

National Worker Protection Standard: A Manual for Trainers

of Agricultural Workers
and Pesticide Handlers

Cover photos courtesy of: Chazzbo Media, Oregon Occupational Safety and Health Administration, and Association of Farmworker Opportunity Programs



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCsupport@ucdavis.edu.

**National Worker Protection Standard:
A Manual for Trainers of Agricultural Workers and Pesticide Handlers**

November 2016

CONTRIBUTORS

Pesticide Educational Resources Collaborative (PERC)

Director – Suzanne Forsyth, University of California Davis Extension

Deputy Director – Kaci Buhl, Oregon State University

Principal Investigator – Jeff Loux, University of California Davis Extension

Project Officer – Jeanne Kasai, U.S. EPA, Office of Pesticide Programs

Primary Authors

Jennifer Weber, Arizona Department of Agriculture

Antonio Castro-Escobar, Michigan Department of Agriculture and Rural Development

Manual Production/Layout Team

Cameron Hughes, Oregon State University

Sean Ross, Oregon State University

Advisory Board Reviewers

Lisa Blecker, University of California

Juan Concha, Farmworker Association of Florida

Content Reviewers U.S. EPA, Office of Pesticide Programs

Kathy Davis, Jeanne Kasai, Jennifer Park, Nancy Fitz, and Richard Pont

Project Coordinators

Amy Bamber, Association of American Pesticide Control Officials

Kerry Richards, American Association of Pesticide Safety Educators

Additional Content Contributors

Cesar Asuaje, University of Florida

Ofelio Borges, Washington State Department of Agriculture

Kathleen Kincade, Oregon OSHA

Ricardo Davalos, Florida Department of Agriculture and Consumer Services

Gregorio Mendez-Ortega, Minnesota Department of Agriculture

Elizabeth Buffington, Iowa State University Extension

This manual was developed by the Pesticide Educational Resources Collaborative (PERC) through a cooperative agreement (agreement #X8-83616301) between the U.S. EPA's Office of Pesticide Programs and University of California Davis Extension, in collaboration with Oregon State University.

TABLE OF CONTENTS

TOC

INTRODUCTION.....	1
Purpose of the Manual	1
Overview.....	1
CHAPTER 1: OVERVIEW OF PESTICIDE REGULATIONS.....	3
FIFRA - the Federal Statute	4
The Agricultural Worker Protection Standard (WPS)	5
State and Tribal Pesticide Laws and Ordinances	5
What is a Pesticide?	5
Why are Pesticides Used in Agriculture?	6
Who is an Agricultural Employer?	6
Who is an Agricultural Worker?	6
Who is a Pesticide Handler?	7
Who is an Early-Entry Worker?	8
Are There Age Restrictions for Certain Activities?	8
Who is an Immediate Family Member?.....	8
What are the Goals of the Worker Protection Standard?.....	9
Why is WPS Pesticide Safety Training Important?.....	11
What are the Benefits of WPS Training for Employees?	11
What are the Benefits of WPS Pesticide Safety Training for Employers?	11
CHAPTER 2: WPS RESPONSIBILITIES FOR EMPLOYERS.....	13
Pesticide Safety Training	14
Entry Restrictions During Pesticide Applications	16
Pesticide Safety Information Poster or Display.....	19
Oral and Posted Pesticide Application Notification of Treated Areas	20
Application Exclusion Zones (AEZ).....	23
Enclosed Space Production Areas.....	24
Decontamination Supplies for Workers	25
Decontamination Supplies for Handlers and Early-Entry Workers	26

Emergency Assistance28

Protections Against Retaliation.....29

Respiratory Protection for Handlers.....29

CHAPTER 3: WPS TRAINING REQUIREMENTS31

 When to Provide Pesticide Safety Training32

 Qualified Trainers33

 EPA-Approved Training Materials34

 Presentation.....34

 Training Records.....35

CHAPTER 4: WPS TRAINING TOPICS37

 Worker Protection Standard (WPS) Training Topics.....38

 WPS Training Topics for Workers and Handlers39

 Additional WPS Training Topics for Handlers43

CHAPTER 5: TRAINING TOPICS FOR WORKERS AND HANDLERS45

 Agricultural Employee Tasks and Limitations.....47

 Pesticides and Pesticide Residues47

 Pesticide-Related Health Effects49

 Reducing the Risk of Pesticide Exposure.....57

 Restrictions During Pesticide Applications57

 Notification About Pesticide Applications58

 Reducing Hazards from Pesticide Drift60

 Work Clothing and Personal Protective Equipment (PPE).....61

 Routine Decontamination Procedures62

 Responding to Pesticide Illnesses and Injuries64

 Employee Rights and Protections Against Retaliatory Acts.....68

TABLE OF CONTENTS

TOC

CHAPTER 6: ADDITIONAL WPS TRAINING TOPICS FOR HANDLERS	69
6-1: Reading and Understanding the Pesticide Label.....	70
6-2: Selecting and Inspecting Personal Protective Equipment (PPE).....	82
6-3: Measuring, Mixing, and Loading Pesticides	92
6-4: Surveying the Pesticide Application Site	102
6-5: Applying Pesticides Safely and Effectively.....	108
6-6: Cleaning up at the End of the Handling Task	116
6-7: Transporting, Storing and Disposing of Pesticides and Their Containers..	120
CHAPTER 7: EFFECTIVE TRAINING TECHNIQUES	123
Presenting Effective WPS Training	124
CHAPTER 8: WPS SAMPLE TRAINING ACTIVITIES	141
Sample Training Activities	142
CHAPTER 9: TRAINING PREPARATION	199
Gathering Information	200
Organizing Your Training	206
Additional Considerations	216
CHAPTER 10: SITUATIONS AND SUGGESTIONS	219
Language Skills, Literacy Levels, and Educational Backgrounds.....	222
Cultural Backgrounds.....	226
Knowledge About Pesticides and Workplace Experience	226
Personalities and Learning Styles	228
Generations.....	231
Attitudes About Safety.....	232
Additional Trainer Resources	236
DEFINITIONS OF COMMON TERMS.....	239
Glossary	239

Purpose of the Manual

The purpose of this manual is to provide guidance for training agricultural workers and pesticide handlers who work in outdoor and enclosed space production areas, such as farms, forests, nurseries, and greenhouses.

The manual is designed to help trainers conduct effective training sessions for agricultural workers and pesticide handlers in compliance with revisions to the federal Worker Protection Standard (WPS) training requirements, which begins January 2, 2017.

Overview

This manual begins with an introduction to pesticides and pesticide safety, including the federal pesticide regulations. It discusses each of the specific points that must be included in WPS training sessions and contains valuable information to help trainers prepare for and conduct pesticide safety training.

This manual focuses on effective ways to communicate pesticide safety and WPS information. It describes a variety of training techniques that are adaptable to different training programs and includes fifteen sample activities for WPS trainers. The final chapter addresses situations that may arise during training and provides suggestions on how to resolve them.

Contents

FIFRA - the Federal Statute	4
The Agricultural Worker Protection Standard (WPS).....	5
State and Tribal Pesticide Laws and Ordinances	5
What is a Pesticide?	5
Why are Pesticides Used in Agriculture?.....	6
Who is an Agricultural Employer?	6
Who is an Agricultural Worker?	6
Who is a Pesticide Handler?	7
Who is an Early-Entry Worker?	8
Are There Age Restrictions for Certain Activities?	8
Who is an Immediate Family Member?	8
What are the Goals of the Worker Protection Standard?	9
Goal 1 – Inform.....	9
Goal 2 – Protect.....	10
Goal 3 – Mitigate.....	10
Why is WPS Pesticide Safety Training Important?	11
What are the Benefits of WPS Training for Employees?	11
What are the Benefits of WPS Pesticide Safety Training for Employers? .	11



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCSupport@ucdavis.edu.

FIFRA - the Federal Statute

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) governs the registration, sale, and use of pesticide products in the United States. The federal agency that regulates pesticides is U.S. Environmental Protection Agency (EPA).

A pesticide product must be registered by EPA before it can be legally marketed in the United States. A pesticide registrant must submit to EPA an application for registration, along with a significant amount of data and information in support of the application. EPA reviews the information and determines whether the proposed use of the product meets the safety standards. If the application is sufficient to make the safety finding, EPA registers the product with conditions of use provided on the label. In most cases, FIFRA requires EPA to balance the risks of using a pesticide with its benefits to society.

Some of FIFRA's provisions require the EPA to

- make registration decisions about pesticides and their uses and to approve product labeling for registered products,
- establish acceptable tolerance levels for residues that may remain in or on raw agricultural products,
- make it illegal to use any pesticide except as directed by the label requirements, and
- assess civil and criminal penalties for misuse of pesticides.



Photo courtesy of Penn State Extension, The Pennsylvania State University

FIFRA also gives EPA the authority to write regulations, such as the Worker Protection Standard (WPS) to achieve the protections outlined in the statute.

The Agricultural Worker Protection Standard (WPS)

The WPS was established by EPA to reduce risks associated with occupational exposure of pesticides to agricultural workers and pesticide handlers. It was also designed to protect other people from risks of pesticides used in agricultural production.

The federal WPS was adopted into the Code of Federal Regulations in 1992. Since 1992, there were several minor changes to the regulation, but major revisions were published on November 2, 2015. Enforcement for most of the 2015 revised requirements begins January 2, 2017.

The WPS covers agricultural workers and pesticide handlers who are employed on farms, forestry operations, or in nurseries and enclosed space production areas when pesticide products, that contain an Agricultural Use Requirements section that references the WPS, are used on the establishment. The WPS requires agricultural employers to provide protections under the rule.

State and Tribal Pesticide Laws and Ordinances

Pesticide laws developed at the federal level are the minimum national requirements that agricultural employers and pesticide handlers must follow to protect people and the environment when using pesticides. A state or tribe may enact additional rules, laws, or ordinances governing pesticide use that are more stringent than the federal regulations.

What is a Pesticide?

A pesticide is any substance used to prevent, destroy, repel, or reduce the effects of pests. Agricultural pests may include insects, rodents, nematodes (microscopic worms), fungi (fungus), and weeds.

CHAPTER 1

By law, a pesticide is any substance "intended for preventing, destroying, repelling, or mitigating any pest."

There are many types of pesticides. Some are well known, such as insect repellents, while others are not, including defoliants and desiccants that facilitate harvest by removing leaves or drying out the plants.

Fertilizers are substances that serve as nutrients to help plants grow. Since they do not control pests, they are not pesticides. Therefore, hazards associated with the use of fertilizers are not covered under the WPS.



Photo courtesy of Ed Crow, Penn State Pesticide Education Program

Why are Pesticides Used in Agriculture?

Agricultural pesticides are used to manage weeds, insects, and crop diseases to increase crop yield and quality. The use of agricultural pesticides helps growers provide consumers with abundant, and affordable supplies of food and fiber. Because pesticides are intended to control pests, their use may present risks to people, wildlife, and the environment. These risks and ways to reduce them are presented throughout this manual.

Who is an Agricultural Employer?

An agricultural employer is any person who owns, or is responsible for the management or working conditions of an establishment, and who employs a worker or handler.



Photo courtesy of Chazzbo Media

Who is an Agricultural Worker?

An agricultural worker, or worker, is a person who is employed (including self-employed) on an agricultural establishment and is doing work such as harvesting, weeding, pruning, or irrigating for the production of agricultural plants on farms, forests, and in nurseries or enclosed space production areas, such as greenhouses.

Who is a Pesticide Handler?

A pesticide handler, or handler, is a person who is employed (including self-employed) on an agricultural establishment and who

- mixes, loads, or applies agricultural pesticides;
- assists with the pesticide application;
- disposes of pesticides or opened pesticide containers that have not been cleaned;
- handles opened containers of pesticides when emptying, triple rinsing, or cleaning pesticide containers according to pesticide product labeling;
- cleans, adjusts, handles or repairs the parts of mixing, loading, or pesticide application equipment that may contain pesticide residues;
- works as a flagger;
- enters an enclosed space after the application of a pesticide and before the inhalation exposure level listed on the labeling has been reached or the ventilation criteria has been met to operate ventilation equipment, monitor air levels, or adjust or remove coverings used for fumigation; or
- enters a treated area outdoors after application of any soil fumigant during the label-specified entry-restriction period to adjust or remove coverings used in fumigation, or to perform tasks as a crop advisor during any pesticide application, restricted-entry interval (REI), or before the inhalation exposure level listed on the pesticide product labeling has been reached or one of the ventilation criteria has been met.



Photo courtesy of Chazzbo Media

Who is an Early-Entry Worker?

An early-entry worker is an agricultural worker who enters an area after the pesticide application is complete but before the REI has expired. Early entry is only allowed under certain narrow circumstances. Early-entry workers must receive the personal protective equipment (PPE), decontamination supplies, and additional information about the pesticide product and the early-entry restrictions to protect themselves before entering the treated area.

Are There Age Restrictions for Certain Activities?

Under the WPS, pesticide handlers and early-entry workers must be at least 18 years old, with the exception of immediate family members.

Who is an Immediate Family Member?

The WPS exempts the owner and their immediate family from certain WPS requirements. The exemption applies on agricultural establishments where a majority of the establishment is owned by one or more members of the same immediate family. The owner and the immediate family members must follow the label instructions and a few WPS requirements, but are exempt from many of the provisions of the WPS. Immediate family members include the owner's



Photo courtesy of Chazzbo Media

- spouse
- parents
- children
- stepparents and stepchildren
- foster parents and foster children
- most in-laws (parents, children, siblings)
- grandparents
- grandchildren
- brothers and sisters
- aunts and uncles
- nieces and nephews
- first cousins

What are the Goals of the Worker Protection Standard?

The WPS has three major goals, which are described in further detail throughout this manual:

1. Inform - To provide workers and handlers information to minimize occupational pesticide exposure for themselves and their families.
2. Protect - To protect agricultural workers and pesticide handlers from pesticide exposure while they are working.
3. Mitigate - To mitigate or reduce the effects of any pesticide exposure that might occur.

Goal 1 – Inform

Agricultural employers must provide workers and handlers with pesticide safety and product use information needed to protect themselves, other people, and the environment from exposure to pesticides. This is accomplished by providing

- annual pesticide safety training,
- pesticide safety information display at the central location,
- pesticide application and hazard information in the form of a safety data sheet (SDS) at the central location, and
- access to pesticide product labeling for handlers.



