if the person handles hazardous materials.
• Consider fingerprinting and photographing employees who handle hazardous materials.
• Be aware of personal identity theft, such as stolen Social Security Numbers, references, etc.
• Request employees to watch for suspicious activities and ask persons they don’t recognize to identify themselves and state their reasons for being at the facility.
• Adopt a company security whistleblower protection policy.
• Know who has keys and access to hazardous material storage areas.
• Retrieve keys and employment identification cards from an employee and change computer access passwords when their employment ends.
• Assess a worker’s violence potential and take appropriate security precautions when terminating or disciplining an employee.

8D. Security: Disposal

Do you have a plan for safe and secure disposal?

Suggested tips:

• Maintain security over material which is being disposed of until it is claimed by appropriate authorities.
• Arrange for prompt and safe disposal of materials.

8E. Security: Response

Do you have a formal response plan? Do your employees know it?

Suggested tips:

• Develop an emergency plan for your facility. Train your workers in the plan and rehearse it with them.
• Post emergency response numbers, including fire, law enforcement, medical contacts, and poison control in several locations in your facility. Make all employees aware of these response numbers.
• Report to appropriate authorities any suspicious activities, vehicles, persons, threats to personnel or facilities, sabotage/vandalism to facilities or equipment, and thefts, inventory shortages, or missing products that could pose a risk to public health or safety.
Section 9. Recognizing Suspicious Behavior

The Drug Enforcement Administration (DEA) has developed a list, which can help you identify individuals who may be seeking to purchase chemicals for illegal purposes:

- Customer cannot answer or is evasive about agricultural use questions.
- Customer insists on taking possession rather than having it delivered.
- Customer insists on using cash, money order, or cashiers check.
- Customer is a stranger and unfamiliar to the area or your business.
- Customer provides suspicious business or credit information.
- Customer intends to fill their own inappropriate tank (e.g., a 20-pound propane cylinder).

Report thefts, signs of tampering, leaks, or any unusual activity to local law enforcement officials.

Section 10. Summary

1. Anhydrous ammonia is a pure form of ammonia. Although it is a colorless gas at normal pressure and temperature, it is stored as a liquid under pressure.

2. Anhydrous ammonia is a very strong base that tends to penetrate skin tissues and cause severe damage.

3. Always be very careful when transferring or applying anhydrous ammonia. Use appropriate personal protective equipment and have first aid materials available for immediate use.

4. Anhydrous ammonia can be used by small-scale drug makers in the production of the illegal drug methamphetamine.

5. When thieves tamper with anhydrous ammonia tanks and valves, the potential for unintentional exposure and injury is increased. Theft of anhydrous ammonia puts both the thief and the tank owner/user at risk of severe injury.

6. Report suspicious activity or thefts of anhydrous ammonia immediately to the proper authorities.
Part 5 — Questions and Discussion

You may wish to have a discussion period where your audience can talk about what they have just learned. Here are some suggestions to start the discussion.

- Ask participants to share about how they work with anhydrous ammonia. Emphasize personal protective equipment and a correct “safety attitude.”
- Ask participants to share stories about injuries involving anhydrous ammonia that they are aware of.
- Ask the participants how what they have just learned will change their work habits.

Part 6 — Post-Test

If you choose to administer the post-test, do so now. You have already prepared the audience for this when you administered the pre-test. Just remind them that it will take only a couple of moments.

Part 7 — Table-top Exercise

At the end of this lesson plan, there is a scenario which participants can use to further explore the issues and to examine the issues in a different way. The table-top exercise is useful but optional; the presenter may judge that the table-top is not appropriate for the audience or that there is not enough time for it. See the table-top exercise for instructions.

The table-top exercise is helpful for further development and understanding of the issues in this session. However, the presenter may wish to substitute Unit 6 — Developing a Hazard Mitigation Plan in which participants learn about hazard mitigation and are guided in developing a mitigation plan for their operation.
The Fertilizer Institute <www.tfi.org> offers a fact sheet titled “Help Keep Anhydrous Ammonia Safe and Secure.”

The Environmental Protection Agency offers a number of materials on its “Homeland Security Measures for Agriculture” Web page <http://www.epa.gov/agriculture/thom.html>. Of particular interest may be “Chemical Accident Prevention: Site Security,” which reviews an overall security plan for a chemical storage site.

Cornell Cooperative Extension has produced a fact sheet titled “Reducing the Risk of Anhydrous Ammonia Theft” which may be helpful for small to medium operations. The complete text can be found after the table-top exercise.

For excellent general surveys of anhydrous ammonia use and safety precautions:

Security and Anhydrous Ammonia — Pre-test

This pre-test is intended to gauge your level of knowledge before participating in the Security and Anhydrous Ammonia training. Please answer all the following questions to the best of your ability.

1. What is the material form of anhydrous ammonia at normal pressure and temperature? ______________________

2. Identify 3 scenarios that can result in unintentional exposure to anhydrous ammonia.
   __________________________________________
   __________________________________________
   __________________________________________

3. In what illegal activity is anhydrous ammonia used, and why is it so desirable?
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

4. What are three things you can do to reduce the hazards of anhydrous ammonia theft?
   __________________________________________
   __________________________________________
   __________________________________________

5. What are two factors that make a purchaser of anhydrous ammonia suspect?
   __________________________________________

6. Who do you contact in the event of suspected theft or misuse of anhydrous ammonia?
   __________________________________________
Security and Anhydrous Ammonia — Post-test

This post-test is intended to gauge your level of knowledge after participating in the Security and Anhydrous Ammonia training. Please answer all the following questions to the best of your ability.

1. What is the material form of anhydrous ammonia at normal pressure and temperature? __________________________

2. Identify 3 scenarios that can result in unintentional exposure to anhydrous ammonia.
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

3. In what illegal activity is anhydrous ammonia used, and why is it so desirable?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

4. What are three things you can do to reduce the hazards of anhydrous ammonia theft?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

5. What are two factors that make a purchaser of anhydrous ammonia suspect?
   __________________________________________________________

6. Who do you contact in the event of suspected theft or misuse of anhydrous ammonia?
   __________________________________________________________
1. What is the material form of anhydrous ammonia at normal pressure and temperature? Vapor or gas

2. Identify 3 scenarios that can result in unintentional exposure to anhydrous ammonia.
   - Overfilling the tank
   - Handling the hose by the valve handle or hand wheel
   - Faulty hitch pin or weakened tongue
   - Weakened undercarriage structure
   - Moving the tank before disconnecting the hose
   - Faulty valves and deteriorated or out-of-date hoses
   - Not using personal protective equipment
   - Failure to bleed pressurized NH$_3$ from the hose before connecting or disconnecting
   - Failure to have sufficient amounts of water available
   - Overturning an applicator tank
   - External overheating of the storage container

3. In what illegal activity is anhydrous ammonia used, and why is it so desirable?
   Anhydrous Ammonia is sought out because of its low cost and accessibility. Only a small amount is needed to make large amounts of Methamphetamine, which is its major illegal use.

4. What are three things you can do to reduce the hazards of anhydrous ammonia theft?
   - Employees should be properly educated about problems associated with anhydrous ammonia theft.
   - Store tanks in well-lit areas.
   - Know your inventory to quickly identify missing chemicals.
   - Visually inspect tanks each morning, especially following weekends or other periods where the facility was not occupied.
   - Consider auditing your facility and setting up a valve protection plan for critical valves that could cause significant releases if left open.
   - Consider installing valve locks or fencing, especially for unattended tanks.
   - Consider installing other theft deterrent measures such as motion detector lights, motion detector alarms, security patrols, and/or video surveillance.
5. What are two factors that make a purchaser of anhydrous ammonia suspect?
   - Customer cannot answer or is evasive about agricultural use questions.
   - Customer insists on taking possession rather than having product delivered.
   - Customer insists on using cash, money order, or cashiers check.
   - Customer is a stranger and unfamiliar to the area or your business.
   - Customer provides suspicious business or credit information.
   - Customer intends to fill their own inappropriate tank (e.g., a 20-pound propane cylinder).