Photo courtesy of Chazzbo Media

Goal 2 – Protect

The WPS requires agricultural employers to provide protections for workers and handlers to limit their risk of exposure to pesticides at work. These protections include

- notifying workers when pesticide applications will take place,
- informing workers, either through oral notification or by posting warning signs, of pesticide-treated areas under an REI that they should avoid entering,
- maintaining and providing PPE for handlers and early-entry workers, and
- keeping workers and other persons out of pesticide treated areas and application exclusion zones (AEZ) during applications.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Goal 3 – Mitigate

The WPS is intended to minimize the effect of pesticide exposures by requiring agricultural employers to provide

- routine and emergency decontamination supplies and eyewash water,
- information about a potential exposure for work-related pesticide illnesses and injuries, and
- transportation to a nearby medical facility, if necessary, for a suspected pesticide illness or injury.



Photo courtesy of Chazzbo Media

Why is WPS Pesticide Safety Training Important?

Pesticides are substances used to target and manage pests. However, they may also be toxic to nontarget organisms, such as people. Workers, unlike handlers, do not apply or work directly with pesticide products, and may be unaware there are pesticides on treated plants or equipment. Workers in or near recently pesticide-treated areas and areas where pesticides are stored or handled need information on how to limit their exposure to pesticides.

Limiting exposure to pesticides is very important, because even a brief exposure to a pesticide may result in a short-term or acute illness. Low level, long term or chronic pesticide exposure can also cause illness or injury. Handlers may be likely to experience chronic exposure from frequent mixing, loading, or other handling activities with concentrated pesticides, and acute injuries from a single spill or splash.

What are the Benefits of WPS Training for Employees?

Workers and handlers benefit from pesticide safety training by receiving information on the potential risks of working in areas where pesticides have been used and pesticide residues may be found. During training, they learn how to protect themselves and their families from being exposed to pesticides and pesticide residues.

What are the Benefits of WPS Pesticide Safety Training for Employers?

Employers benefit when their employees protect themselves from pesticide exposure and act to minimize the effects should exposure occur. A worker or handler who has received effective pesticide safety training is less likely to have a pesticide-related workplace accident that could result in lost work time, increased workers' compensation insurance rates, and possible legal action.

Contents

Pesticide Safety Training 14
 Previously Trained Employees.....15
 Training Records Provided upon Request15
Entry Restrictions During Pesticide Applications..... 16
 Early-Entry Exceptions and Limitations.....17
 Table 2.1: Early-Entry Worker Exceptions and Limitations18
Pesticide Safety Information Poster or Display 19
 Pesticide Application and Hazard Information at the Central Location.....19
 Application Records20
Oral and Posted Pesticide Application Notification of Treated Areas ... 20
 Notification in Outdoor and Enclosed Space Production Areas21
 Warning Sign Posting Locations for Outdoor Agricultural Production21
 Posting Location for Enclosed Space Production Areas.....21
 Posting Requirements.....22
 Oral Notification22
 Double Notification23
 Exceptions to Oral or Posted Pesticide Notifications23
Application Exclusion Zones (AEZ) 23
 Table 2.2: AEZ Distances Based on Height and Droplet Size24
Enclosed Space Production Areas 24
Decontamination Supplies for Workers 25
 Location.....25
 Duration.....25
Decontamination Supplies for Handlers and Early-Entry Workers 26
 Table 2.3: Decontamination Supplies for Handlers & Early-Entry Workers26
Emergency Assistance 28
Protections Against Retaliation 29
Respiratory Protection for Handlers 29
 Respiratory Protection Recordkeeping System.....29

The Worker Protection Standard (WPS) requires agricultural employers to take steps **before, during, and after** pesticide applications to protect workers and handlers and to limit their exposure to pesticides while working in outdoor or enclosed space production areas.

This chapter contains an overview of many of the WPS responsibilities for employers, such as

- pesticide safety training,
- pesticide application information and safety data sheets (SDSs),
- notification of pesticide applications and treated areas under an REI,
- decontamination supplies,
- application exclusion zones (AEZ), and
- respiratory protection for handlers.

More thorough details about employers' responsibilities can be found in "How to Comply With the 2015 Revised Worker Protection Standard For Agricultural Pesticides," (EPA 735-B-16-001), also referred to as the "How to Comply Manual," which can be accessed and downloaded from the PERC and EPA websites:

PERC: pesticideresources.org/wps/htc

EPA: epa.gov/pesticide-worker-safety/pesticide-worker-protection-standard-how-comply-manual

Pesticide Safety Training

Agricultural employers must ensure that pesticide safety training is provided to workers before they enter a field or area where a pesticide has been applied or where a restricted-entry interval (REI) has been in effect within the last 30 days. Handlers must be trained before they handle any pesticide product that contains an Agricultural Use Requirements box, under Directions for Use, which references the WPS.

Under the WPS, the employer is not required to present the training, but must make sure each worker or handler working on the establishment has received pesticide safety training by a qualified WPS trainer in the previous 12 months.

Previously Trained Employees

If a worker or handler received training while working for a previous employer within the past year and the training can be verified, the new employer does not need to retrain the worker or handler until the training expires. The new employer must retain a copy of the training record as proof that training occurred. The new employer must also provide the employee with establishment-specific information, such as the location of the pesticide safety information, pesticide application information, safety data sheets (SDSs), and decontamination supplies.

The agricultural employer must keep a detailed WPS training record for two years following the training. **The training record details must include**

- the date of training,
- the employer's name,
- printed name and signature of the trained worker or handler,
- the trainer's name,
- documentation proving the trainer is qualified to provide the WPS worker or handler training,
- the type of training provided (worker or handler), and
- information about the EPA-approved materials that were used during the WPS training.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Training Records Provided upon Request

The federal WPS requires agricultural employers to maintain training records for two years. Therefore, it is highly recommended that trainers provide employers with copies of the WPS training record for their files. Some states require pesticide safety trainers to provide each trained worker and handler with a card verifying completion of a pesticide safety training.

Entry Restrictions During Pesticide Applications

During pesticide applications, agricultural employers must ensure workers do not enter or remain in the treated area or application exclusion zone (AEZ). In general, agricultural employers can accomplish this by scheduling applications and workers' tasks appropriately. Some supporting WPS requirements include

- posting application information at a central location,
- notifying workers orally about applications, and/or
- posting warning signs.

There are occasions when a WPS-trained worker must enter an area that is under a REI. In these instances, the employee becomes an "early-entry worker."

Examples of early-entry workers are those who will

- have **no contact with treated surfaces**, such as plants, soil, air, irrigation water or water standing in drainage ditches or puddles;
- have **limited contact with treated surfaces** in response to situations that were unforeseen, could not be delayed and do not involve hand labor;
- have **limited contact with treated surfaces while performing unforeseen irrigation tasks** that could not be delayed and do not involve hand labor;
- perform **short term tasks** that last less than one hour and do not involve hand labor; or
- enter to perform tasks in response to an **agricultural emergency** situation.

Exceptions for early-entry workers can be found in Chapter 3 of the "How to Comply With the 2015 Revised Worker Protection Standard For Agricultural Pesticides," (EPA 735-B-16-001). See Chapter 10 for a list of links.

BEFORE the “early-entry worker” is allowed to enter the area under the REI, the employer must provide the early-entry worker with the PPE listed on the pesticide product label for early-entry tasks, decontamination supplies, and the following information

- location of the area where the early-entry task will be performed,
- name of the pesticide(s) applied to the area,
- date and time the REI began and ends,
- exception that is the basis for the early-entry task,
- description of the tasks that may be performed under the exception,
- amount of time the worker is allowed to remain in the area,
- requirements on the pesticide product labeling for early-entry tasks,
- location of the pesticide safety information (EPA pesticide safety poster), and
- location of the decontamination supplies required for early-entry workers.

Early-Entry Exceptions and Limitations

There are several types of early-entry exceptions and limitations based on the type of task the worker will perform. The following table can serve as a guide for trainers who will provide early-entry workers with information about these exceptions and limitations prior to entry into the area under the REI.

Table 2.1: Early-Entry Worker Exceptions and Limitations

IF AN EARLY-ENTRY WORKER WILL:					
	Have NO contact with a treated surface	Have limited contact with a treated surface	Have limited contact under an irrigation exemption	Perform short term tasks for less than 1 hour	Assist with or respond to an agricultural emergency
Can this person contact treated surfaces?	NO	Allowed contact of treated surfaces with hands, forearms, feet, and lower legs	Allowed contact of treated surfaces with hands, forearms, feet, and lower legs	YES	YES
Can this person participate in hand labor tasks during the REI?	YES (1)	NO	Only allowed to perform irrigation tasks	NO	YES
How long can this person remain in the area under the REI in a 24-hour period?	There is NO time limit	There is an 8 hour time limit per worker	There is an 8 hour time limit per irrigator	There is a 1 hour time limit per worker	There is NO time limit except for double notification products, which have a 4 hour time limit per worker
Is there a restriction that states this person is only allowed into the area under the REI when the situation is “unforeseen?”	NO	YES	NO	NO	YES
Does this person need to wear the PPE listed on the label for early-entry workers?	NO	YES	YES	YES	YES
How long must this person wait before entering the area under the REI?	Until after the respiratory or ventilation criteria are met	4 hours after the application ends and respiratory or ventilation criteria are met	4 hours after the application ends and respiratory or ventilation criteria are met	4 hours after the application ends and respiratory or ventilation criteria are met	4 hours after the application ends and respiratory or ventilation criteria are met
Is early entry allowed if the pesticide applied in the area requires BOTH oral and written notification about the application?	YES	NO	NO	YES	NO, although there is a 4 hour time limit per 24 hour period for these products
Is the employer required to notify early-entry workers about the situation and explain the exemption is being used?	YES	YES	YES	YES	YES

(1)Hand labor is only allowed if the hand labor will not result in any contact with any pesticide treated surfaces. For example, if the pesticide is incorporated into the soil during the application (and is not a fumigant) or if it is a soil-drench application in a nursery or enclosed space production, it may be possible to do hand labor and not contact any pesticide treated surfaces.

Pesticide Safety Information Poster or Display

The pesticide safety poster or display provides basic hygienic and safety steps workers and handlers learned during training and should use to reduce their exposure to pesticides at work. It also contains contact information for reporting pesticide use violations and for nearby medical facilities in case of an emergency.

The employer must make this information available at a central location on the establishment. The information must be provided in a manner workers and handlers can understand, and must be posted before the application and for 30 days after the REI has expired. The poster must also be displayed at permanent decontamination supply sites and other decontamination supply locations when there are 11 or more workers.

Pesticide Application and Hazard Information at the Central Location

Employers must make available pesticide application information and hazard information in the form of SDSs for each pesticide applied. This information must be readily available at a central location on the establishment, such as a break room or common gathering area that is accessible to all employees during regular work hours.

The information must be displayed within 24 hours after the end of the application and before employees enter the pesticide treated area. It must be continuously available for 30 days after the end of the last applicable REI, or until workers or handlers are no longer on the establishment, whichever comes first.

The hazard information that is made available must be in the form of an SDS from the manufacturer of the pesticide.

The application information must contain

- the product name, EPA registration number, and active ingredient(s) of the pesticide;
- the crop or site treated and the location and description of the treated area(s);
- the date and start time of the pesticide application;
- the time that the application was completed; and
- the duration of the REI for that application.



Photo courtesy of Ed Crow, Penn State Pesticide Education Program

Application Records

The agricultural employer must retain the pesticide application records and SDSs on the agricultural establishment for two years after the expiration of the REI. The employer must provide the pesticide application records and SDSs to workers, handlers, treating medical personnel, and designated representatives upon request.

Oral and Posted Pesticide Application Notification of Treated Areas



Photo courtesy of Chazzbo Media

In addition to displaying the safety poster, pesticide application records and hazard information at a central location, agricultural employers must notify workers about pesticide-treated areas on the establishment. This notification must be provided either orally or by posting the warning sign at the entrances of pesticide-treated areas. Posting requirements are dependent on the label instructions and the length of the REI.

Notification in Outdoor and Enclosed Space Production Areas

The posted warning sign is required whenever a site on the agricultural establishment has been treated with a pesticide that has

- an REI greater than 48 hours for outdoor agricultural production,
- an REI greater than 4 hours for enclosed space agricultural production, or
- a label statement requiring double notification.

The employer can choose whether to orally notify employees about the application or post the area when using a pesticide that does not require double notification or with REIs less than those listed above.

Warning Sign Posting Locations for Outdoor Agricultural Production

When posting warning signs at an outdoor production area that is under an REI, the signs must be visible from all reasonably expected points of worker entry to the restricted area. This includes access roads and each border with any worker housing area within 100 feet of the treated area, as well as walking routes into the treated area. If these entry points do not exist, the signs must be posted to allow maximum visibility.



Photo courtesy of James Hollyer, University of Hawai'i at Mānoa

Posting Location for Enclosed Space Production Areas

When posting in an enclosed space production area, whether the entire space is being treated or a specific area, posted warning signs must be visible from all reasonably expected points of worker entry.

Posting Requirements

Workers must not be permitted into the treated area while the warning signs are posted, except as permitted under the early-entry exceptions. Warning signs must be

- posted in outdoor or enclosed space production areas no more than 24 hours before the start of the pesticide application,
- visible and legible during the entire REI, and
- removed or covered no more than 3 days after the end of the REI.

Oral Notification

If the REI for the pesticide that was applied to the area does not meet the requirement for posting of warning signs, the employer may orally notify workers of the pesticide treated areas. If employers provide oral notification, they must tell workers

- the description and location of pesticide-treated areas subject to restriction,
- the date and time entry into pesticide-treated areas is restricted during the application and after the application,
- not to enter the treated area until the REI has expired and all posting signs have been removed or covered, and
- not to enter the AEZ.

The above information must be provided

- in a manner the worker understands,
- before the application begins if a worker will be at the establishment at the start of the application, and
- at the beginning of the work period if the worker arrives at the establishment when the pesticide application is taking place, or when a REI is in effect.

Double Notification

Some product labels require the employer to provide both oral warnings and posted warning signs, which is called “double notification.” If double notification is required on the label, the employer must use both notification systems.

Exceptions to Oral or Posted Pesticide Notifications

Employers do not need to provide oral or posted notification if any of the following apply:

1. **In enclosed space production areas**, no worker will enter the entire structure from the start of the application through the end of the REI.
2. **In outdoor production**, no worker will enter or walk within 1/4 mile of the treated area from the start of the application through the end of the REI.
3. The employee made the application and is aware of the related restrictions.