6. Who do you contact in the event of suspected theft or misuse of anhydrous ammonia?

   Report thefts, signs of tampering, leaks, or any unusual activity to local law enforcement officials.
**Participant’s Evaluation of Security and Anhydrous Ammonia**

Please circle the number that best expresses your opinions for each of the following statements. Circle only one number per question for questions 1 through 4.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. The training unit’s format was easy to follow.

2. The information presented is useful to me.

3. The time it took to complete the training session was acceptable.

4. As a result of this session, I understand better how to work with anhydrous ammonia.

5. We welcome your comments about this program:

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

Please use the back of this sheet for any further comments.

Thank you for your time!
Table-top Discussion

Participants should use the following information in small groups to apply what they have just learned and to brainstorm their responses to this scenario. After the groups have worked separately, it may be useful to bring them back together and have a reporter from each group describe how their group responded to the discussion questions.

The Tell-Tale Valve

The day began normally as Alex Hamilton started his routine at Vega Farm Supply. He walked around the nurse tanks which contained anhydrous ammonia, and began taking readings on how much chemical was left in each tank. He did not notice anything out of the ordinary, except for a brass valve on one of the tanks that appeared to have a lot of oxidation on it. He wrote it off as corrosion due to the recent salting of the roads, because the first snow had just fallen. The nurse tank had just been rented out by a local farmer and long-time customer of Vega, Steve Lancer. Steve had returned the tank the previous day just before closing time. Steve rented out a full nurse tank about every three weeks, and is one of the most active customers of Vega.

Later that day, around 1:00 o’clock, Alex began talking with their anhydrous supplier, who was doing a bimonthly calibration check on the outflow valves of the nurse tanks. They check these to make sure that the gauge is giving the farmer a correct indication as to the amount of anhydrous being dispensed into the ground. For curiosity’s sake, Alex began to talk about the oxidation he discovered on the valve earlier that morning.

The supplier requested that Alex show him, and he discovered that the valve in question was not one that the farmer would have used for normal operation, and told Alex that it was probably due to tampering with the valve. He told him that the anhydrous will react with the brass to cause oxidation. He told Alex that he would try to investigate the matter further.

Alex spoke with his manager, who decided to report the incident to the local authorities. They decided to go undercover and see if Steve was doing anything illegal.

When Steve came to Vega again, Alex rented him a tank of anhydrous ammonia. The police discovered that Steve had been selling small amounts of ammonia to local meth labs for about $250.00 for a small propane cylinder’s worth. Steve was apprehended and is currently awaiting trial.
Questions/Discussion

1. What factors should have made Alex suspicious?

Alex should have become suspicious about how frequently Steve was renting the tank. Once every three weeks is not normal.

- The fact that it had just started to snow was another factor. As the winter months come, farmers have less and less need for agricultural products.
- Oxidation on the tank that Steve had just rented.

2. Did Alex handle the situation correctly?

Alex handled the situation very well. He notified management, who after discussion with him, also found the situation suspicious.

3. Did the fact that Steve was a long-time customer have a direct effect on his credibility?

Yes. Steve had been coming to Vega for many years, therefore he was well-known and allowed many times to slip through where others might have been suspected.
Security and Anhydrous Ammonia

By Bob King, Senior Extension Educator
Cornell Cooperative Extension – Monroe County

Due to increases in the number of anhydrous ammonia thefts on New York farms, it has become increasingly important to be more aware of the physical security of the storage and handling of this agricultural fertilizer. Anhydrous ammonia is a key ingredient in the manufacture of methamphetamine, which is a powerful illegal drug that makes users feel euphoric and go days without sleep. Side effects of this drug include irritability, paranoia, aggression and violence. Thefts occur during the day and night, with most thefts occurring at night. Five to six gallons of anhydrous ammonia are sufficient to manufacture a large quantity of methamphetamine.

Tampering can cause the weakening of flow valves and result in malfunctioning valves that will leak or spill material. Physical contact and inhalation of anhydrous ammonia can result in serious injuries including chemical burns to the eyes, lungs and body.

Anhydrous ammonia theft can also increase the risk of an explosion especially when using an improper container for storage and transport. Anhydrous ammonia exerts the same pressure as a fully inflated car tire when placed in a closed container at 30 degrees F.

Anhydrous ammonia is a known hazardous substance and creates a dangerous condition; consequently, farmers may be liable for the harm to any farm visitor, including the trespassing thief. Documenting reasonable precautions to secure the chemical and posting signs warning of dangerous conditions may help reduce liability.

Since the amount of material stolen is relatively small compared to the total volume of the tank, farmers are often unaware that a theft has occurred. Signs of tampering also include footprints in the soil, stained soil, tank valves which are not tightly closed or which have been tampered with; items left near the tank, such as duct tape, garden hoses, plastic tubing, bicycle inner tubes, or coolers; or the presence of barbeque grill propane tanks.

Extreme caution should be used when empty containers are found, especially small barbeque propane tanks. Propane tanks found with blue- or green-colored valves or with frost indicate anhydrous ammonia and compromised copper or galvanized valve fittings.

Reducing the Risk of Anhydrous Ammonia Theft

Light it up. At night, portable tanks and storage tanks should be kept in well-lit locations — preferably with motion-sensored lights — that can be easily observed and monitored by
family, employees, and neighbors at any time.

**Just-in-time inventory.** Inventory only what you need and receive it just before the time of application. Promptly return tender tanks back to your supplier. A just-in-time inventory schedule may significantly decrease your exposure to this crime. Bleed and remove hoses at the end of the day to remove excess liquid and prevent use of them to steal your material.

**Keep it out of sight.** When doing fieldwork, avoid storing portable tanks in plain view, especially from a road. Move portable tanks to an inconspicuous location to avoid detection by a passerby.

**Keep an eye on it.** Whenever possible, take a quick look at your storage tanks and surroundings. When using the bathroom at night, take a quick look out your windows to observe any unusual activity on your farm, especially motion lights that may have turned on. Place brightly colored plastic wire ties or seals between the valve wheel and the roll cage to facilitate quick visual checks. If the tie or seal has been broken, it is likely that someone has tampered with your tank.

**Report it.** Call local law enforcement immediately about any suspicious vehicles or activity that you observed at any time near or on your farm. When possible, write down a license plate number and/or description of vehicle(s) and/or individual(s). Report it immediately. We highly recommend that you do not confront any suspicious vehicles and/or individuals. Individuals engaged in this crime are likely to be under the influence of methamphetamine, which can result in aggressive, violent and dangerous behaviors.

**Know whom to call.** When you are concerned about suspicious activities on your farm, have important phone numbers readily available so you can call at a moment’s notice.

**Call 911, Sheriff’s Office or State Police.**

Locking a tank valve has proven to be less than an effective measure, since perpetrators break off the lock and/or valve, which can result in, significant environmental and repair problems. Restricting access to a tank through the use of fencing and other physical barriers can be an effective deterrent.

Make sure that all tanks are labeled with caution labels to warn others of the highly hazardous nature of anhydrous ammonia.

Ultimately, sharpening your skills as an observer requires networking with your neighbors and community. The more you are aware of your surroundings, the more proficient you will be at reducing the risk of this opportunistic crime.

Sources: New York State Police; Offices of the Sheriff - Monroe, Livingston, & Wyoming Counties
PowerPoint Slides 1-3

Learning Objectives

As a result of this session, participants will:

- Be aware that anhydrous ammonia can be used to make illegal drugs.
- Understand behaviors that may indicate suspicious activity.
- Understand that specific security measures can prevent unlawful access to anhydrous ammonia.