Application Exclusion Zones (AEZ)

Employers must make sure during a pesticide application in outdoor production (farm, forest, nursery), only trained and equipped handlers are in the area being treated and within a specific distance away from the pesticide application equipment. This area is called the pesticide AEZ. The employer must ensure that handlers involved in the pesticide application understand they must suspend the application if a worker or other person is in the AEZ during a pesticide application in outdoor production. Handlers can continue the application once no one is within the AEZ.

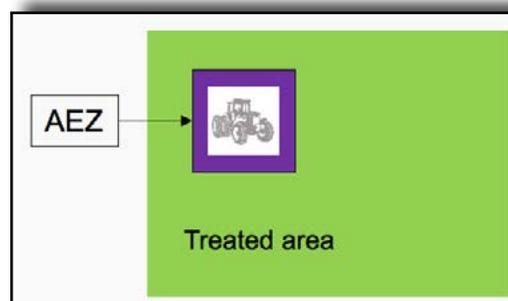


Photo courtesy of EPA Region 3

The AEZ may also apply to a neighboring or adjacent agricultural establishment if the establishment is within certain distances.

100 Foot AEZ

When the pesticide is sprayed through a nozzle producing **fine or small spray droplets**, the AEZ is the area that extends 100 feet horizontally from the application equipment in all directions.

The AEZ is ALWAYS 100 feet, no matter the distance or droplet size, when the pesticide is applied aerially, by air blast, or as a fumigant, smoke, mist or fog.

25 Foot AEZ

When the pesticide is sprayed from a **height greater than 12 inches**, through a nozzle producing **medium to coarse spray droplets**, the AEZ is the area that extends 25 feet horizontally from the application equipment in all directions.

No AEZ

When the pesticide is sprayed from a **height less than or equal to 12 inches**, through a nozzle producing **medium to coarse spray droplets**, the AEZ does not apply.

Table 2.2: AEZ Distances Based on Height and Droplet Size

AEZ Distance	Application Height	Droplet Size
100'	>12"	fine or small
25'	>12"	medium or coarse
0'	≤12"	medium or coarse

Enclosed Space Production Areas

After a pesticide application is made in an enclosed space production area, employers must not allow worker entry into an enclosed space structure until the air concentration level specified on the label is met. If no air concentration level is specified on the label, workers must wait until proper ventilation criteria is met. For more information, refer to the How to Comply Manual, which can be accessed through the resources listed in Chapter 10.

Decontamination Supplies for Workers

Under certain circumstances, employers must provide workers and handlers with supplies for routine and emergency decontamination.

When workers will be performing tasks that involve contact with pesticide-treated surfaces, the employer must provide the following items for routine decontamination and emergency eyewash:

- at least 1 gallon of water per worker at the beginning of each worker's shift,
- soap, and
- single use towels.

Location

Decontamination supplies must be located no more than 1/4 of a mile from the workers' current work location, and must be located outside of a pesticide-treated area and outside an area that is under an REI.

Duration

The number of days decontamination supplies must be provided for workers is dependent on the length of the REI of the pesticide that was applied to the site. Decontamination supplies must be provided from the time workers first enter the treated area until at least

- 30 days after the REI expires, when the pesticide used has an REI greater than 4 hours, or
- 7 days after the REI expires, when the pesticide used has an REI of 4 hours or less.

Hand sanitizing liquids or gels do not meet the soap requirement. Wet wipes or towelettes cannot be used as soap or single-use towels.

Decontamination Supplies for Handlers and Early-Entry Workers

The agricultural employer must also provide handlers and early-entry workers with supplies for routine and emergency decontamination and eyewash. Because early-entry workers may be exposed to higher residue levels than a worker who enters the area after the REI has expired, it is important early-entry workers have access to decontamination supplies similar to those provided to handlers.

The following table describes the decontamination supplies the employer must provide for each type of task and area.

Table 2.3: Decontamination Supplies for Handlers & Early-Entry Workers

Employee/Tasks	Decontamination Supplies	Additional Eyewash
<p>Handler during mixing and loading tasks</p>	<ul style="list-style-type: none"> • 3 gallons of water per handler, • soap, • single-use towels, and • a change of clothing or coveralls to use in case of an emergency. 	<p>If the label requires the handler to use protective eyewear or the handler uses a pressurized closed-mixing system, the employer must provide either</p> <ul style="list-style-type: none"> • a system that delivers gently running water at a rate of at least 0.4 gallons per minute for 15 minutes, or • 6 gallons of water in containers that provide a gentle eye-flush for 15 minutes.

<p>Handler during tasks other than mixing and loading</p>	<ul style="list-style-type: none"> • 3 gallons of water per handler, • soap, • single-use towels, and • a change of clothing or coveralls to use in case of an emergency. 	<p>If the label requires eye protection, the employer must provide</p> <ul style="list-style-type: none"> • at least 1 pint of water per handler in a portable container that is immediately available to the handler.
<p>Early-entry worker during early-entry tasks</p>	<ul style="list-style-type: none"> • 3 gallons of water per early-entry worker, • soap, and • single-use towels. 	<p>If the label requires eye protection, the employer must provide</p> <ul style="list-style-type: none"> • at least 1 pint of water per early-entry worker in a portable container that is immediately available to the early-entry worker.
<p>Handler and early-entry worker at PPE changing area</p>	<ul style="list-style-type: none"> • water, • soap, and • single-use towels. 	

The decontamination supplies must be located

- outside a treated area or an area under REI, unless the soap, water, single use towels, and change of clothing are protected from pesticide contamination in closed containers;
- not more than 1/4 of a mile from, or the nearest point of vehicular access to, the handler's and early-entry worker's work site;
- at mixing sites;
- in the aircraft or at the aircraft loading site for aerial applicators; and
- in the area where handlers and early-entry workers will put on and remove their protective clothing and PPE.

Emergency Assistance

The employer is responsible for providing emergency assistance, in the event a worker or handler has potentially been exposed to a pesticide at work, or if they show symptoms that may be caused by a pesticide. The employer must provide the name, address, and phone number of a nearby medical facility on the pesticide safety information poster at a central location.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Safety data sheets (SDSs) for each pesticide applied in the previous 30 days must also be accessible at a central location. The employer must also keep copies of the SDSs for 2 additional years and make them available to employees upon request. These resources can be very useful for gathering and providing product information during pesticide exposure situations.

If there is a reason to believe that a worker or handler has been exposed to pesticides while working or is experiencing possible pesticide illness or injury, the employer must provide the following:

- transportation to a nearby medical facility capable of providing emergency care treatment to a person exposed to pesticides, and

- copies of the applicable SDSs, product name and EPA registration number, and the active ingredient for each pesticide to which the worker or handler may have been exposed. These items and information must be provided to the worker, handler, or medical personnel via the worker or handler.

Protections Against Retaliation

The WPS prohibits employers from retaliating against workers and handlers for complying, or attempting to comply, with the WPS for reporting employer violations to EPA, state or a tribal pesticide regulatory agency. Examples of retaliation include intimidation, firing, demotion, or otherwise discriminating against a worker or handler.

Respiratory Protection for Handlers

If the pesticide product label requires the handler to use a respirator, the employer must ensure the handler completes a respiratory protection program prior to working with the pesticide. The employer must pay for each element of the respiratory protection program, which includes

- a medical evaluation, including time for the handler to complete a medical evaluation questionnaire;
- follow-up visit with a physician, if deemed necessary by the physician reviewing the medical evaluation questionnaire;
- all of the label-required respiratory equipment for the product(s) the handler will use;
- training on the proper use, seal checking, care, and maintenance of the respiratory equipment; and
- annual fit testing with the respiratory equipment the handler will use.

Respiratory Protection Recordkeeping System

The employer must keep records of the medical evaluation, fit testing, and respirator training for 2 years.



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCsupport@ucdavis.edu.

Contents

When to Provide Pesticide Safety Training	32
Table 3.1: WPS Training Requirements and Frequency	32
Qualified Trainers.....	33
Additional Requirements for Trainers	33
EPA-Approved Training Materials	34
Presentation	34
Training Records	35



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCsupport@ucdavis.edu.

When to Provide Pesticide Safety Training

Due to the nature of their jobs, workers, early-entry workers, and handlers may frequently work in or near areas that are being or have been treated with pesticides. Therefore, the federal Worker Protection Standard (WPS) requires these individuals to receive pesticide safety training before working on agricultural establishments.



Photo courtesy of Chazzbo Media

Table 3.1: WPS Training Requirements and Frequency

	Pesticide Handlers	Early-Entry Workers	Agricultural Workers
Requirement	Training must be provided before any handling activity.	Training must be provided before entry into an area under a restricted-entry interval (REI).	Training must be provided before working in a “treated area.” A treated area is any site where a pesticide has been applied and an REI has been in effect within the last 30 days.
Frequency	Provide training each year.	Provide training each year. Provide product-specific information before every early-entry task.	Provide training each year.

The WPS does not require employers to actually conduct the training themselves, however, the employers must ensure each worker or handler receives or has received the appropriate training.

If worker or handler attended WPS training while working for a previous employer within the past 12 months and the training can be verified, the new employer can wait until the training expiration date to retrain that individual. However, the new employer needs to inform all employees, even those who received WPS training elsewhere, about the central posting area and decontamination sites on the establishment.

Qualified Trainers

Under the **federal** Worker Protection Standard, people who conduct WPS pesticide safety training for handlers, early-entry workers, and workers must:

- be designated as a trainer of certified applicators, handlers or workers by EPA or the state or tribal agency responsible for pesticide enforcement,
- be currently certified as an applicator of restricted-use pesticides, or
- have completed an EPA-approved pesticide safety train-the-trainer program for workers (if training workers) and/or for handlers (if training handlers).

A person designated by EPA or the State or Tribal agency as a trainer of workers, may only train agricultural workers. They are not qualified to train pesticide handlers.

Additional Requirements for Trainers

Trainers who meet any of the above federal trainer certification criteria must also check with their state pesticide regulatory agency to ask about state certification requirements, trainer agreements, and additional state pesticide-related regulations that must be included in the training.

Similarly, employers who own or lease agricultural establishments located on tribal land should contact the agency overseeing the tribe's pesticide or environmental program before WPS training is conducted at their worksite. Tribal pesticide regulatory agency staff can provide employers and trainers with additional information about trainer certification requirements, pesticide ordinances, and regulations that are unique to their community.

EPA-Approved Training Materials

Beginning January 2, 2018, if the trainer uses pesticide safety training materials, such as a DVD or informational booklet, these training materials must be approved by EPA and contain the most current WPS information. EPA-approved materials will carry an approval number, such as EPA Worker PST 00001 and have a production or development date of 2016 or later. Trainers can find EPA-approved materials by visiting the following websites:

Pesticide Educational Resources Collaborative:

pesticideresources.org/wps/inventory.html

Environmental Protection Agency:

epa.gov/pesticide-worker-safety

Presentation

Pesticide safety training must be provided in a manner understood by the training attendees. The information must be presented either verbally from written materials or through audiovisual media. The person presenting the training must be a qualified trainer, but a translator can assist.



Photo courtesy of Jennifer Weber, Arizona
Department of Agriculture

The WPS requires that the qualified trainer is available to answer questions and therefore must be present during the entire pesticide safety training, even when showing a pesticide safety video.

Finally, trainers must do their best to select a training site that is conducive to training and is reasonably free from distractions.

Training Records

Trainers should provide employers with a document that serves as a record of the WPS training. This document must include all of the following information

- the date of training,
- the employer's name,
- printed name and signature of the trained worker or handler,
- the trainer's name,
- documentation proving the trainer is qualified to provide the WPS worker or handler training,
- the type of training provided (worker or handler), and
- information about the EPA-approved materials used during the WPS training.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

The employer must keep a copy of this training record on file for two years following the date of the training. Employees that attended the training have the right to request a copy of the training record from the employer at any time within the two year timeframe.

WPS TRAINING TOPICS

CHAPTER 4

Contents

Worker Protection Standard (WPS) Training Topics	38
WPS Training Topics for Workers and Handlers	39
Table 4.1: WPS Training Topics ~ Effective January 2, 2018.....	39
Additional WPS Training Topics for Handlers.....	43



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCsupport@ucdavis.edu.

Worker Protection Standard (WPS) Training Topics

Trainers who will provide WPS pesticide safety training may find it challenging to know exactly which topics must be covered during a WPS training for workers and how those topics differ from the information provided to handlers.

Much of the general pesticide safety information included in the WPS is pertinent to both workers and handlers. However, since handlers work directly with pesticides when performing tasks such as mixing, loading or applying pesticides, or cleaning and repairing equipment, they must receive additional information on how to work safely with pesticide products.

Table 4.1 identifies the topics that must be included in detail during a WPS training. The first section displays the information that must be provided to both workers and handlers, while the second section lists additional points for handler training. Chapters 5 and 6 expand on these topics and include details that trainers must provide during training.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Table 4.1: WPS Training Topics ~ Effective January 2, 2018

AGRICULTURAL EMPLOYEE TASKS AND RESTRICTIONS	Agricultural Workers	Pesticide Handlers
1. The rule prohibits agricultural employers from allowing or directing any worker to mix, load, or apply pesticides or assist in the application of pesticides, unless the worker has been trained as a handler.	✓	✓
2. Agricultural employers must provide specific information to workers before directing them to perform early-entry tasks. Workers must be at least 18 years old to perform early-entry tasks.	✓	✓
WHERE YOU MAY ENCOUNTER PESTICIDES AT WORK AND HOW THEY CAN ENTER YOUR BODY	Agricultural Workers	Pesticide Handlers
3. Where and in what form pesticides may be encountered during work tasks, and potential sources of pesticide exposure on the agricultural establishment. This includes exposure to pesticide residues that may be on or in plants, soil, tractors, application and chemigation equipment, or used personal protective equipment (PPE), and that pesticides may drift through the air from nearby applications or be in irrigation water.	✓	✓
4. Routes through which pesticides can enter the body.	✓	✓
PESTICIDE-RELATED HEALTH EFFECTS	Agricultural Workers	Pesticide Handlers
5. Signs and symptoms of common types of pesticide poisoning.	✓	✓
6. Potential hazards to children and pregnant women from pesticide exposure.	✓	✓
7. Potential hazards from toxicity and exposure that pesticides present to workers and their families, including acute and chronic effects, delayed effects, and sensitization.	✓	✓
8. Potential hazards from pesticide residue on clothing.	✓	✓

WAYS TO REDUCE THE RISK OF PESTICIDE EXPOSURE	Agricultural Workers	Pesticide Handlers
9. How to recognize and understand the meaning of the posted warning signs used for notifying workers of restrictions on entering pesticide treated areas on the establishment.	✓	✓
10. How to follow directions and/or signs about keeping out of pesticide treated areas subject to a restricted-entry interval and application exclusion zones.	✓	✓
11. When working in pesticide treated areas, wear work clothing that protects the body from pesticide residues and wash hands before eating, drinking, smoking, chewing gum or tobacco, or using the toilet.	✓	✓
12. Wash or shower with soap and water, shampoo hair, and change into clean clothes as soon as possible after working in pesticide treated areas.	✓	✓
13. After working in pesticide treated areas, remove work boots or shoes before entering your home, remove work clothes and wash or shower before physical contact with children or family members.	✓	✓
14. Wash work clothes before wearing them again and wash them separately from other clothes.	✓	✓
15. Do not take pesticides or pesticide containers used at work to your home.	✓	✓
16. Keep children and nonworking family members away from pesticide-treated areas.	✓	✓

FIRST AID FOR PESTICIDE ILLNESSES AND INJURIES	Agricultural Workers	Pesticide Handlers
17. Routine and emergency decontamination procedures, including emergency eye flushing techniques, and if pesticides are spilled or sprayed on the body to use decontamination supplies to wash immediately or rinse off in the nearest clean water, including springs, streams, lakes or other sources if more readily available than decontamination supplies, and as soon as possible, wash or shower with soap and water, shampoo hair, and change into clean clothes.	✓	✓
18. How and when to obtain emergency medical care.	✓	✓
19. Emergency first aid for pesticide injuries or poisonings.	✓	✓
20. Safety data sheets (SDSs) provide hazard, emergency medical treatment and other information about the pesticides used on the establishment workers and handlers may come in contact with. It is the responsibility of agricultural employers to do all of the following: <ul style="list-style-type: none"> • Display SDSs for all pesticides used on the establishment. • Provide workers and handlers information about the location of the SDSs on the establishment. • Provide workers and handlers unimpeded access to SDSs during normal working hours. 	✓	✓

ADDITIONAL EMPLOYER RESPONSIBILITIES	Agricultural Workers	Pesticide Handlers
<p>21. The rule prohibits agricultural employers from intimidating, threatening, coercing or discriminating against any worker or handler for complying with or attempting to comply with the requirements of this rule, or because the worker or handler provided, caused to be provided or is about to provide information to the employer or the EPA or its agents regarding conduct that the employee reasonably believes violates this part, and/or made a complaint, testified, assisted or participated in any manner in an investigation, proceeding, or hearing concerning compliance with this rule.</p>	✓	✓
<p>22. The responsibility of agricultural employers to provide workers and handlers with information and protections designed to reduce work-related pesticide exposures and illnesses. This includes ensuring workers and handlers have been trained on pesticide safety and application and hazard information, decontamination supplies and emergency medical assistance, and notifying workers of restrictions during applications and on entering pesticide-treated areas. A worker or handler may designate in writing a representative to request access to pesticide application and hazard information.</p>	✓	✓
<p>23. How to report suspected pesticide use violations to the state or tribal agency responsible for pesticide enforcement.</p>	✓	✓

PESTICIDE LABEL INFORMATION	Agricultural Workers	Pesticide Handlers
24. Format and meaning of information contained on pesticide labels and in labeling applicable to the safe use of pesticides.		✓
25. Handlers must follow the portions of the label applicable to the safe use of pesticides.		✓
PROTECTING PEOPLE AND THE ENVIRONMENT WHEN USING PESTICIDES	Agricultural Workers	Pesticide Handlers
26. Handlers must be at least 18 years old.		✓
27. Information on proper application and use of pesticides.		✓
28. The responsibility of agricultural employers to post treated areas as required by this rule.		✓
29. Handlers must not apply pesticides in a manner that results in contact with workers or other persons.		✓
30. Handlers must suspend a pesticide application if workers or other persons are in the application exclusion zone.		✓
31. Environmental concerns, such as drift, runoff, and wildlife hazards.		✓
32. Safety requirements for handling, transporting, storing, and disposing of pesticides including general procedures for spill cleanup.		✓

PERSONAL PROTECTIVE EQUIPMENT (PPE)	Agricultural Workers	Pesticide Handlers
33. Need for and appropriate use and removal of all PPE.		✓
34. How to recognize, prevent and provide first aid treatment for heat-related illness.		✓
35. The responsibility of agricultural employers to provide handlers with information and protections designed to reduce work-related pesticide exposures and illnesses. This includes providing, cleaning, maintaining, storing, and ensuring proper use of all required PPE; providing decontamination supplies; and providing specific information about pesticide use and labeling information.		✓
36. The responsibility of agricultural employers to ensure handlers have received respirator fit-testing, training, and a medical evaluation if they are required to wear a respirator by the product labeling.		✓

Contents

Agricultural Employee Tasks and Limitations 47

Pesticides and Pesticide Residues..... 47

 Pesticide Types and Formulations.....48

 Pesticide Residues48

Pesticide-Related Health Effects 49

 Routes of Pesticide Exposure49

 Situations that may Lead to Pesticide Exposure Through the Skin50

 Situations that may Lead to Pesticide Exposure Through the Eyes.....51

 Situations that may Lead to Inhalation of Pesticides51

 Situations that may Lead to Ingesting or Swallowing a Pesticide52

 Hazards of Pesticides Resulting from Toxicity and Type of Exposure.....52

 Toxicity Signal Word52

 Signs and Symptoms of Common Types of Pesticide Poisonings.....53

 Acute, Chronic and Delayed Effects of Pesticide Exposure and Sensitization55

Reducing the Risk of Pesticide Exposure 57

Restrictions During Pesticide Applications..... 57

 Restrictions During the REI57

 Working in “Treated Areas” Following the End of the REI.....57

 Table 5.1: Entry Restrictions58

Notification About Pesticide Applications 58

 Central Posting of Pesticide Application Information and SDSs.....58

 Oral Warning and Warning Sign Posting59

 Enclosed Space Production Areas.....60

Reducing Hazards from Pesticide Drift 60

 Application Exclusion Zones (AEZ).....60

Work Clothing and Personal Protective Equipment (PPE) 61

Routine Decontamination Procedures 62

Decontamination Supplies.....62
Reducing Exposure to Pesticide Residue on Clothing63
Protecting Family Members from Pesticide Exposure63
Responding to Pesticide Illnesses and Injuries 64
How and When to Obtain Emergency Medical Care64
Emergency First Aid for Pesticide Exposure65
 First Aid for Skin Exposure66
 First Aid for Eye Exposure66
 First Aid for Inhalation Exposure.....67
 First Aid for Exposure Through Ingestion or Swallowing.....67
Employee Rights and Protections Against Retaliatory Acts 68



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCsupport@ucdavis.edu.

Agricultural Employee Tasks and Limitations

You may find new employees are uncertain about the expectations at their worksite or the tasks they will perform. Providing employees with a clear definition of workers’ and handlers’ tasks will help them to identify the type of work they will perform and the areas they can enter.

Workers perform hand labor tasks such as harvesting, pruning, thinning, weeding, and watering. They do not work directly with pesticides but may be exposed to pesticide residues when working in areas where a pesticide has been applied in the previous 30 days.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

On occasion, an employer may instruct a worker to enter an area during the restricted-entry interval (REI). In this case,

the worker is considered an **“early-entry worker”** and must receive additional training and product-specific information before entering the area.

Handlers are employees who mix, load and apply pesticides. They might also work as flaggers or spotters during aerial applications or be responsible for cleaning and repairing pesticide application equipment. Irrigators may also be considered handlers if they work with chemigation systems, which are used to apply pesticides with the irrigation water.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Employees involved in pesticide handling or early-entry tasks must be at least 18 years old.

Pesticides and Pesticide Residues

Due to their tasks described above, workers and handlers may be exposed to pesticides. In this section, we discuss the types of pesticides and their formulations. It is important to note workers may not see pesticides or their residues on plants or other surfaces, but pesticides can still be present.

Pesticide Types and Formulations

Most people are familiar with insecticidal aerosol sprays they may use in their homes and liquid herbicides they may use to control weeds in their yards.

There are several types of pesticides and formulations used on agricultural establishments. Some of the most commonly-used types of pesticides are

Insecticides – to control insect pests

Herbicides – to control weeds

Rodenticides – to control rats, mice, and other rodents

Fungicides – to control fungi (fungus) and disease organisms

Miticides – to control mites

Nematicides – to control nematodes

Pesticides are formulated in different ways and are applied to agricultural crops and cropland in a variety of forms. Some of the most commonly-used formulations are

- liquids
- dusts
- powders
- granules
- pellets
- gases
- gels
- aerosols

Pesticide Residues

Pesticide residues may be found in or on

- treated surfaces such as plants and soil;
- tractors, sprayers, and other application equipment;
- work clothing, shoes, and PPE (including gloves);



Photo courtesy of Stewart Jacobson, Arizona Department of Agriculture

- pesticide mixing and loading areas;
- air that drifts from a nearby pesticide application;
- irrigation water as a result of pesticide runoff or chemigation; and
- pesticide containers, shelves, and the air inside pesticide storage areas.

Pesticide-Related Health Effects

After workers and handlers understand where they can find pesticides and their residues it is easier to discuss health hazards, routes of entry, and signs and symptoms that may result from pesticides exposure.

Routes of Pesticide Exposure

Pesticides can enter the body through the following four routes of entry:

- Skin (Dermal)
- Eyes (Ocular)
- Nose (Inhalation)
- Mouth (Ingestion)

The majority of the reported cases of agricultural pesticide exposure involved skin contact. However, during WPS training, workers who work in enclosed space production areas may mention they are more concerned about inhaling pesticides, while handlers may state they are worried about splashing pesticides in their eyes during mixing and loading tasks. Certain situations increase the risk of pesticide exposure through the eyes, nose, mouth or skin.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Situations that may Lead to Pesticide Exposure Through the Skin

- Workers who choose to wear a short-sleeve shirt on a warm day leave their forearms exposed to pesticide residues. Warm weather causes people to sweat and this sweat can help pesticides enter into a person's body through their pores.
- Pesticides can also enter through cuts or sores on a person's skin.
- Workers or handlers who carry and use their cell phones while they are working with pesticides or areas where pesticides have been applied, might transfer pesticide residues from their phones to their faces or hands when they answer a call or respond to a text.
- Skin exposure can occur by wearing work clothes that have pesticide residues on them.
- Pesticide residues can transfer from contaminated hands to other parts of the body if workers or handlers do not wash their hands thoroughly before eating, drinking, smoking or using the restroom.
- Skin exposure can also occur when a pesticide drifts onto people who are working near an application.
- Handlers or early-entry workers may absorb pesticides through their skin if they fail to wear the label-required gloves or if they don't wash their gloves with soap and water before removing them.
- Handlers may take off their gloves to adjust, clean or repair pesticide application equipment, which may contain pesticide residues.
- Handlers may accidentally splash a pesticide onto their skin when mixing a pesticide or loading a spray tank.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Situations that may Lead to Pesticide Exposure Through the Eyes

- Workers can transfer pesticide residues to their eyes if they touch their eyes after coming into contact with treated surfaces.
- Sweat could run down a worker's or handler's forehead and carry pesticide residues into their eyes.
- A handler may rub their eye with a contaminated glove.
- A handler may splash or spray pesticides in their eyes when mixing and loading pesticides, adjusting application equipment or applying a product overhead without wearing proper eye protection.
- If a handler is wearing the required protective eyewear and it slips down his or her face or if the handler removes the eye protection when it fogs up, the handler can get pesticides in their eyes.



Photo courtesy of Kai Umeda, University of Arizona Cooperative Extension

Situations that may Lead to Inhalation of Pesticides

- Workers may be at risk of inhaling pesticides if they continue to work while in an application exclusion zone (AEZ) or in enclosed spaces such as greenhouses before the REI has expired.
- A worker or handler may smoke a cigarette near an area where pesticides are stored or applied. Tobacco absorbs pesticides and therefore that person could inhale the pesticide vapors.
- If a pesticide container leaks in a storage area, people who enter the area may inhale the vapors from the spilled product.
- A handler may mix two incompatible pesticides together, which can create toxic fumes when combined.
- Pesticide exposure can occur if a handler fails to wear the label-required respirator, does not change the cartridge, uses the wrong cartridge, or uses a respirator that does not fit correctly.

Situations that may Lead to Ingesting or Swallowing a Pesticide

- Workers or handlers who fail to wash their hands before eating or drinking may get pesticide residues in their mouths.
- If an employee takes a snack or lunch break too close to an area where pesticides are stored or used, the food or drink could become contaminated.
- A worker or handler who takes produce home directly from the field may get exposed to pesticide residues that are still on the produce.
- Workers and handlers can swallow pesticides if they drink water from irrigation canals, pipes or sprinklers as irrigation water may contain pesticide residues.
- A person may accidentally swallow a pesticide if they take a sip from a beverage container that someone has illegally used to store or measure pesticides.



Photo courtesy of Dr. Kurt D. Nolte, University of Arizona Cooperative Extension

Hazards of Pesticides Resulting from Toxicity and Type of Exposure

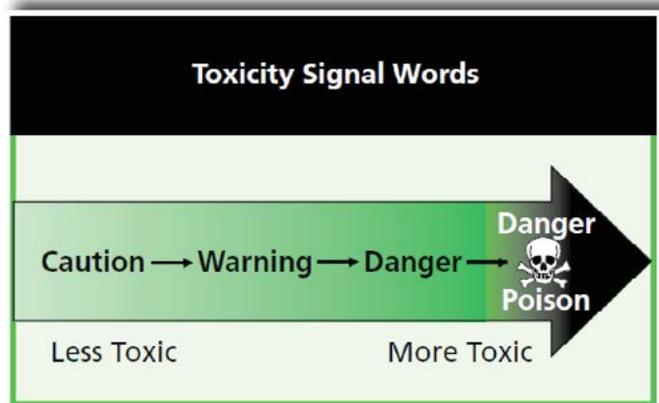
Toxicity is the potential of any pesticide to cause harm. Pesticides are often toxic to the target pests for which they are intended. Some pesticides can also be toxic to humans. Additionally, people differ in their susceptibility to injury from pesticides, which can depend on their health, age or other factors. For these reasons workers and handlers should always take steps to minimize their exposure to pesticides. Even the least toxic pesticides may cause illness.