Ammonia is an important industrial chemical.

- Fertilizer
  - ammonium sulfate
  - ammonium phosphate
  - ammonium nitrate

- Chemicals
  - nitric acid
  - sodium bicarbonate
  - sodium carbonate
  - hydrochloric acid

- Explosives
  - ammonium nitrate

- Cleaning
  - ammonia solutions

- Mining, Metallurgy
  - nickel extraction

- Pulp and Paper
  - ammonium hydrogen sulfate

- Pharmaceuticals
  - sulfanilamide and derivatives

- Fibers, Plastics
  - nylon, polyurethanes

- Refrigeration
PowerPoint Slides 4-6

Ammonia Distribution Network

- Manufacture
- Distribution
- Storage
- Delivery
- Application

Anhydrous Ammonia Tank

Anhydrous Ammonia Hazards

- Caustic (alkali) burns
- Freezing burns
- Inhalation danger to lining of mouth, throat, and lungs
- Does not support respiration – suffocation danger
- Especially dangerous to eyes
Means of Exposure

- Hose – rupture, not bled
- Connection – faulty, worn, improperly connected, freezing
- Valve – corroded, worn, or freezing
- Inhalation danger to lining of mouth, throat and lungs
- Does not support respiration – suffocation danger
- Very dangerous to eyes

Tank rupture or pressure relief (Never fill tank over 85%)

Personal Protective Equipment

- Always use eye and hand protection when working with anhydrous ammonia
- Use full-body protection when working with large tanks

Response

Water, water, water!
Carry a squirt bottle on your person and in your vehicle for immediate first aid to eyes.
Have a water hose installed near all storage tanks.
Know the location of showers and eye wash stations.
Methamphetamine

Common names: meth, crank, ice, crystal meth

Can be taken orally, injection, or smoked

Meth Labs in the U.S.

Source: El Paso Intelligence Center’s National Clandestine Laboratory Seizure System, 2002

Meth Labs

Meth lab showing mix of specialized equipment and everyday items.
Meth Labs

This trailer was used as a meth lab. It is concealed with a tarp and piles of brush and debris.

Meth Labs

Small-scale meth lab. Notice propane tank used to store anhydrous ammonia.

Meth Labs

An entire portable meth lab fits in this storage tub.
Hazard Reduction and Prevention

- Educate employees about anhydrous ammonia theft
- Store tanks in well-lit areas
- Know your inventory
- Inspect tanks every morning and before every use
- Consider valve locks, fences, or other physical security measures, especially for infrequently used tanks
- Consider other deterrents such as motion detector lights, alarms, security patrols or video surveillance

Legal Responsibility

“Facilities handling extremely hazardous chemicals (including anhydrous ammonia) have a general duty to assess hazards, design and maintain a safe facility, and minimize the consequences of accidental releases.” – Clean Air Act (1970)
GloTell additive causes anhydrous ammonia to leave a bright pink stain. It can help to detect thefts or leaks. It interferes with illegal drug production.

Improving Security

- Storage
- Transportation
- Personnel
- Disposal
- Response

Security: Storage

How easy would it be for anhydrous ammonia to “disappear” from your facility?
### PowerPoint Slides 22-24

#### Security: Storage

- Maintain inventories so that you always know the exact quantities of anhydrous ammonia you have.
- Use logbooks to keep track of who removes anhydrous ammonia from your facility.
- Store anhydrous ammonia in a building which can be locked or in a fenced enclosure with a locked gate.
- If appropriate, provide a second security perimeter, such as a fence with a locked gate surrounding your storage facility.

#### Security: Storage

- Perform a walk-through and walk-around daily to check for attempted entry, vandalism, and structural integrity.
- Provide good lighting on all sides of your storage facility.
- For some facilities, install security systems, such as alarms and camera systems, and make sure they are properly maintained.

#### Security: Transportation

Is transportation the weak link in your security?
Security: Transportation

- Create a paper-trail for any anhydrous ammonia you ship.
- Ship anhydrous ammonia in a locked vehicle.
- Go directly to delivery point when possible, taking the best route available to avoid high population areas, tunnels, and bridges.
- Exercise extreme caution if it becomes necessary to stop. Avoid unguarded and unlighted areas where theft is a substantial risk and be on your way as soon as possible.
- Be alert to vehicles following your truck, strangers asking questions, or anyone snooping around your cargo.

Security: Transportation

- Do not pick up hitchhikers, do not talk about your cargo on CB radio, and do not discuss your cargo with those not involved.
- Always telephone your customer if you find you will be late for a delivery.
- Check your load at delivery to ensure no product is missing. Do not leave product at field site unless it is well attended or secured within buildings. Always obtain a signed delivery ticket.
- Carefully check background of all new drivers. Every driver should be properly licensed and trained in good practices for handling chemicals that may be hazardous in the hands of dangerous people.

Security: Personnel

Do you know your employees?

Do you know who has access?
PowerPoint Slides 28-30

Security: Personnel

- Develop effective hiring and labor relations policies.
- Consider background checks for current/new employees, particularly if the person handles hazardous materials.
- Consider fingerprinting and photographing employees who handle hazardous materials.
- Be aware of personal identity theft, such as stolen Social Security numbers, references, etc.
- Request employees to watch for suspicious activities and ask persons they don’t recognize to identify themselves and state their reason for being on the facility.

Security: Personnel

- Adopt a company security whistleblower protection policy.
- Know who has keys and access to hazardous material storage areas.
- Retrieve keys and employment identification cards from an employee and change computer access passwords when their employment ends.
- Assess a worker’s violence potential and take appropriate security precautions when terminating or disciplining an employee.

Security: Disposal

Do you have a plan for safe and secure disposal?

Hazmat worker inspects aging chemical drums abandoned in a field.
PowerPoint Slides 31-33

Security: Disposal

- Maintain security over material which is being disposed of until it is claimed by appropriate authorities.
- Arrange for prompt and safe disposal of materials.

Security: Response

- Develop an emergency plan for your facility. Train your workers in the plan and rehearse it with them.
- Post emergency response numbers, including fire, law enforcement, medical contacts, and poison control in several locations in your facility. Make all employees aware of these response numbers.
- Report to appropriate authorities any suspicious activities, vehicles, persons, threats to personnel or facilities, sabotage/vandalism to facilities or equipment, and thefts, inventory shortages, or missing products that could pose a risk to public health or safety.
Identifying Suspicious Behavior

Watch for unusual or suspicious behavior by a purchaser who:

- Seems unfamiliar with details of using fertilizers
- Acts nervous, seems uneasy or vague, and avoid eye contact
- Demands immediate possession of purchase material instead of future delivery
- Asks for material in smaller individual containers rather than in bulk
- Insists on paying in cash instead of using a check, cash or credit card

If someone is acting suspicious...

- Notify your manager.
- Notify local law enforcement.

Summary 1

1. Anhydrous ammonia is a pure form of ammonia. Although it is a colorless gas at normal pressure and temperature, it is stored as a liquid under pressure.
2. Anhydrous ammonia is a very strong base that tends to penetrate skin tissues and cause severe damage.
3. Always be very careful when transferring or applying anhydrous ammonia. Use appropriate PPE and have first aid materials available for immediate use.
4. Anhydrous ammonia can be used by small-scale or large-scale manufacturers of the illegal drug methamphetamine.
Summary 2

5. Tampered tanks and valves increase the potential for unintentional exposure and injury to both the thief and the tank owner/user.

6. Examine storage and handling procedures and develop a security plan that covers the following areas:
   - Storage
   - Transportation
   - Personnel
   - Disposal
   - Response

7. Suspicious Behavior
   - Watch for unusual or suspicious behavior.
   - Contact your manager or local law enforcement to report suspicious persons.

Questions and Discussion

The Agrochemicals and Security Training Module was produced in part with support from the United States Department of Agriculture (USDA) and the Extension Disaster Education Network (EDEN).

Mention of trade name products in this presentation does not constitute an endorsement and is included for informational purposes only.
Developing a Hazard Mitigation Plan

Subject
Agroterrorism using agrochemicals is one kind of man-made disaster. Producers can establish plans and procedures and make simple changes to their facilities that can minimize the impact of such an event. It begins with a Hazard Mitigation Plan.

Goal
Make participants aware of the importance of hazard mitigation. They will work through the steps of producing a hazard mitigation plan.

Objectives
As a result of this session, participants will:

• Understand the meaning of “mitigation.”
• Understand the value of hazard mitigation planning.
• Understand the hazard mitigation process.
• Understand how to develop a hazard mitigation plan.
• Be able to prepare a partial hazard mitigation plan.

Session Outline
Part 1: Welcome and Introduction
Part 2: Unit Learning Objectives
Part 3: Pre-Test
Part 4: Learning Sections

Section 1: What is hazard mitigation?
Section 2: What can a Hazard Mitigation Plan do for you?
Section 3: The Mitigation Process
Section 4: Developing Your Hazard Mitigation Plan

Step 1. Create a Planning Team
Step 2. List operations and facilities
Step 3. Outline potential hazards and impacts
Step 4. List mitigation and response strategies for each hazard
Step 5. Prioritize operations
Step 6. Prioritize mitigation efforts.
Step 7. Assigning tasks and target dates
Step 8. Acquiring resources

Section 5: Summary

Part 5: Questions and Discussion
Part 6: Post-Test
Part 7: Session Evaluation
Part 8: Adjourn
To conduct this training, you will need:

1. “Developing a Hazard Mitigation Plan” PowerPoint presentation, and a means to show it. (Download from the UF/IFAS Disaster Handbook Web site: <http://disaster.ifas.ufl.edu>.)
2. Note paper or PowerPoint slide pages to serve as participant workbooks
3. If desired, sufficient copies of the Pre- and Post Test for all participants to take the test both before and after session
4. Unit 6 evaluation forms.

Part 1 — Welcome and Introduction

Take a moment at the beginning of the lesson to welcome the participants to the session. Introduce yourself as the presenter, and remind participants of the title and subject (above) of the session.

Part 2 — Unit Learning Objectives

Briefly introduce the audience to the learning objectives for this unit. As a result of this session, participants will:

- Understand the meaning of “mitigation”
- Understand the value of hazard mitigation planning
- Understand the hazard mitigation process
- Understand how to develop a hazard mitigation plan
- Be able to prepare a partial hazard mitigation plan

Part 3 — Pre-Test

If you choose to administer pre- and post-tests, do so now before you do anything else. Explain to the participants that everyone will take a short quiz before the session just to give themselves a clearer idea of what they already know about the subject and some things they will learn during the session. Tell them that they will take the same test at the end of the session and this will help the presenter by giving an idea of the effectiveness of the session.

The pre- and post-tests should take only a few minutes each.
Part 4 — Learning Sections

Section 1: What is hazard mitigation?

“Mitigation” is an unfamiliar word to most people, but it has a simple meaning: Mitigation means taking actions that will reduce damages if a disaster or other catastrophe occurs. It is an important part of any preparedness plan and should be the focus of business leaders and civil officials. Thinking in terms of mitigation is a way of prioritizing the many actions that can be taken in advance of disaster. It is like asking, “What can we do now that will best reduce injury and damage later?”

Although “hazard” is a more familiar word, emergency planners and safety specialists use this word in a specific way. For example, a sudden change in ceiling height is a hazard. It does not jump out and hurt anyone, but if you weren’t paying attention, or if the ceiling wasn’t marked, or if you weren’t wearing head protection, you might bump your head and be hurt. In other words, a hazard is a source of possible injury or damage. Many work sites are full of hazards, but with adequate training, good working practices, and appropriate safety equipment, the number of injuries and incidents of property damage can be reduced.

Hazard mitigation strategies can fall into several categories. In the previous example, one option was to mark the ceiling to draw attention to the hazard. This is an example of an environmental solution, in other words, how can we change the environment to minimize the hazard? An important environmental solution is providing information about hazards. Tail lights on cars and back-up alerts on trucks do this, as do barricades, safety markings, and signs. Other categories of mitigation strategies are: engineering solutions (design and production of the helmet in the previous example); and behavior-based solutions (training the employees to 1) watch out for uneven ceilings, and 2) training them to wear the helmet). A fourth category is the human factors solution, which means designing the workspace for efficiency, comfort, and safety of the workers. In this example, it might be possible to find out why the ceiling is uneven and make adjustments that would reduce the possibility of head bumps. Look for these strategies in the examples that follow and as you work through the exercise.

Another example comes from riding in a car. People do this all the time without incident, but if a collision occurs, the normally safe interior of a car must be re-evaluated in terms of a person being thrown around in it. Under
these circumstances, the hardness of the dashboard, the placement of the steering wheel, or the windshield itself become hazards. The hazards exist all the time, but they aren’t “activated” until there is a collision. There are many strategies in place to reduce the possibility of injuries due to collision. The first strategy has the goal of preventing collisions and comes in the form of driver training, organizing traffic flow to prevent collisions through the use of street markings, traffic signals, tail-lights, and rules of the road (and of course, a group of people whose job it is to observe drivers and penalize them if they break the rules!). A second strategy comes in the form of engineering cars that absorb impacts and resist crushing of or intrusion into the passenger compartment. A third strategy has the goal of interfering with the hazard if a collision occurs. This comes in the form of passenger restraints, i.e., seat belts and air bags, and the audible warning that tells passengers that a seat belt is not fastened. A fourth strategy – and a true mitigation strategy – is to reduce the damage that would result if a passenger is not restrained and is violently thrown in a collision. To mitigate injuries, car manufacturers try to eliminate hard surface or sharp objects from the car interior. They pad dashboards and steering wheels and most of the interior surfaces of the vehicle.

Let’s take a more extreme example. Consider an explosion. In operations that employ volatile, flammable or explosive materials or high pressures, explosion is a possibility – it is a hazard, and owners or managers of such operations must take steps to prevent explosions, to provide a means of escape should an explosion appear imminent, and a means of reducing the impact on their operations if an explosion does occur.

If an explosion does occur, a new set of hazards is created. A previously safe work environment now presents the possibility of falling materials, jagged edges, exposed electrical lines, dangerous chemicals, and so on. So in mitigating hazards, it is important to think of the direct impact of a catastrophe like an explosion, which can kill and injure in the instant it happens by the shock and/or heat it generates, by shrapnel or other thrown materials, by falling materials, or fire. It is also important to think about the hazardous environment that the explosion will create out of a normal work environment.

In the Agrochemicals and Security module, we are focusing on acts of terrorism or sabotage that are by their very nature unpredictable. If we don’t know when or where such an event might occur or what its nature or extent might be, how can we possibly prepare? What makes reasonable preparation possible is that many disasters require the same kind of response, and there is a response infrastructure at all levels of government that is training for a wide range of possible events.
Think of mitigation planning as something you do before an incident to put you in the best possible position after the incident. However, many planners include prevention (and therefore security) as part of mitigation.

**Section 2: What can a Hazard Mitigation Plan do for you?**

The first concern is protecting the lives and health of you, your family and workers in your operation. That is the highest priority for any hazard mitigation plan, so the first answer to the question is “It can save your life.”

A hazard mitigation plan can also save your business. It can do this in one of two ways: 1) by protecting critical elements of your operation without which you might not be able to stay in business, and 2) by having alternate procedures and resources in place that allow you to continue your operation while you are recovering from an incident. The latter topic is often referred to as business continuity, and there is a lot of information and some periodicals devoted to this subject. We often think about critical infrastructure, such as the facilities, tools and machinery, that we use everyday in operations. But equally important are fuel, electricity, and computers.