Toxicity Signal Word

The signal words on the pesticide label reflect the relative degree of the product's acute (immediate) toxicity. Signal words include Danger, Danger-Poison, Warning, and Caution.

Danger or Danger-Poison

The most acutely toxic pesticides have the signal word “Danger” on the label. If the pesticide is highly acutely toxic when inhaled, swallowed or absorbed through the skin, the product will also have the word “Poison” along with a skull and crossbones symbol on the label.



Warning

Pesticides that are moderately acutely toxic to people have the signal word “Warning” on the label.

Caution

Pesticides that are slightly acutely toxic have the signal word “Caution” on the label. Some low acutely toxic pesticides may have no signal word.

Signs and Symptoms of Common Types of Pesticide Poisonings

Symptoms are any abnormal condition or change in health function that a person sees or senses, or that can be detected by medical examination or laboratory tests. These symptoms may indicate the presence of a disease, disorder or an illness or injury.

Poisoning symptoms vary among classes of pesticides and pesticides within a class. For example, pesticides that control weeds (herbicides) can be less toxic to humans than some pesticides used to control insects (insecticides). The severity of symptoms is usually proportional to the amount of pesticide entering the person’s body and the person’s sensitivity to certain chemical ingredients.

If a worker or handler feels sick while working in a pesticide-treated area or when handling a pesticide, it may be difficult to determine if the symptoms are related to a pesticide exposure. Common pesticide symptoms mimic those of a cold, flu, heat stress, morning sickness, food poisoning or a hangover.

The following is a list of symptoms that may result from pesticide exposure:

- eye irritation
- nose and throat pain
- skin rash
- dizziness
- headache
- muscle aches or cramps
- exhaustion
- nausea
- diarrhea
- chest pain
- breathing difficulties
- blurred vision
- excessive salivation or drooling
- very small, pinpoint pupils
- lack of muscle control
- convulsions or seizures
- unconsciousness
- death

In addition, people exposed to certain fumigants may experience

- irrational behavior, or
- elevated body temperatures.

The type and severity of exposure symptoms can be influenced by several factors, such as the

- pesticide itself,
- toxicity of the product,
- amount and concentration of the pesticide at the time of exposure,
- length of exposure,
- amount absorbed into the body,
- route of entry, or
- how fast the body absorbs and excretes it.

One pesticide may cause only mild eye irritation if splashed in a person's eye, while exposure to another product may result in blurred vision or blindness. Some pesticides are extremely toxic if swallowed but not as harmful if spilled on the skin. Finally, there are pesticides that, when used correctly and according to the safety measures listed on the label, cause no known adverse health effects.

Another factor that can significantly influence the type and severity of reaction to pesticide exposure is the overall health and genetic makeup of the individual. Each person is different. People who are elderly, very young, sick, or who have compromised immune systems may have less tolerance to some types of pesticides.

Furthermore, people who have medical conditions, such as asthma, may experience breathing difficulties when working in an area where pesticides have been applied even after the REI has expired.

Pesticide exposure can be hazardous for pregnant women and may result in miscarriage or cause harm to their unborn child.

Children are often more susceptible to the effects of pesticides as their bodies and internal organs are still developing and may be negatively impacted by exposure. For this reason **all handlers who work directly with pesticides or workers who enter an area still under a REI (early-entry workers) must be at least 18 years old.**

Acute, Chronic and Delayed Effects of Pesticide Exposure and Sensitization

Many pesticide exposure symptoms will show up immediately following an exposure incident; other symptoms can be delayed and result in long-term (chronic) health effects or chemical sensitivity.

Immediate or Acute Health Effects

The onset of **acute** illness or injury occurs shortly after or within 24 hours following an exposure. These illnesses or injuries can be serious and may result in lost work time and/or medical treatment. In the most serious cases, acute health effects could result in death.

Examples of **acute** health effects include

- nausea;
- headache or dizziness;
- red or watery eyes;
- rash, irritated, or burning skin; and
- throat irritation or difficulty breathing.

Delayed, Long-Term or Chronic Health Effects

Long-term or **chronic** effects are illnesses or injuries that develop or persist over long periods of time. They may result from a single exposure incident involving an extremely toxic pesticide or a large amount of pesticide. It may also result from many repeated exposures at a level that is too low to produce noticeable immediate illnesses or injuries. Therefore, it is extremely important for workers and handlers to take all of the necessary steps to protect themselves from a pesticide exposure.

Symptoms from repeated pesticide exposure may not show up for weeks, months, or even years. These **delayed** symptoms may be difficult to associate with their cause because of the lapse of time between exposure and observable effects.

Delayed and **long-term** or **chronic** health effects associated with exposure to certain pesticides include

- cancer,
- fertility problems,
- respiratory illness,
- nervous system disorders,
- birth defects,
- damage to the organs or immune system, and
- skin disorders.

Sensitization is the gradual development of an allergic reaction to a type of pesticide or chemicals in general. Some people get headaches, rashes, or experience dizziness each time they work with a pesticide or enter an area where pesticides were recently used.

Workers and handlers may better understand sensitization if it is compared to an allergic reaction to poison oak or poison ivy. Not everyone will have an adverse skin reaction the first few times they come in contact with the plants. However, after repeated exposures some people will become sensitized and develop a rash that becomes worse with each additional exposure.



Photo courtesy of Merete Pinker and Mark Morrison

Some people will experience sensitization after working with a product for several years. Not everyone will develop a sensitivity to pesticides, but those who do should avoid exposure to the pesticide creating the adverse reaction.

Reducing the Risk of Pesticide Exposure

Since pesticide residues are usually invisible, it is often difficult for workers to avoid contact. Therefore, they should take steps to protect themselves from exposure to these residues. The first step to preventing pesticide exposure is understanding who is allowed to enter the area during the application, during the REI, and after the REI expires.

Restrictions During Pesticide Applications

Only appropriately trained and equipped handlers can enter and work in areas during a pesticide application.

Restrictions During the REI

The REI is the amount of time that must pass after a pesticide application before it is safe for workers to enter the area without the required PPE and additional protections. During the REI, only appropriately-trained and equipped handlers and early-entry workers are allowed in the area.

Working in “Treated Areas” Following the End of the REI

Once the REI expires, all WPS-trained employees are allowed into the “treated area,” which is the term used to describe an area that was treated with a pesticide within the previous 30 days. This 30-day period begins at the completion of the REI.

Table 5.1: Entry Restrictions

During the Application	Following the Application During the REI	After the REI has Expired
<ul style="list-style-type: none"> • ONLY WPS-trained handlers, equipped with the PPE listed on the label for the handling task. 	<ul style="list-style-type: none"> • WPS-trained handlers equipped with the PPE listed on the label for handling task. • WPS-trained workers who have received product-specific training and protections for the particular early-entry situation, and who are equipped with the PPE listed on the label for the early-entry task. 	<ul style="list-style-type: none"> • All WPS-trained employees, including workers and handlers.

Notification About Pesticide Applications

Central Posting of Pesticide Application Information and Safety Data Sheets

It can be difficult for workers to know and remember every detail about the pesticide applications made at the worksite. Therefore, the WPS requires that employers provide this information in writing at a central location on the establishment. The central location is any area the employees are likely to pass by or congregate where the information can be readily seen and read. Many agricultural employers choose to display the pesticide application information on the wall of a lunchroom, on a display board outside of a central office, or in a binder inside the farm shop. Employers must tell employees where they can find this information and make it readily accessible during their normal work hours.

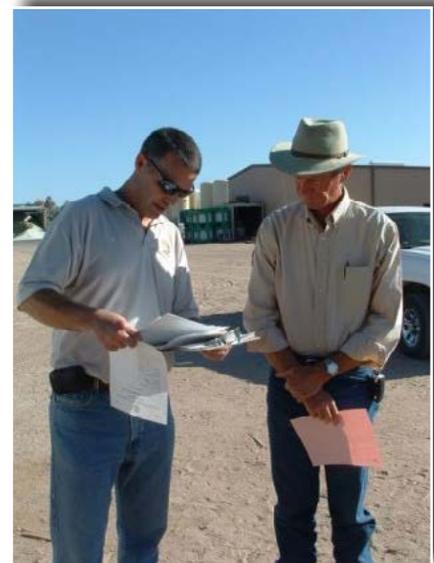


Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Trainers who are interested in learning more about the central location requirements, field posting and notification about pesticide applications can refer to the "How to Comply Manual," (EPA 735-B-16-001). See Chapter 10 for a list resources.

It is important workers understand the field posting sign is a warning that it is not safe to enter the application area. They can only enter the area if the employer verifies that the REI has ended **and** the sign is covered or removed. Workers may also enter if they are directed by their employer to do so to perform early-entry tasks with the appropriate protections.

If the REI is 48 hours or less, employers may choose to either use the field posting sign or orally provide employees with details about the application and the length of the REI.

Enclosed Space Production Areas

The notification requirements for pesticide applications in enclosed spaces production areas, such as greenhouses, are similar to those described previously. However, warning sign posting is required for applications of pesticides with REIs greater than 4 hours.

Reducing Hazards from Pesticide Drift

Drift is the movement of pesticide dust, spray or vapor away from the application site. Handlers are prohibited from applying pesticides in a manner that will contact people (other than appropriately trained and equipped handlers involved in the application), either directly or through drift. In fact, as described in the AEZ section below, handlers must suspend all applications if workers are in the area they are treating.

Workers should leave immediately if they are working in an area where someone is applying a pesticide, or if a pesticide from a nearby application is drifting towards them. Workers and handlers can also come into contact with pesticides through drift if their homes are located near pesticide treated areas.

Application Exclusion Zones (AEZ)

The WPS includes measures designed to protect people from pesticide drift. One such measure is the AEZ.

The AEZ is an area around the pesticide application equipment that should be free of all persons other than properly trained and equipped handlers who are involved in the application.

The employer is responsible for ensuring people are outside the AEZ. In addition to the employer's responsibility, starting in January 2018, handlers must temporarily suspend their application if there are people in the AEZ.

Pesticides have a greater potential to drift when they are applied through nozzles designed to deliver small droplets. These droplets are light weight, and can be carried further in the wind than medium- or coarse-sized droplets.

Wind also plays an important role in the distance that pesticide vapors or dust can travel. Therefore, as the distance from the sprayer to the ground increases, so does the likelihood that pesticide vapors or dust will be impacted by any existing wind.

To reduce the possibility of contamination, AEZs have been developed based on equipment type, nozzle size, and distance from the nozzle to the ground. More detailed information can be found in Chapter 6-5: Applying Pesticides Safely and Effectively.

Work Clothing and Personal Protective Equipment (PPE)

Workers and handlers should wear clothing that protects them from contact with pesticides. Appropriate work clothing includes

- long-sleeved shirts,
- long pants,
- closed-toe shoes, and
- socks.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Employers of early-entry workers and handlers must always refer to the pesticide product label and provide the PPE required for their individual handling and early-entry tasks. Additional information about the proper use, care, and storage of PPE can be found in Chapter 6-2: Selecting and Inspecting Personal Protective Equipment (PPE).

Routine Decontamination Procedures

Routine decontamination procedures can minimize workers' and handlers' exposure to pesticides and pesticide residues. Routine decontamination procedures include the following:

- Agricultural employees should not drink or use irrigation water to wash their hands as it may contain pesticides or pesticide residues.
- Employees should use the decontamination supplies to wash their hands before eating, drinking, smoking, chewing gum or tobacco, or using the restroom while at work.
- Employees should shower/bathe and shampoo their hair immediately after working with pesticides or in areas where pesticides have been used and before changing into clean clothes.

Decontamination supplies must be readily available for handlers at the mixing and loading sites at all times.

Decontamination Supplies

The WPS requires employers to provide decontamination supplies for all workers, handlers, and early-entry workers. Decontamination sites for workers must be located outside of the treated area but within 1/4 mile of their worksite and contain

- soap,
- single-use towels, and
- 1 gallon of water for each employee at the beginning of their shift.

Early-entry workers and handlers must always have access to

- soap,
- single-use towels,
- 3 gallons of water for each employee, and
- a change of clothing to use if their protective clothing or PPE becomes contaminated.



Photos courtesy of Olga Anaya, Foothill Packing

Reducing Exposure to Pesticide Residue on Clothing

As was mentioned earlier in this chapter, workers and handlers may come into contact with pesticide residues that remain on their clothing or PPE. They can reduce their risk of exposure to these residues by

- wearing work clothes only once before washing them,
- having at least two sets of work clothes to avoid wearing potentially contaminated clothes before they are washed,
- keeping work clothes that may contain residues separate from other clothing by placing them in a clean plastic bag,
- washing work clothes separately from other clothing,
- informing people who wash agricultural work clothing that the clothes may contain pesticide residues and telling them how to protect themselves, and
- decontaminating the washing machine after washing a load of work clothes by running another full wash cycle with hot water and detergent to remove any remaining pesticide residues from the machine.



Photos courtesy of Ed Crow, Penn State Pesticide Education Program

Protecting Family Members from Pesticide Exposure

The following are additional steps trainers can provide to workers and handlers to help them reduce the likelihood of exposing their family members to pesticides used at work.

- Keep all children and nonworking family members away from pesticide-treated areas. Even if children do not come into direct contact with pesticides, they may still be at high risk for exposure to residues if they play in or near treated areas or irrigation ditches, live in labor camps, or play with empty pesticide containers.



Photo courtesy of Ashley Estes, Arizona Department of Agriculture

- Children who live near treated areas should always wear shoes when playing outside.
- If pets have become exposed to pesticides or pesticide residues, wash them before allowing children to touch them.
- Never take home pesticides or pesticide containers. Even empty and rinsed pesticide containers can contain pesticide residues.
- Never pour pesticides from their original containers into food or beverage containers. **This is very dangerous and illegal.** An unsuspecting person may mistake the pesticide for something edible and swallow it.
- Remove work boots or shoes before entering homes.
- Remove work clothes and wash or shower before physical contact with children or family members.



Photos courtesy of Jennifer Weber, Arizona Department of Agriculture

Responding to Pesticide Illnesses and Injuries

While it is very important to take steps to prevent pesticide exposure at work, accidents do happen. Therefore, it is necessary that people who handle pesticides or work in pesticide-treated areas know how to correctly respond to pesticide illnesses and injuries. It is also imperative that they know where to find the emergency medical and pesticide application information so they will have the tools to properly respond to these situations.