Consider also how your hazard mitigation plan can affect your insurance rates and protect your operation’s neighbors, customers, your community and the environment.

**Section 3: The Mitigation Process**

Developing a mitigation plan is one part of the mitigation process. The complete process has several phases:

- Development of a hazard mitigation plan
- Implementation of the plan
- Periodic review of the plan
- Working the plan (in case of an incident)
- Examination of the plan (after an incident)

We’ll look at each of these phases briefly and then proceed to developing a hazard mitigation plan.
Phase 1: Developing a Mitigation Plan

Developing a mitigation plan involves identifying the risks your operation faces and deciding what actions you could take both in advance of and in reaction to an incident.

Planning is about what could happen, and often, people prefer not to think about that. They may prefer to imagine that if there is a disaster, their knowledge of the operation and the facilities will allow quick action. For most people, their expectation of what will happen is based largely on what has happened. For all these reasons, it would be easy for many people to resist making the effort to plan for disasters. When companies review the causes and complicating factors behind the loss of lives, property, or data, it often comes down to a failure to anticipate the impact of an incident. Regardless of the size of your operation, the time invested in developing a plan is time well spent.

It can be easy to get lost in the planning process and forget that the point of the plan is making it work when an incident occurs. The plan must be specific enough to cover the kinds of incidents one would expect in an operation like yours, but it must also be flexible enough so that you can handle unexpected kinds of incidents.

We’ll be developing a mitigation plan later in this exercise, so we’ll leave this part of the process here.

Phase 2: Implementation of the Plan

There is a certain value to developing a mitigation plan in and of itself. It alerts you to dangers to your operation you might not have been aware of. But a plan by itself isn’t very valuable, and a plan doesn’t become part of your operation without a critical step: implementation.

Implementation is a process within itself. You must sit down with the plan and probably some colleagues or managers and prioritize the elements of the plan. Once you know what elements of the plan will be put in place first, then it is time to figure out how it will get done.

What resources are needed? Where will needed materials be purchased? When will workers be trained in new procedures or the use of new equipment? Each element of the plan will get a plan of its own to make it a working part of your operation.
Implementation can include rehearsing the plan. For instance, some elements of a mitigation plan may require a high level of communication or coordination in shutting down operations in the right order or at critical moments. If your plan includes complex procedures like this, it is a good idea to schedule classroom training followed by a drill. Although some workers or managers may resent the time that training takes from their work, they must realize the importance of being prepared to work as a team in the event of an emergency. If drills are impractical, table-top simulations can be used.

Phase 3: Periodic Review of the Plan

You should arrange to meet with your planning committee at regular intervals, at least annually, to review your mitigation plan. Your operation can change in ways that require additions or deletions from the plan. New workers will need training in your mitigation plan – untrained workers can quickly become part of the problem in an emergency situation.

Phase 4: Working the Plan (in case of an incident)

When an incident occurs, you will find out quickly how good your planning, implementation and training are.

Phase 5: Examination of the Plan (after an incident)

After an incident is over, bring together workers and managers and examine how the plan performed. Did everyone know their role? Were required resources readily available and in good condition? If local responders were required, interview them and find out what they saw in your plan that was helpful and what hampered their efforts. Take time to revise your mitigation plan and go through another implementation phase to bring together the necessary resources, train workers, etc.

Ironically, an incident can provide an opportunity to design your operation with mitigation in mind. This is another benefit of mitigation planning: it can lead to a smarter design process for operations.
Section 4: Developing Your Hazard Mitigation Plan

Developing a hazard mitigation plan can be a very detailed process or you can limit its focus. How detailed you want to be depends on your operation and on how much is at risk. Keep in mind that the best plan is one that actually gets implemented, so be practical. This kind of brainstorming can lead to productive discussion that goes beyond mitigation planning. Look at this as an opportunity to take some time out to learn more about your own operations.

The development process has been divided into 8 steps in order to clarify the kind of work that should go into the plan. In actual planning sessions, you may find that it is easier to take individual operations or hazards through all eight steps.

Step 1. Create a planning team
Step 2. List operations and facilities
Step 3. Outline potential hazards and impacts
  – natural hazards
  – sabotage and terrorism
  – unintentional errors
Step 4. List mitigation and response strategies for each hazard
Step 5. Prioritize operations
Step 6. Prioritize mitigation efforts
Step 7. Assign tasks and target dates
Step 8. Acquire resources

In these exercises, we will use the example of Pace Manufacturing, which has a facility composed of four buildings. Building 1 is a storehouse for materials to be processed. Building 2 houses vehicles and a workshop. Building 3 is where the materials are processed, and building 4 is shipping/receiving. There is a small office in building 4 where the owner and a clerk work. A total of 25 people work in this business.

Step 1. Create a Planning Team

Ideally, your planning team will include individuals familiar with all phases of your operations, however, a planning team of more than 8-10 people can become very difficult to work with. If your operations require the participation
of that many people, you may want to group individuals into subteams. Instruct team leaders in the planning procedure, and let them work with their subteams to develop mitigation plans for their operations. Reconvene team leaders to share the results of their planning and to discuss how to share resources and strategies and avoid needless duplications (sometimes, duplication can be a valuable mitigation strategy in its own right).

In our example, the owner of the facility decides to put seven people on the planning team:

1. owner
2. clerk
3. storehouse manager
4. vehicle manager
5. workshop manager
6. processing facility manager
7. shipping manager

**Step 2. List operations and facilities**

Once you have a planning committee, bring the members together to list all your operations and facilities. It’s a good idea to list suppliers and buyers as well. If a disaster occurs in your area, it may not damage your facility directly, but if it impacts your suppliers, your workers’ homes, etc., there will be a direct impact on your business’s ability to function.

In our example, the owner decides to call the planning committee together on a Friday morning when most of the week’s orders have been filled and the managers’ time is more flexible. They begin by listing the operations and facilities. Because of the size of this business, there aren’t really any surprises, until the processing facility manager brings up waste disposal. He has always been somewhat concerned about the potential for fire in the debris from the processing, which involves some solvents. This causes everyone to look at their own operation a little more closely. Usually everyone is so focused on the product that they don’t think that much about the potential hazards of byproducts and wastes. It’s never really been an issue. But what if a fire started in wastes from the workshop?

You can use the Hazard Mitigation Planning Worksheets in this booklet with your planning committee to work through the planning process. Provide
worksheets to committee members so that they can analyze their component of your business, or work together to fill out worksheets during a committee meeting.

For the purposes of this action plan, select one or two operations or facilities, and use the worksheets provided in this booklet for steps 2-7.

**Step 3. Outline potential hazards and impacts**

Our example illustrates that when the planning committee starts to think about the operation in the context of hazards, some new ways of looking at the business can emerge. It shows that there are different ways of approaching these issues.

The key to planning for hazards is to understand impacts, that is, how hazards can affect your operations. In terms of our example, the planning committee can look at this in two different ways. They can start with a hazard and ask what would happen if there were a fire, for instance, in the processing facility. Or they could start with an impact and ask what would happen to their business if the primary processor was broken – and then backtrack to think about what hazards might cause this situation.

In looking for hazards and impacts, think about these three categories and ask yourself some questions:

1. **Natural hazards**
   - What is the history of natural hazards in the area where our facility is located?

2. **Vandalism, sabotage and terrorism**
   - Is there a history of vandalism or sabotage in our industry? In our locale?
   - If someone wanted to sabotage our operation, what is a likely target? What is the easiest target? What target would cause the most damage if it was sabotaged?
   - Thieves can cause damage to facilities, either intentionally or otherwise. What are the likely targets of theft in our facilities, and what damage might an uninformed intruder cause?

3. **Unintentional situations**
   - Are there critical parts of our process that are more likely to cause fires, explosions, etc.? Are there parts of the process that involve...
Developing a Hazard Mitigation Plan

Step 4. List mitigation and response strategies for each hazard

For many hazards, your operation may already have mitigation strategies, even something as simple as a fire extinguisher, a first aid kit, or posted escape routes. The planning process is a good time to formalize mitigation steps you have been considering but haven’t quite gotten around to. It’s also a good time to think about your mitigation budget. What annual outlay is reasonable for your business?

At this point, you may wish to review the Hazard Mitigation Checklist (at the end of this unit) with the participants. This checklist can be useful to suggest some hazard mitigation strategies to them and for them to work through on their own. If you use the checklist during the training session, you can go through it one item at a time and ask participants what their answers are and what their experiences are with that mitigation strategy or the hazard it suggests. When time is more limited, pick only a few items on the checklist to review with the participants.

In the sample worksheet, notice that our planning committee has used the
Mitigation/Response Strategies column in a very flexible way to list an upgrade to a system they already have, new equipment, and new procedures. Many mitigation efforts depend on information and are as inexpensive as the time it takes to post the information or spend some time with employees training or discussing procedures.

**Step 5. Prioritize operations**

In a broad planning effort, there would be many planning worksheets, and the committee would probably want to sit down with them and decide in what order they want to work on their mitigation plans. Just a reminder: To be successful, a plan has to be implemented. A lot of work can go into mitigation planning, but a determination to “do it all” can be counterproductive. Better to prioritize and get a few items accomplished. In further planning meetings, the committee can address work that was not done and reprioritize.

In our example, the committee has struggled to prioritize its operations. They looked at each operation and asked how long they could run if that operation was severely damaged or destroyed. Even with that understanding, they found that they could not rank manufacturing against business and personnel operations; they ranked both as number 1.

**Step 6. Prioritize mitigation efforts**

Continuing the prioritization effort, we now consider the individual strategies to decide what must be accomplished first and what can wait. There may be many considerations that go into prioritizing. Efforts that do not cost money but only take time can be high priority items because they can easily be accomplished as time allows. When the work of implementing the strategies is assigned to several people, more tasks can be accomplished at high priority.

In our example, we can see all these ideas at work. Several mitigation strategies proposed by the committee involve only time, such as posting information, training employees, and adding a backup procedure to the clerk’s weekly routine. Other strategies, such as the fire suppression system, will require research before a system can be purchased – if the research shows that it is a good idea. The top priority for this group is a fireproof cabinet. The ability to maintain business records through a disaster is a good way to reassure clients that their service can be resumed as quickly as
possible. Businesses with a high transaction rate may want to consider backing up and securing electronic data more frequently than weekly. The question to ask about your electronic data is: how would you reconstruct your electronic records and how long would it take?

**Step 7. Assign tasks and target dates**

Now that the committee has decided what to do and what to do first, it’s time to decide who will do it and when it should be done by. Defining the who and when in the planning meeting makes sure that someone will take responsibility and increases the chances that the work will get done. It also allows the committee to spread out the work fairly.

In our example, three committee members have taken on all the tasks, probably because these tasks fall naturally in their work areas. The owner, Tom, is taking responsibility for some larger responsibilities, but the manager of the processing facility, Karen, is going to look into the fire suppression system. The office clerk, Keith, will take care of the strategies that fall in his area. The committee has given itself three weeks to get all of these tasks done. They can schedule a follow-up meeting on June 1 to see if everything went smoothly and the strategies are in place and to hear reports from Tom and Karen on insurance and new fire systems.

**Step 8. Acquire resources**

The committee also needs to consider what special resources are needed to allow the strategies to be completed. In many cases, this will come down to money, and the business will have to prioritize strategies that cost money in the order it can afford them. But there are other important resources, such as information, administrative approval, delivery of equipment, etc.

**Section 5: Summary**

Mitigation means actions you can take now to reduce the impact of disasters.

Hazard mitigation planning can save your business and your life.

The mitigation process has five phases:

- Development of a hazard mitigation plan
- Implementation of the plan
- Periodic review of the plan
- Working the plan
- Examination of the plan

Create your hazard mitigation plan in 8 steps:

1. Create a planning team
2. List operations and facilities
3. Outline potential hazards and impacts
4. List mitigation and response strategies for each hazard
5. Prioritize operations
6. Prioritize mitigation efforts
7. Assigning tasks and target dates
8. Acquiring resources

**Part 5 — Questions and Discussion**

Take this opportunity to discuss the unit. Participants may wish to take some time to work through the Hazard Mitigation forms at the end of this unit, or to brainstorm some mitigation strategies.

**Part 6 — Post-Test**

If you choose to administer the post-test, do so now. You have already prepared the audience for this when you administered the pre-test. Just remind them that it will take only a couple of moments.

**Part 7 — Session Evaluation**

An evaluation form is supplied in this booklet. Ask participants to take a few minutes to fill out this form, tear it out of the workbook and turn it in. If you allow participants to fill these forms out at home and return them to you at a later time – even later in the workshop – the chances of getting any evaluations are greatly reduced.
Part 8 — Adjourn

Thank the participants for their attention and encourage them to implement the hazard mitigation steps they developed during the training session.

Additional Resources

The Federal Emergency Management Agency (FEMA) has an extensive listing of on-line courses in their “Curriculum for Community-based Pre-Disaster Mitigation.” One part of the curriculum is designed for community organizations, and another for emergency managers. These courses allow students to take mitigation planning as far as they want. Find these courses on the Web at: <http://www.fema.gov/tab_education.shtm>.

The Extension Disaster Education Network (EDEN) maintains a Web site and database of resources which mitigation planners may find useful. Access the EDEN Web site at: <http://www.eden.lsu.edu>.

Searching the Web can quickly lead to resources specific to your locale. Many government agencies now have mitigation planning information and local resources available over the Internet.
Developing a Hazard Mitigation Plan—Pre-test

This pre-test is intended to gauge your level of knowledge before participating in the Developing a Hazard Mitigation Plan training. Please answer all the following questions to the best of your ability.

1. Select the best definition of mitigation.
   ___ a. Mitigation means repairing damages caused by a disaster.
   ___ b. Mitigation means taking actions before a disaster that will help people survive.
   ___ c. Mitigation means taking actions that will reduce damages if a disaster occurs.
   ___ d. Mitigation means reducing the likelihood of a disaster.

2. Why is hazard mitigation planning important?
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

3. What are the five steps involved in a successful hazard mitigation plan?
   1. ________________________________________________________________
   2. ________________________________________________________________
   3. ________________________________________________________________
   4. ________________________________________________________________
   5. ________________________________________________________________

4. Only management should be involved in hazard mitigation planning. (Circle one.)
   True or False.

5. Why is it important to constantly monitor progress with a hazard mitigation plan?
   ________________________________________________________________
   ________________________________________________________________
Developing a Hazard Mitigation Plan—Post-test

This post-test is intended to gauge your level of knowledge after participating in the Developing a Hazard Mitigation Plan training. Please answer all the following questions to the best of your ability.

1. Select the best definition of mitigation.
   ___ a. Mitigation means repairing damages caused by a disaster.
   ___ b. Mitigation means taking actions before a disaster that will help people survive.
   ___ c. Mitigation means taking actions that will reduce damages if a disaster occurs.
   ___ d. Mitigation means reducing the likelihood of a disaster.

2. Why is hazard mitigation planning important?
   ____________________________________________________________________
   ____________________________________________________________________
   ____________________________________________________________________

3. What are the five steps involved in a successful hazard mitigation plan?
   1. ____________________________________________________________________
   2. ____________________________________________________________________
   3. ____________________________________________________________________
   4. ____________________________________________________________________
   5. ____________________________________________________________________

4. Only management should be involved in hazard mitigation planning. (Circle one.)
   True or False.

5. Why is it important to constantly monitor progress with a hazard mitigation plan?
   ____________________________________________________________________
   ____________________________________________________________________
Developing a Hazard Mitigation Plan—Answer Key

1. What is mitigation?
   c. Mitigation means taking actions that will reduce damages if a disaster occurs.

2. Why is hazard mitigation planning important?
   Hazard mitigation planning can reduce loss of life or property and help assure continuity of operations in the event of an emergency or disaster.