How and When to Obtain Emergency Medical Care

The employer must post the name, address and phone number of a nearby medical facility that employees can use in case of a pesticide emergency. Similar to the pesticide application information, it must be available at a central location that is accessible to employees during their normal working hours.

Safety data sheets (SDS) for each pesticide applied in the previous 30 days must also be accessible at the central location. The employer must also keep copies of the SDS for two additional years and make them available to employees upon request. These resources can be very useful for gathering and providing product information during pesticide exposure situations.

In some pesticide exposure cases, the person who is suffering from pesticide exposure may need to get to a hospital. Agricultural employees have the right to receive transportation to the designated medical facility if they are exposed or suspect that they have been exposed to pesticides at work. Do not allow the victim to drive to the hospital. Someone else must take the victim to a nearby medical facility.

The employer must provide the employee or treating medical personnel with the following information about the pesticide to which the employee was exposed:

- product name, EPA registration number, and active ingredient(s);
- antidote, first aid, and other medical information from the product's SDS;
- circumstances of the application or the use of the pesticide; and
- circumstances of the exposure.

Emergency First Aid for Pesticide Exposure

When helping someone who has been exposed to pesticides, there are several steps that can be taken immediately to reduce the effects of the exposure before the person is taken to a nearby medical facility.



Photos courtesy of Jennifer Weber, Arizona Department of Agriculture

For additional information about employer responsibilities for the provision of emergency medical, pesticide application records, and SDS requirements, refer to the "How to Comply Manual." See Chapter 10 for a list of resources.

First Aid for Skin Exposure

If a pesticide gets onto a person's clothing or skin, remove the pesticide-contaminated clothing immediately and wash the affected skin with soap and lots clean water.

It is important to wash the skin thoroughly to keep the pesticide from being absorbed into the person's body. The people assisting in the decontamination process must take steps to prevent exposing themselves to contaminated items. One way to do this is by wearing gloves.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

First Aid for Eye Exposure



Photo courtesy of Ed Crow, Penn State Pesticide Education Program

If a pesticide splashes or runs into a person's eye, gently hold the person's eyelids open and rinse the eye with the solution from an eyewash kit or any gentle stream of clean, cool water for at least 15 minutes.

Tilt the person's head so that the affected eye is lower than the unaffected one. This will keep contaminated water from entering the unaffected eye.

If the person wears contact lenses, remove the lenses and continue to rinse the eye.

Never add any kind of medicine or other substance to the eye rinsing water because it may damage the eye by interacting with the pesticide residue.

Get the injured person medical help as soon as possible.

First Aid for Inhalation Exposure

If you find a person who has inhaled a pesticide, assess the situation to make sure you won't get exposed to pesticides if you enter the area. If it is safe to do so, get the person to fresh air and loosen any clothing that might make breathing difficult.

If the person is unconscious inside an enclosed area and it is possible the person inhaled pesticides, don't go into the area unless you have the appropriate respiratory equipment. Call for emergency assistance. Explain the situation to the emergency personnel so they can arrive with the appropriate equipment to rescue the person.



Photo courtesy of Chazzbo Media

First Aid for Exposure Through Ingestion or Swallowing

When helping a person who has swallowed a pesticide, **read and follow the first aid information on the product label or the SDS. Get immediate medical attention.** Each pesticide is different and reacts differently in the body, therefore first aid treatment will vary. Some labels recommend you feed the person water, milk, egg whites, or activated charcoal. Other labels may recommend that you assist the person by making them vomit. Other labels may contain specific warnings against inducing vomiting. Workers and handlers must understand they should never induce vomiting if the person is unconscious, having convulsions, or is lying face up. **The most important step in cases of swallowing pesticides is for the employer to get the person to a nearby medical facility as quickly as possible.**



Photos courtesy of J. Hollyer, University of Hawai'i at Mānoa

Employee Rights and Protections Against Retaliatory Acts

The WPS states an agricultural employer must not punish or retaliate against any agricultural employee for attempting to comply with the protections that are provided by the WPS. Among the many protections are the right to

Note: Trainers must explain to workers and handlers how to report suspected WPS violations and the contact information of their local regulatory agency must be available to them at the central location.

- receive annual WPS pesticide safety training;
- information about pesticides used at work through the availability of pesticide application records, SDS, and oral or posted notifications;
- transportation to a nearby medical facility and treatment for any suspected pesticide illnesses and injuries;
- the provision of PPE for pesticide handling and early-entry worker tasks;
- routine and emergency decontamination supplies;
- leave a situation that may lead to pesticide exposure through drift or direct contact; and
- contact their local state or tribal pesticide regulatory agency, should they have pesticide-related questions, concerns, or complaints.

ADDITIONAL WPS TRAINING TOPICS FOR HANDLERS

Pesticide Labels

CHAPTER 6-1

Contents

6-1: Reading and Understanding the Pesticide Label	70
The Parts of the Pesticide Label	71
Brand Name.....	74
Pesticide Manufacturer	74
Pesticide Type.....	75
Active Ingredient.....	75
Inert or Other Ingredients	75
Pesticide Formulation.....	76
Table 6.1: Examples of Different Types of Pesticide Formulations	76
EPA Registration Number	76
Signal Word	77
First Aid	77
Personal Protective Equipment (PPE)	78
Precautionary Statements	78
Environmental Hazards Statements	79
Restricted-Entry Interval (REI)	79
Directions for Use	80
Storage and Disposal Instructions	80



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCsupport@ucdavis.edu.

After handlers receive the general pesticide safety awareness and exposure prevention portion of the Worker Protection Standard (WPS) training, it is time to provide them with information on how to safely and effectively handle agricultural pesticides.

These sections will include all of the **additional** information that must be included in a WPS training for handlers. The key points are presented in seven sections:

Section 6-1: Reading and Understanding the Pesticide Label

Section 6-2: Selecting and Inspecting the Required Personal Protective Equipment

Section 6-3: Measuring, Mixing, and Loading Pesticides

Section 6-4: Surveying the Pesticide Application Site

Section 6-5: Applying the Pesticide Safely and Effectively

Section 6-6: Cleaning up at the End of the Handling Task

Section 6-7: Transporting, Storing and Disposing of Pesticides and Containers

6-1: Reading and Understanding the Pesticide Label



Photo courtesy of Penn State Extension,
The Pennsylvania State University

The pesticide label is the most important part of the pesticide packaging. It contains information on how to use the product safely and effectively and lists the personal protective equipment (PPE) required when working with the pesticide. The label also includes details about the crops and areas to which the pesticide can be legally applied, the amount to use, application methods, first aid instructions, and additional precautionary measures.

It is a violation of federal law to use a product in a manner inconsistent with its labeling. It may be difficult to understand label instructions due to unfamiliar terminology, label format, font size, and language. If a handler is not able to read the label, the employer must ensure there is always someone available to explain the health, safety, and directions for use information to the handler.

It is very important handlers **read and refer to the label BEFORE**

1. **buying the pesticide or taking it out of the storage area** to ensure they will be using the correct product. Handlers should check to see the type of pest it controls and the crop or site to which it can be applied. This is also a good time to review the PPE information to make sure they have all of the required PPE or protective clothing.
2. **mixing the pesticide** to ensure they understand the mixing instructions. Mixing is the most hazardous task because handlers are working with the product in its most concentrated form. If the instructions and precautions are not clear, they should ask their employer or supervisor for clarification or assistance.
3. **applying the pesticide** to get instructions on how to apply it safely and to become familiar with the environmental hazards, first aid information, and special precautions.
4. **storing the pesticide or disposing of the container** for specific instructions about temperature limits, potential fire hazards, environmental impacts, and guidelines for container cleaning and disposal.

The Parts of the Pesticide Label

Labels are great resources for WPS handler training. While it is most effective to refer to a label of a product handlers will use at the worksite, not all trainers will have access to them. There are tools available that provide handlers with an overview of the information commonly found on pesticide labels. One such teaching tool is a mock label called “Acaramort”, developed by Melanie Zavala of the Statewide Integrated Pest Management (IPM) Project’s Pesticide Safety Education Program at the University of California, Davis. The “Acaramort” label does not represent an actual product label. It is a training tool used to describe various sections of a pesticide label. If you would like to use this label in your training, you will find a copy on the following pages.

Brand Name → **ACARAMORT EC** ← **Formulation**

AGRICULTURAL MITICIDE ← **Pesticide Type**

RECOMMENDED FOR AGRICULTURAL USE ONLY

Manufacturer → **AGRICOQUEM INTERNATIONAL**

Active Ingredients →

Inert Ingredients →

COMPOSITION

Active ingredients: (% by weight)	
Propargite [2-(p-tert-butylphenoxy) cyclohexyl 2-propynyl sulfite]*	73.0%
Inert ingredients	27.0%
Total	100.0%

* Contains 6.55 lb. technical PROPARGITE per gallon

AGRICOQUEM INTERNATIONAL, INC. PETROVILLE, PA 19099

EPA REG. No. 999-909 ← **EPA Registration Number**

EPA EST. No. 9999-PA-1

ACARAMORT is a registered product of Agricoquem International, Inc.

© Copyright 1995, Agricoquem International, Inc.

Signal Word → **KEEP OUT OF REACH OF CHILDREN**

DANGER • PELIGRO

TO THE USER: Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

First Aid →

FIRST AID

- If in eyes:** Immediately flush eyes with plenty of water. See a physician.
- If inhaled:** Remove person to fresh air. Apply artificial respiration if symptoms indicate. Call a physician.
- If on skin:** Wash thoroughly with soap and water. Get medical attention.
- If swallowed:** Do not induce vomiting. Drink promptly a large quantity of milk, egg whites or gelatin solution. If these are not available, drink large quantities of water. Avoid alcohol. Call a physician or Poison Control Center immediately.

Precautionary Statements →

HAZARDOUS TO HUMANS AND DOMESTIC ANIMALS

Corrosive, causes eye damage. May be fatal if inhaled. Harmful if swallowed or absorbed through skin. Do not breathe vapors or spray mist. Do not get in eyes, on skin or on clothing. Wash hands and face thoroughly with soap and water after use and before eating, drinking or smoking.

PPE →

PERSONAL PROTECTIVE EQUIPMENT

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for Category C on an EPA chemical resistance category selection chart.

Applicators and Other Handlers Must Wear: A long-sleeved shirt and long pants; chemical-resistant gloves such as Nitrile, Butyl, barrier laminate, neoprene rubber, polyvinyl chloride, or viton; shoes plus socks; protective eye wear; chemical-resistant headgear for overhead exposure; chemical-resistant apron when cleaning equipment, mixing or loading dust/mist filtering respirator (MSHA/NIOSH approval number prefix TC-21C). Applicators, if applying more than 2 pints of ACARAMORT per acre in air blast equipment to citrus, must be in an enclosed cab. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard(WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

Environmental Hazards →

USER SAFETY RECOMMENDATIONS

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish. Do not apply directly to water or wetlands (swamps, bogs, marshes, and potholes). Drift or runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment wash water.

PHYSICAL OR CHEMICAL HAZARDS

Flammable. Keep away from heat and open flame.

This mock pesticide product label was developed for training purposes by Melanie Zavala, UC Statewide IPM Project

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), notification to workers, and restricted-entry intervals. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

REI

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 7 days.

Exception: After the first 48 hours or the REI, workers may enter the treated area to perform hand labor or other tasks involving contact with anything that has been treated, such as plants, soil, or water, without time limit, if they wear the early-entry personal protective equipment listed below.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, appears below.

PPE for Early Entry Tasks

- coveralls
- chemical-resistant headgear
- chemical-resistant gloves, such as nitrile, butyl, barrier laminate, neoprene rubber, polyvinyl chloride or viton
- shoes plus socks
- protective eye wear

Notify workers of the application by warning them orally and by posting warning signs at the entrances to treated areas.

Directions for Use

USE RESTRICTIONS

Do not apply this product through any type of irrigation system.

Do not mix ACARAMORT with alkaline materials (such as lime, Bordeaux mixture or lime sulfur) or with materials containing a large amount of petroleum type solvents.

Do not use in spray solution above pH 10.

Do not plant any food or feed crop in rotation within 6 month after last application of propargite unless the crop is a registered use for propargite.

Cotton—Apply only before bolls open. Do not feed treated foliage or cotton trash to livestock.

Directions for Use

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift.

Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

Formulation

ACARAMORT is a liquid emulsifiable concentrate for preparing sprays to control banks grass, Pacific spider, strawberry spider and two-spotted spider mites.

Directions for Use

ACARAMORT is not systemic in action, therefore complete coverage of both upper and lower leaf surfaces and of fruit is necessary for effective control.

After three-quarters full of water, add recommended dosage (from table) of ACARAMORT to the spray tank. Fill tank, agitate and spray thoroughly to cover foliage and fruit for best results.

DOSAGE INSTRUCTIONS

Crop	Mites Controlled	Timing of Application	Amount of Acaramort per Acre	Gallons of Spray Solution per Acre		Total Number of Sprays per Year	Earliest Harvest Days After Applications
				Ground Application	Aerial Application		
COTTON	Strawberry spider Pacific spider	Early	1 pint	15 to 30	Not recommended	3	Before bolls open
		Mid-season to Layby	1.5 to 2 pints	25 to 40	—		
	2 pints		—	5 to 15			
	2 pints		25 to 50	5 to 15			
	Layby to boll opening	2 pints	—	5 to 15			

STORAGE AND DISPOSAL

Storage and Disposal Instructions

Do not contaminate water, food or feed by storage or disposal.

PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

The following section describes information typically found on pesticide labels. Most of the parts listed are found on all labels, but some, such as the common name of the pesticide, may be absent. Since labels do not follow a standardized format and are often difficult to read, it is useful to know what information you can expect to find when you read a label.

Brand Name

The brand name is the commercial name of the pesticide product. It is usually the largest and most noticeable word on the front of the pesticide label.

Trainer Tip: It is important handlers understand each pesticide product is different, and they must read each label even if they have used a similar product. A handler who has used “GetUm 7” in the past may not take the time to read the “GetUm 7 Max” label, and miss the fact that the second “Max” product requires additional PPE and has a longer restricted-entry interval (REI).