3. What are the five steps involved in a successful hazard mitigation plan?
   1. Development of a hazard mitigation plan
   2. Implementation of the plan
   3. Periodic review of the plan
   4. Working the plan (in case of an incident)
   5. Examination of the plan (after an incident)

4. Only management should be involved in hazard mitigation planning. True or False.
   False. Employees can have very valuable input into mitigation planning. They are also the ones who are ultimately going to carry it out and make it successful.

5. Why is it important to constantly monitor progress with a hazard mitigation plan?
   It is important to constantly monitor mitigation planning progress because it must be evaluated periodically to make sure revisions can be made as needed.
Participant’s Evaluation of Developing a Hazard Mitigation Plan

Please circle the number that best expresses your opinions for each of the following statements. Circle only one number per question for questions 1 through 4.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. The training unit’s format was easy to follow.

2. The information presented is useful to me.

3. The time it took to complete the training session was acceptable.

4. As a result of this session, I have a better understanding of hazard mitigation planning.

5. We welcome your comments about this program:

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

Please use the back of this sheet for any further comments.

Thank you for your time!
Hazard Mitigation Planning Worksheet 1

Step 1: Create a Planning Team

<table>
<thead>
<tr>
<th>Individual</th>
<th>Knowledge Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. _________</td>
<td>__________________</td>
</tr>
<tr>
<td>2. _________</td>
<td>__________________</td>
</tr>
<tr>
<td>3. _________</td>
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<td>4. _________</td>
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<td>8. _________</td>
<td>__________________</td>
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<td>9. _________</td>
<td>__________________</td>
</tr>
<tr>
<td>Date</td>
<td>Target Date</td>
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<td>------</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
### Hazard Mitigation Planning Worksheet for Example Operation

<table>
<thead>
<tr>
<th>Hazards/Impacts</th>
<th>Mitigation/Response Strategies</th>
<th>Priority</th>
<th>Assigned to</th>
<th>Resources Required</th>
<th>Target Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fire</strong></td>
<td>Alarm system that notifies fire department and owner (Upgrade current alarm system)</td>
<td>2</td>
<td>Tom</td>
<td>Business loan</td>
<td>5/7</td>
</tr>
<tr>
<td></td>
<td>Fire suppression system (research this and present options to committee)</td>
<td>3</td>
<td>Karen</td>
<td></td>
<td>5/14</td>
</tr>
<tr>
<td><strong>Destruction of business records</strong></td>
<td>Backup computers on a weekly basis</td>
<td>Keith</td>
<td>Backup system and software</td>
<td>5/7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Get fireproof cabinet for storage of critical records and computer backups</td>
<td>1</td>
<td>Keith</td>
<td>Storage unit</td>
<td>5/14</td>
</tr>
<tr>
<td><strong>Wildfire</strong></td>
<td>Check with insurance company about wildfire coverage</td>
<td>Tom</td>
<td></td>
<td></td>
<td>5/7</td>
</tr>
<tr>
<td></td>
<td>Review evacuation with employees</td>
<td>Tom</td>
<td></td>
<td></td>
<td>5/21</td>
</tr>
<tr>
<td></td>
<td>Post fire response information in all buildings</td>
<td>Keith</td>
<td></td>
<td></td>
<td>5/7</td>
</tr>
</tbody>
</table>
## Hazard Mitigation Checklist

### Emergency Communications

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>___</td>
<td>Do you have a contact system, such as a telephone tree, to notify all employees in an emergency?</td>
</tr>
<tr>
<td>___</td>
<td>Do you have a way to contact next-of-kin for every employee?</td>
</tr>
<tr>
<td>___</td>
<td>Is an automated emergency notification system (for example, via Web site, e-mail, telephone, or radio) appropriate for you?</td>
</tr>
<tr>
<td>___</td>
<td>Do you have a manual for emergency policies and procedures?</td>
</tr>
<tr>
<td>___</td>
<td>Are employees aware of the manual and have they been trained in the policies and procedures?</td>
</tr>
<tr>
<td>___</td>
<td>Do your employees receive a safety orientation when they are hired and periodic safety training and drills?</td>
</tr>
</tbody>
</table>

### Facility Security

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>___</td>
<td>Do you review your insurance coverage periodically?</td>
</tr>
<tr>
<td>___</td>
<td>Do you have inventory safeguards, especially for hazardous materials?</td>
</tr>
<tr>
<td>___</td>
<td>Do you conduct periodic building and property inspections?</td>
</tr>
<tr>
<td>___</td>
<td>Do you have policies and procedures controlling who can access your facilities?</td>
</tr>
</tbody>
</table>

### On-site Emergency Resources

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>___</td>
<td>Are first aid kits, water, tool kits and other emergency supplies readily accessible?</td>
</tr>
<tr>
<td>___</td>
<td>Do you periodically inspect and update fire and gas detectors and extinguishing systems.</td>
</tr>
</tbody>
</table>

### Dealing with Vendors

<p>| | |</p>
<table>
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<tr>
<td>___</td>
<td>Do you know your vendors? Do they conduct background checks on employees?</td>
</tr>
<tr>
<td>___</td>
<td>Do your contracts include security requirements and safeguards?</td>
</tr>
</tbody>
</table>

### Records and Computer Operations

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>___</td>
<td>Are all essential records backed up and stored in remote locations.</td>
</tr>
<tr>
<td>___</td>
<td>Do you change system passwords periodically, at least twice a year?</td>
</tr>
<tr>
<td>___</td>
<td>Do you delete obsolete addresses and accounts from the corporate network?</td>
</tr>
<tr>
<td>___</td>
<td>Do you maintain current antivirus and antispyware software?</td>
</tr>
<tr>
<td>___</td>
<td>Do you have security policies for hardware, software and network assets?</td>
</tr>
</tbody>
</table>
Contact Numbers for Emergency Service Providers

<table>
<thead>
<tr>
<th>Law Enforcement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Police</td>
<td></td>
</tr>
<tr>
<td>Local Sheriff</td>
<td></td>
</tr>
<tr>
<td>State Police</td>
<td></td>
</tr>
<tr>
<td>FBI</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fire</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Emergency Medical Services</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Utilities</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical</td>
<td></td>
</tr>
<tr>
<td>Gas</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Services or Suppliers</th>
<th></th>
</tr>
</thead>
</table>
PowerPoint Slides 1-3

Agrochemicals and Security

*Developing a Hazard Mitigation Plan*

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**Learning Objectives**

As a result of this session, participants will:

- Understand the meaning of “mitigation”
- Understand the value of hazard mitigation planning
- Understand the hazard mitigation process
- Understand how to develop a hazard mitigation plan
- Prepare a partial hazard mitigation plan

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**Hazard + Mitigation**

Hazard – potential source of personal injury or property damage

Mitigation – taking actions to reduce negative impacts
PowerPoint Slides 4-6

Mitigation Strategies

- Environmental solution
- Information
- Engineering solutions
- Behavior-based solutions
- Human factors solution

Prevention/Mitigation Strategies: Car

1. Prevent collisions
   - Traffic laws, marking and lighting systems for roads and cars...
2. Build tougher cars
   - Impact-resistant body panels, shock absorbing bumpers...
3. Passenger restraint systems
   - Seat belts, airbags, automatic door locks...
4. Safer car interiors
   - Padded dash and steering wheel, headrests...

Extreme Hazards: Explosion

- List hazards created by an explosion
- What steps could you take to reduce:
  1) The possibility of an explosion (Prevention)
  2) The damage to life and property should an explosion occur (Mitigation)
Hazard Mitigation Plan: Benefits

- It can save your life!
- It can save your business:
  1) By reducing the impact of an event
  2) By having resources in place to continue doing business in case of an event

Hazard Mitigation Process

- Development of a hazard mitigation plan
- Implementation of the plan
- Periodic review of the plan
- Working the plan (in case of an incident)
- Examination of the plan (after an incident)

Phase 1: Develop a plan

- Identify risks to your operation
- Decide what actions you could take both in advance of and in reaction to an incident
- Assign roles
PowerPoint Slides 10-12

Phase 2: Implement your plan

- Acquire resources required by the plan
- Train workers to fulfill roles
- Rehearse components of the plan
- Explain the importance of the plan

Phase 3: Periodic review of your plan

- Meet at least annually to consider if changes are needed in the hazard mitigation plan
- How has your operation changed since the last meeting?

Phase 4: Working the plan

When an emergency occurs, you will learn quickly how thorough and effective your hazard mitigation plan is.
Phase 5: Evaluating the plan

Meet after every event to consider if the plan worked.
- Was the event covered adequately by the plan?
- Did workers understand their responsibilities during the event?

Developing Your Hazard Mitigation Plan

Step 1. Create a planning team
Step 2. List operations and facilities
Step 3. Outline potential hazards and impacts
  - natural hazards
  - sabotage and terrorism
  - unintentional errors
Step 4. List mitigation and response strategies for each hazard
Step 5. Prioritize operations
Step 6. Prioritize mitigation efforts.
Step 7. Assigning tasks and target dates
Step 8. Acquiring resources

Pace Manufacturing

- Warehouse
- Manufactoring
- Vehicle/Workshop
- Shipping/Receiving
PowerPoint Slides 16-18

**Step 1: Create a Planning Team**
- Select individuals from all phases of your operations
- Aim for 8-10 members
- Create subteams for specialized situations
- Subteams follow Steps 2-7 of the planning process

**Pace creates a planning team**
- Storehouse manager
- Vehicle manager, Workshop manager
- Process manager
- Owner, clerk, Shipping manager

**Step 2: List Operations and Facilities**
- In the case of an event that affects a large local area, consider buyers, suppliers, utilities, and workers’ homes
- Consider byproducts and waste materials
The Pace planning committee lists its operations and facilities

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Special needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>Chemicals for process 1 (non-hazardous but expensive)</td>
</tr>
<tr>
<td>Warehouse</td>
<td></td>
</tr>
<tr>
<td>Vehicle maintenance</td>
<td>Chemicals for process 2 (highly flammable)</td>
</tr>
<tr>
<td>and repair</td>
<td>Acetylene</td>
</tr>
<tr>
<td>Workshop/fabrication</td>
<td></td>
</tr>
<tr>
<td>Front Office</td>
<td></td>
</tr>
<tr>
<td>Access road?</td>
<td></td>
</tr>
<tr>
<td>Back-up generator?</td>
<td></td>
</tr>
</tbody>
</table>

Step 3: Outline Potential Hazards and Impacts

1. Natural hazards
   - What is the history of natural hazards in the area of your facility?
   - If a natural disaster occurred, what aspects of your operation would be most affected?

2. Vandalism, sabotage, and terrorism
   - Is there a history of vandalism or sabotage in your industry? In your locale?
   - What is the likeliest target of sabotage? The easiest? The most critical?
   - What damages could an uninformed intruder cause?
PowerPoint Slides 22-24

Step 3: Outline Potential Hazards and Impacts

3. Unintentional situations
   • Which parts of our process that are likely to cause fires, explosions, etc.? Parts that involve intense heat, high pressure, dangerous chemicals, exposure to disease-causing organisms?
   • What injuries, catastrophes, emergencies, etc. have happened in the past in our business?

The Pace planning committee considers potential hazards and impacts

Hazards/Impacts
   • Fire (had a near miss; fire dept – long response time)
   • Destruction of business records (a lot of it is electronic)
   • Wildfire (because of location and bad fire seasons)
   • What could shut down the access road?

Step 4: List Mitigation Strategies for Each Hazard

Key: What can you do now that could keep your operation running or get it going again as quickly as possible?
   • Strategies in place for the hazard?
   • Upgrade existing strategies?
   • Alternatives for each process in your operation?
   • Need documentation and training?
PowerPoint Slides 25-27

The Pace planning committee focuses on the fire hazard

<table>
<thead>
<tr>
<th>Hazard/Impact</th>
<th>Mitigation/Response Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire</td>
<td>• Alarm system that notifies fire dept. and owner (Upgrade current system)</td>
</tr>
<tr>
<td></td>
<td>• Fire suppression system (research this and present options to committee)</td>
</tr>
</tbody>
</table>

Step 5: Prioritize Operations

• Think “business continuity.”
• Balance how critical an operation is against how good an alternative you can find.

The Pace planning committee prioritizes operations.

1. Business and personnel operations
   Manufacturing operations
2. Shipping/Receiving
3. Vehicle maintenance/repair
4. Warehousing
PowerPoint Slides 28-30

Step 6: Prioritize Mitigation Efforts

- Estimate costs of specific efforts.
- Balance cost of mitigation efforts against how critical an operation is.

The Pace planning committee prioritizes mitigation efforts

<table>
<thead>
<tr>
<th>Hazards/Impacts</th>
<th>Mitigation/Response Strategies</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire</td>
<td>Alarm system upgrade</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Fire suppression system</td>
<td>3</td>
</tr>
<tr>
<td>Destruction of</td>
<td>Backup computers weekly</td>
<td>3</td>
</tr>
<tr>
<td>business records</td>
<td>Fire-proof record storage</td>
<td>1</td>
</tr>
<tr>
<td>Wildfire</td>
<td>Current wildfire insurance coverage?</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Review evacuation with employees</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post fire response info in all buildings</td>
<td></td>
</tr>
</tbody>
</table>

Step 7: Assign Tasks and Target Dates

- Specific assignments and target dates help assure that work will get done
Developing a Hazard Mitigation Plan

PowerPoint Slides 31-33

The Pace planning committee assigns tasks and target dates

<table>
<thead>
<tr>
<th>Hazards/Impacts</th>
<th>Mitigation/Response Strategies</th>
<th>Priority</th>
<th>Assigned to</th>
<th>Resources Required</th>
<th>Target Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire</td>
<td>Alarm system upgrade</td>
<td>2</td>
<td>Tom</td>
<td>Business loan</td>
<td>5/7</td>
</tr>
<tr>
<td>Fire suppression system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5/14</td>
</tr>
<tr>
<td>Destruction of business records</td>
<td>Fire-proof record storage</td>
<td>1</td>
<td>Keith</td>
<td>Storage unit</td>
<td>5/14</td>
</tr>
</tbody>
</table>

Step 8: Acquire Resources

Think about “resources” in broad terms:
- Money, budgetary authority
- Information, data
- Administrative approval

Acquisition can be affected by delivery times, installation requirements, etc.

Summary 1

Mitigation means actions you can take now to reduce the impact of disasters.

Hazard mitigation planning can save your business and your life.
PowerPoint Slides 34-36

Summary 2
The mitigation process has five phases:
- Development of a hazard mitigation plan
- Implementation of the plan
- Periodic review of the plan
- Working the plan
- Examination of the plan

Summary 3
Create your hazard mitigation plan in 8 steps:
1. Create a planning team
2. List operations and facilities
3. Outline potential hazards and impacts
4. List mitigation and response strategies for each hazard
5. Prioritize operations
6. Prioritize mitigation efforts
7. Assigning tasks and target dates
8. Acquiring resources

Questions and Discussion
Agrochemicals and Security: Developing a Hazard Mitigation Plan

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