Pesticide Manufacturer

Often the manufacturer is the company that produces the pesticide. However, in some instances the name that appears on the label could be a company that purchased and packaged a pesticide product.

Trainer Tip: The pesticide manufacturer can be a good resource for handlers and employers who may have questions about information listed on the label, the pesticide’s compatibility with other products, expiration dates, shelf life, and how to acquire additional copies of pesticide labels or safety data sheets (SDSs).

Pesticide Type

Labels list the type of pesticide (e.g., insecticide, fungicide, rodenticide, herbicide, etc.) or the types of pests they control on the front page.

Trainer Tip: You may hear people claim, “We don’t use pesticides. We just use herbicides.” You can explain that the word “pesticide” is the umbrella term that includes insecticides to control insects, herbicides to control weeds, rodenticides to control rodents, etc.

Active Ingredient

The active ingredient is the ingredient that will perform the pest control activity. For example, it is the ingredient that will repel the mosquitoes or kill the weeds.

Trainer Tip: It is common for a handler to believe the active ingredient is the ingredient with the highest percentage listed on the product label. This is not always the case. You can clarify by defining “active” as the ingredient that will perform the pest control “action” or “activity.”

Inert or Other Ingredients

The inert ingredients are additional ingredients in the container such as water, coloring agents, or ingredients that help the pesticide stick to the plant or more effectively control the pest.

Trainer Tip: At this time, the actual names of the inert ingredients are not listed on the labels. They are often listed as a percentage of the mixture or simply as “inert ingredients” or “other ingredients.”

Pesticide Formulation

The pesticide formulation is the mixture of active and inert/other ingredients.

Table 6.1: Examples of Different Types of Pesticide Formulations

Examples of liquid formulations	Examples of dry or solid formulations	Examples of additional formulations
<ul style="list-style-type: none"> • Emulsifiable concentrates • Flowables • Liquid baits and gels • Solutions 	<ul style="list-style-type: none"> • Dusts • Wettable powders • Pellets • Granules 	<ul style="list-style-type: none"> • Aerosols • Foggers • Soil fumigants • Fumigants for grain bin pests or burrowing rodents

Trainer Tip: Some labels list the formulation, such as “pellets,” on the front page of the label. Handlers can often gather information about the formulation by looking at the acronyms in a product’s name. For example, the “EC” in the product called “One ‘N’ Done EC” tells the handler that the product is an emulsifiable concentrate. The “DF” in the pesticide “FlyAway DF” indicates that it is a dry flowable. If the formulation is not included in the product name, the handler may have to search for more information in the Directions for Use section.

EPA Registration Number

The U.S. Environmental Protection Agency (EPA) assigns a unique registration number to each pesticide product approved for use in the United States.

Trainer Tip: The registration number can be very useful during a pesticide exposure situation. It gives medical personnel a way of identifying the product so they can find additional information on the health effects, ingredients, and first aid instructions.

Signal Word

Before a pesticide is approved for use in the U.S., the pesticide manufacturer must do a lot of research on the product, including studies on how toxic it is to humans. The results of these studies determine the signal word that will be placed on the front page of the pesticide label.

DANGER: A pesticide that is highly hazardous or toxic to humans.

Pesticides that are highly toxic if they are inhaled, swallowed or come in contact with the skin, will contain a picture of a skull and crossbones and the words “**DANGER**” and “**POISON**” on the label.

WARNING: A pesticide that is moderately hazardous or toxic to humans.

CAUTION: A pesticide that is least hazardous or toxic to humans.

Trainer Tip: Explain to handlers that despite the level of toxicity and the signal word they see on a label, they must be equally careful when working with all pesticides.

First Aid

The first aid instructions for pesticide exposure are usually found on the first or second page of the label. Sometimes there are additional instructions for medical personnel included in the same section.

Training Tip: It is extremely important that handlers read the first aid section **before** exposure occurs so they will be prepared to respond to any pesticide-related illness or injury. First aid instructions can vary, especially for incidences of pesticide ingestion/swallowing.

Personal Protective Equipment (PPE)

Note: The PPE listed for early-entry worker tasks is often listed separately and found in the Agricultural Use Requirements section.

Personal protective equipment may also be referred to as the acronym “PPE” on the pesticide label. This section will list the protective clothing and/or PPE items that must be worn when mixing, loading, or applying the product; when entering an area during the restricted-entry interval; and when cleaning, repairing, or maintaining application equipment.

Trainer Tip: The required protective clothing and PPE can vary on the same label for the type of handling task. For example, a handler may need to wear a chemical-resistant apron when mixing the product, but not when applying it. A handler may also notice a respirator is not required when applying the product outdoors but is required when applying it inside an enclosed space production area. Therefore, it is important that handlers review the entire PPE section prior to using the product.

Precautionary Statements

Precautionary statements can be found throughout the pesticide label. They include measures handlers must take to protect themselves, other people, and the environment. Examples of these include statements instructing the handler to apply the pesticide in a way that doesn't contact people, livestock, or water sources; to avoid inhaling the product; and to wash hands before eating, drinking, smoking, or using the restroom.

Trainer Tip: Some handlers may skim or overlook these important precautionary measures because they might believe that the information is standardized. Precautionary statements can vary from one product to the next and are an equally important part of the label.

Environmental Hazards Statements

Some pesticides are harmful to birds or beneficial insects, such as bees. Others may be toxic to fish or can easily move through the soil and contaminate the groundwater. The environmental hazards section will tell the handler about the potential impacts on the environment and warn the handler to avoid harming certain species or contaminating sensitive areas, such as wetlands or waterways.

Trainer Tip: After reading the environmental hazards statements and before applying the pesticide, handlers must survey the application area for the presence of any beneficial insects, wildlife, or sensitive areas that are listed on the label.

Restricted-Entry Interval (REI)

The REI is the time workers must wait after an application, before it is safe to enter the area, without protection and additional training. The REI is often included in the Agricultural Use Requirements section, but may also be found in the Directions for Use section if the REI varies by site. Similarly, the label may contain a **pre-harvest interval (PHI)**, which is the time that must pass after the application before a treated crop can be harvested.

Trainer Tip: Some states have set a minimum REI if one is not listed on the label or if the label states workers can enter once the product is dry. Since these regulations are state-specific they will most likely not be found on the product label. Nevertheless, all agricultural employers and handlers must be aware of and follow state-specific REI regulations.

Directions for Use

The "Directions for Use" section provides the handler with details about pests the product will control, the sites to which the pesticide can be applied, application rates, mixing instructions, equipment that can or cannot be used, and application restrictions.

Trainer Tip: It is illegal for a handler to exceed the maximum rate listed on the label. It is also illegal to apply a pesticide to a site or crop that is not listed on the label. While it is not illegal to apply the pesticide below the listed application rate or to a pest that isn't included on the label, it is not advisable because the product might not perform well and the pest may develop resistance to the pesticide. It is also a waste of the product, time, and money. Agricultural employers and handlers should contact the pesticide manufacturer if they need clarification about mixing or application instructions, or have questions about products that are available as an option for a particular pest or site.

Storage and Disposal Instructions

Storage and disposal instructions are usually found at the end of the label. They may include a storage temperature range or warnings about storing the pesticide near fertilizers, feed, or in a container other than the original container.

Trainer Tip: Storage and disposal regulations may vary between states or counties. Agricultural employers should check with their local pesticide regulatory agency for additional storage and disposal regulations, container recycling services, and unused pesticide collection programs.

ADDITIONAL WPS TRAINING TOPICS FOR HANDLERS Personal Protective Equipment

CHAPTER
6-2

Contents

6-2: Selecting and Inspecting Personal Protective Equipment (PPE)	82
PPE Definitions and Descriptions.....	83
Chemical-Resistant PPE	83
Waterproof PPE	83
Coveralls or Chemical-Resistant Suits.....	83
Aprons	83
Chemical-Resistant Headgear	83
Protective Eyewear	84
Chemical-Resistant Footwear	84
Gloves	84
Respirators.....	85
Respirator-Use Requirements	85
Medical Evaluation	86
Respirator Fit Test	86
Respirator Use and Maintenance Training.....	86
Selecting PPE to Use when Combining Pesticides	86
PPE Inspection.....	87
Replacing Respirator Filters and Cartridges	88
Adjusting PPE.....	89
Preventing Heat Stress when Wearing PPE	89
Steps to Reduce the Risk of Heat Stress.....	90



This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License by The Regents of the University of California, Davis campus, 2017. For information contact PERCSupport@ucdavis.edu.

6-2: Selecting and Inspecting Personal Protective Equipment (PPE)

After the handler has read and become familiar with the product label, the next step is to select the correct protective clothing and PPE. The type of PPE required is based on several factors, such as the product's toxicity, concentration, and formulation; the amount and type of exposure; and the application equipment, site and task. Based on data supplied by the pesticide manufacturer, EPA develops a risk assessment and identifies the protective clothing or PPE a handler or early-entry worker must wear to protect themselves from exposure.

Some pesticide labels require handlers to wear **protective clothing**, such as

- a long-sleeved shirt,
- long pants,
- shoes and socks, or
- a short-sleeved shirt and shorts (occasionally a label will require these items are worn underneath a chemical-resistant suit).



Photo courtesy of Chazzbo Media

These clothing items are not required to be provided by the employer.

Other pesticide labels list **PPE**, which may include

- gloves,
- an apron,
- chemical-resistant footwear,
- coveralls,
- a chemical-resistant suit,
- chemical-resistant headgear,
- protective eyewear, or
- a respirator.



Photo courtesy of Penn State Extension, The Pennsylvania State University

Handlers must read the label thoroughly to make sure they understand all of the PPE requirements. A handler who merely skims the label for PPE information may miss important details, such as those described below.

PPE Definitions and Descriptions

Chemical-Resistant PPE

When a “chemical-resistant” item is listed on the label, it is referring to PPE made of a material that doesn’t allow a measurable amount of chemical to pass through. Handlers may see “chemical-resistant” used to describe certain glove, footwear, suit, or apron material.

Waterproof PPE

Similarly, some labels require PPE to be made of “waterproof” material, which does not allow a measurable amount of water or pesticides mixed with water to pass through the item during use.

Coveralls or Chemical-Resistant Suits

Coveralls and chemical-resistant suits must be loose fitting, one- or two-piece garments that cover, at a minimum, the entire body except the head, hands, and feet. When the label specifies coveralls, this requires the handler to wear a cloth garment **not** a chemical-resistant garment.

Aprons

The label may require a chemical-resistant apron if needed to protect the handler during a situation in which a pesticide might splash back onto the handler, such as while mixing a pesticide or cleaning application equipment. The apron must be long enough to cover the front of the body from mid-chest to knees.

Chemical-Resistant Headgear

Some product labels will require overhead protection, while others will state chemical-resistant headgear must be worn. If chemical-resistant headgear is specified, it must either be a chemical-resistant hood or a chemical-resistant hat with a wide brim. If a label requires a hat for overhead protection, handlers must wear something made of a non-absorbent material they are willing to wash with soap and water at the end of the handling task. Handlers should not wear hats, such as baseball caps, when handling pesticides.

Protective Eyewear

Protective eyewear options include safety glasses with front, brow, and temple protection; chemical splash goggles; face shields; and full-face respirators. People who wear reading glasses might opt for a face shield, which will enable them to clearly see the label while mixing the product.



Photo courtesy of Penn State Extension, The Pennsylvania State University

Chemical-Resistant Footwear

While many labels will specify shoes and socks, labels that require handlers to wear chemical-resistant footwear are referring to shoes, boots, or shoe coverings made of chemical-resistant material, such as rubber or vinyl.

Gloves

If the label requires handlers to wear gloves, they must be worn during all handling tasks, including when repairing application equipment and adjusting nozzles.

The gloves must be the type listed on the label. Many labels will list the type of glove material (for example, nitrile gloves) or will state the gloves can be of any chemical-resistant or waterproof material. **Handlers must not wear cotton, suede, or leather gloves when they are handling pesticides unless instructed to do so by the label.** These materials absorb pesticides and will not protect handlers from pesticides.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Separable glove liners made of a thin lightweight fabric may be worn beneath chemical-resistant gloves as long as they are not exposed to the chemical by extending outside of the chemical-resistant gloves. If used, separable glove liners must be discarded either after 10 hours of use or within 24 hours of initially putting on the gloves, whichever comes first.

Separable glove liners are not to be confused with gloves that have a cotton or fleece lining, which are not allowed because they could absorb pesticides and contaminate the handler.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Respirators

If respiratory equipment is required, handlers will notice the type of respirator filter or cartridge identified by “NIOSH” **and** “TC” followed by a coding system. These acronyms tell the handler the National Institute of Occupation Safety and Health (NIOSH) has Tested and Certified (TC) the equipment listed on the label. Respirators are product- and task-specific. Therefore, it is imperative handlers wear the equipment specified on the label for the handling task they will perform.



Photo courtesy of Elizabeth Buffington Iowa State University Extension

Respirator-Use Requirements

It is the employer’s responsibility to make sure handlers who will use pesticides that require respiratory protection participate in a medical evaluation, respirator use and maintenance training, and respirator fit testing. However, it is the trainer’s responsibility to inform all handlers that the employer must fulfill these requirements before they work with a pesticide that requires respiratory protection. Each of the elements of the respiratory protection program must be documented.

Medical Evaluation

During the medical evaluation, the handler might be asked to complete a confidential medical history questionnaire. Based on the handler's responses to the questionnaire, a physician or medical professional may require the handler to schedule a follow-up visit or provide additional information to determine if the handler is physically able to use the type of respirator required by the product label.

Medical evaluations are not usually required every year. Additional evaluations are required if the medical evaluation from the medical personnel has a time limit, there is a change in the conditions of how the respirator is used, or there is a change in the health status of the handler.



Photo courtesy of Chazzbo Media

Respirator Fit Test

If the handler is given medical clearance, the employer must make sure the respirators they will use fit properly. The respirator must be fit tested at least annually.

Respirator Use and Maintenance Training

Each medically-cleared handler must also receive annual training on how to properly use, store, and care for their respirators. The handler must be trained more frequently if they do not demonstrate proper use or maintenance of their equipment.

Trainers who are interested in learning more about the respiratory-use requirements and instructions for administering respirator fit tests can refer to the resources available on the PERC website.



Photo courtesy of Penn State Extension, The Pennsylvania State University

Selecting PPE to Use when Combining Pesticides

Handlers may be instructed to mix two products together to control the pest. In this situation, the handler or the employer must compare the PPE sections of both labels and select the PPE listed on the label that provides the most protection.

For example, if one product label requires a long-sleeved shirt and pants and the other requires a chemical-resistant suit, the handler must wear a chemical-resistant suit. If one requires a respirator and the other does not, the handler must wear the required respirator. If different types of respirators are required, the handler employer must provide the appropriate type of respirator and cartridge to protect for both hazards.

PPE Inspection

After the handler has selected the PPE listed on the product label, it is good practice to check the PPE to make sure it is in good condition and safe to use before putting it on. The handler should inspect PPE again when cleaning it at the end of the handling task so they can tell the employer if the equipment is damaged.

PPE Inspection Checklist

- Inspect boots or chemical-resistant shoe coverings for holes, tears, or weak spots.
- Inspect re-usable gloves for damage, such as holes, cracks, tears, areas that have become bubbled or spongy, and any discoloration.
- Check coveralls and chemical-resistant suits for rips, tears, holes, or separation along seams and zippers.
- Make sure coveralls or chemical-resistant suits are the correct size for optimal protection and do not interfere with movement.
- Check apron material for holes or damage. Make sure apron strings are in good condition and enable you to wear the apron securely.
- Inspect protective eyewear for scratched or cracked lenses and replace if needed.
- Check elastic parts of goggles for fraying, tears, wear, or loss of elasticity and replace if worn.
- Check overhead protective headwear for cracks, holes, and worn adjustable fittings.
- Faceshields and protective headwear often have adjustable fittings for a secure fit and to prevent them from slipping or falling off. Inspect these fittings to make sure they are working properly.

Respirator Inspection Checklist

Note: If you need to replace any items on the respirator, it is important to use only approved replacement parts for that particular brand and model of the respirator. If unapproved parts are used, the respirator will not be in compliance with the law and the respirator may not provide the necessary protection.

- Check the elastic and adjustable straps for fraying, tears, or loss of elasticity, and replace any of these items if worn.
- Remove filters and discard them properly.
- Check filter retainers for scratches and cracks, and replace if defective.
- Disassemble and inspect valve flap assemblies for wear, deformities, or punctures. Replace parts if you suspect they might leak.
- Check the threads of all valves and cartridge parts for cracks and scratches.
- Examine the face piece for cracks, cuts, scratches, and signs of wear. Replace any defective parts.

Replacing Respirator Filters and Cartridges

Even if a respirator seals and fits well, handlers can still be exposed if the filters, canisters, or cartridges are old or damaged. Handlers must remove and replace respirator filters, cartridges, and gas- or vapor-removing canisters when any of the following situations occur:

- breathing becomes difficult;
- the filter is damaged or torn;
- the handler detects a pesticide taste, smell, or any type of irritation;
- when required according to the part manufacturer's recommendation or the pesticide label instructions, whichever is more frequent; or
- at the end of 8 hours of total use, if none of the above has occurred.



Photo courtesy of Penn State Extension, The Pennsylvania State University

It is often the handler who inspects the PPE before each use and cleans the items at the end of the handling activity. However, **it is the employer's responsibility to**

- provide and pay for all of the PPE listed on the label;
- make sure employees are trained on the proper use and care of PPE and that they follow the instructions provided;

- maintain all PPE and ensure it is inspected for cracks, tears, holes, weak spots, or damage before each day of use;
- properly discard and replace any damaged and disposable PPE;
- provide instructions to handlers on the proper way to clean, dry, and store re-usable PPE; and
- provide a place away from pesticide storage areas for handlers to put on, remove, and store PPE.



Photo courtesy Ed Crow, Penn State Pesticide Education Program

Adjusting PPE

Pant Legs and Sleeves

Handlers may ask whether they should tuck their sleeves into their gloves or their gloves into their sleeves when applying pesticides. They may have the same question about how to arrange their pant legs and boots.

A good way to present the correct arrangement is to mimic a ground application and an overhead pesticide application. Ask the handlers to think about these two scenarios and how they can best prevent the pesticide spray from entering and getting trapped in their boots or running down into their gloves or sleeves.

- **Ground Application:** place pant legs over boots to prevent pesticides from entering the boots. Place sleeves **over the gloves** to prevent pesticides from entering the gloves.
- **Overhead Application:** place pant legs over boots to prevent pesticides from entering the boots. Place gloves **over the sleeves** to prevent pesticides from entering the sleeves.

Coveralls with elastic at the wrist and ankle help to reduce gaps between the sleeve and glove or between the pant leg and boot.

Preventing Heat Stress when Wearing PPE

Personal protective equipment, especially items made from non-breathable material, can increase the risk of heat stress when worn during pesticide applications and early-entry work tasks. Heat stress is a serious health condition and can even lead to death.

Early stages of heat stress symptoms include

- fatigue,
- muscle weakness,
- dizziness,
- headache,
- nausea, and
- heavy sweating.

More severe stages of heat-related illness can include

- chills;
- severe thirst and dry mouth;
- fainting;
- lack of sweat as heat stress progresses;
- hot, dry, clammy skin;
- slurred speech; and
- irrational behavior and confusion.

Steps to Reduce the Risk of Heat Stress

Employers must take steps to prevent handlers from experiencing heat stress. Ways to reduce the risks include providing plenty of cool drinking water and shade for handlers and altering their work hours. For example, summer applications can be scheduled in the cooler hours of the day or night and for shorter periods of time, especially when working with pesticides that require the most PPE.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

ADDITIONAL WPS TRAINING TOPICS FOR HANDLERS

Measuring, Mixing, and Loading

CHAPTER
6-3

Contents

6-3: Measuring, Mixing, and Loading Pesticides.....	92
The Measuring, Mixing, and Loading Site.....	92
Checking the Weather.....	92
Selecting PPE.....	92
Decontamination Supplies at the Mixing and Loading Site	92
Opening Pesticide Containers.....	93
Measuring Pesticides.....	94
Cleaning Up Pesticide Spills.....	95
Table 6.2: Spill Cleanup Procedures.....	96
Loading the Tank	97
Cleaning Containers and Measuring Utensils	97
Final Step in Loading the Tank.....	98
Mixing More than One Pesticide (Tank Mixing).....	99
Leaving the Mixing and Loading Site.....	100



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCSupport@ucdavis.edu.

6-3: Measuring, Mixing, and Loading Pesticides**The Measuring, Mixing, and Loading Site**

When handlers are mixing and loading pesticides, they are working with the products in their most concentrated form. The mixing and loading site should be in a well-ventilated area, preferably outdoors. It must be as far away as possible from areas where people eat, drink, or smoke. To protect water sources, handlers must not mix pesticides near drains, wells, ditches, canals, ponds, or other waterways. Some pesticide mixing and loading sites have a sealed or portable containment pad, which prevents pesticide leaks and spills from getting into the soil. Certain states may have specific requirements for mixing and loading sites, such as their location, distance from water sources, and construction materials.

Checking the Weather

Prior to mixing and loading a pesticide, the handler must make sure that the weather conditions will be appropriate. Mixing and applying pesticides outdoors on a windy or rainy day can be hazardous for the handler, other people and the environment.

Selecting PPE

After the handler has determined the weather will not create a problem, the next step is to select and put on the protective clothing and/or PPE listed on the pesticide label for mixing and loading the pesticide.

Decontamination Supplies at the Mixing and Loading Site

If the product label requires the handler to wear any type of eye protection, it means the product is an eye irritant. The employer must ensure that eyewash is readily available at the mixing and loading site. Eyewash is also required for handlers who work with high pressure, closed-mixing systems.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Since pesticide labels often recommend rinsing eyes for at least 15 minutes, the eyewash system at the mixing and loading site must be capable of delivering at least

- 0.4 gallons of water per minute for 15 minutes, or
- 6 gallons of water in containers suitable for providing a gentle stream of water to rinse out the contaminated eye(s) for 15 minutes.

The employer must also provide the following decontamination supplies at the mixing and loading site:

- clean water,
- soap,
- single-use towels, and
- change of clothing.

Opening Pesticide Containers

After the handler has selected and put on the correct protective clothing and/or personal protective equipment, he or she can safely open the pesticide container.

Before opening pesticide containers, the handler must set the container down on a level surface to prevent it from tipping over and spilling once the cap is removed. The handler should place the cap tightly back onto the container when not using it to further reduce the risk of spilling the product.

When working with bagged dry pesticide products, the handler can use a sharp knife, box-cutting blade, or scissors to open the bag. Tearing open the bag can cause the product to spill on the ground or get on the handler's face or hands. The handler must clean the knife, blade, or scissors with soap and water immediately afterwards, and label the utensils, "for pesticide use only," so they are not used for any other purpose.



Photo courtesy of Penn State Extension,
The Pennsylvania State University

Measuring Pesticides

It is not uncommon for a new handler to believe all pesticides can be measured using the same measuring utensils or devices. Although liquid pesticide products are measured by volume, using familiar liquid measuring utensils, dry pesticide products are typically measured by weight, which requires a scale. Luckily, some pesticide manufacturers understand this is not easily understood by all handlers. Those manufacturers pre-weigh the products and include plastic measuring utensils with the pesticide shipment. Handlers can use these utensils to accurately measure the dry product. It is good practice to use one set of utensils for measuring herbicides and a separate set for measuring insecticides and fungicides, to avoid cross-contamination.



Photo courtesy of Penn State Extension, The Pennsylvania State University

When measuring out pesticides, the handler should set the pesticide measuring utensil or device on a flat and level surface below eye level. This will reduce the risk of the pesticide getting into the handler's eyes. It is important the handler concentrates, works slowly, and measures the product accurately.



Photo courtesy of Penn State Extension, The Pennsylvania State University

If a pesticide container does tip over and the pesticide spills onto a concrete surface or the ground, the handler must work quickly to control, contain, and clean up the spill. However, the handler must also keep their own safety in mind before responding to a potentially hazardous spill situation.

A spill kit should be available at the mixing and loading site and include

- chemical-resistant gloves,
- boots,
- chemical-resistant apron,
- protective eyewear,
- respirator (if required on label),
- absorbent material,
- shovel,
- broom,
- dustpan,
- cones and/or caution tape,
- heavy duty detergent,
- small squirt bottle to moisten dry products,
- plastic container with a lid for collecting contaminated material,
- any other spill cleanup materials identified on the label of the spilled pesticide, and
- phone numbers for local pesticide regulatory agencies and hazardous materials and emergency response agencies.

Cleaning Up Pesticide Spills

Many pesticide labels contain instructions on how to clean up a spill. Handlers must never hose down a spill. The water from a hose could spread the pesticide around and contaminate a larger area, including water sources, if the liquid runs down a drain.



Photo courtesy of Penn State Extension, The Pennsylvania State University

In all pesticide spill situations handlers should

- **Protect themselves** by putting on the PPE listed on the label. If the situation is too dangerous, they should call for emergency help.
- **Control the spill** by placing the container upright to prevent more pesticide from spilling or by putting a broken or leaking container into a plastic bag or other secondary container.
- **Contain the spill and the area** by using an absorbent material to keep the product from spreading. Set up cones, a rope or caution tape so people don't accidentally walk through the area.
- **Clean up the spill** according to label directions.

The following table contains additional instructions about spill cleanup procedures.

Table 6.2: Spill Cleanup Procedures

Liquid pesticide spill on concrete	Liquid pesticide spill on soil	Dry pesticide spill on concrete	Pesticide spills on public roadways
<p>Step 1</p> <p>Pour dry soil or an absorbent material like cat litter around the spill to prevent it from spreading.</p>	<p>Step 1</p> <p>Use a shovel to remove the contaminated soil.</p>	<p>Step 1</p> <p>Lightly moisten the dry product with water from a spray bottle and cover it with a plastic tarp to keep it from blowing around.</p>	<p>Step 1</p> <p>If safe do so, put cones or caution tape around the area to prevent people or cars from entering. Otherwise, stay in your vehicle, up-wind from the spill area and use your emergency flashing lights.</p>
<p>Step 2</p> <p>Use a broom to sweep the absorbent material from the perimeter of the spill toward the center. You can pour more absorbent material on the spill if needed to soak up all of the pesticide.</p>	<p>Step 2</p> <p>Make sure to remove all of the contaminated soil, by digging at least 6 inches below and around the soil that appears to be contaminated.</p>	<p>Step 2</p> <p>Once contained, sweep up the moistened pesticide with a broom and dust pan.</p>	<p>Step 2</p> <p>Call 9-1-1 or a local hazardous material team to respond to the situation. They may need to close the road and report the spill to additional agencies.</p>
<p>Step 3</p> <p>Put the spilled material and any contaminated cleanup supplies into sealable plastic containers.</p>	<p>Step 3</p> <p>Place the soil in sealable plastic buckets.</p>	<p>Step 3</p> <p>Place in a sealable plastic container.</p>	
<p>Step 4</p> <p>Call your local regulatory agency for further instructions on hazardous material disposal. You may be able to apply the material to a labeled site at the label rate.</p>	<p>Step 4</p> <p>Label the buckets with information about the pesticide.</p>	<p>Step 4</p> <p>Label the bag with information about the pesticide.</p>	
	<p>Step 5</p> <p>Contact the local regulatory agency for additional procedures for disposing of the hazardous material. You may be able to apply the material to a labeled site at the label rate.</p>	<p>Step 5</p> <p>Contact the local regulatory agency for further instructions for hazardous material disposal.</p>	

Loading the Tank

Handlers can begin the loading process by partially filling the spray tank with water before adding the pesticide. After the water has settled, the handler can check the hoses and attachments for any tears, leaks, or weak spots. This provides the handler an opportunity to make repairs and adjust equipment before adding the pesticide, allowing them to avoid the risk of spilling the product and contaminating the environment.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Once the handler has determined the equipment is in good condition, it is time to add the pesticide to the tank. It is very important the handler works slowly and safely to prevent the product from splashing.

Cleaning Containers and Measuring Utensils

If the pesticide container is completely empty after the product is loaded into the tank, **the handler must follow the label instructions** for cleaning the container.

Some pesticide labels will indicate that the empty container must be triple-rinsed when empty. The following procedures serve as a guide for **triple-rinsing plastic pesticide containers**.

- Once the container is empty, let it drain into the spray tank for about 10 seconds.
- Add water to the empty container as recommended below.

Container Size	Amount of Water for Rinsing
Less than a gallon	1/4 of the container volume
1 gallon	1 quart
5 gallons	1 1/4 gallon
30 to 55 gallons	7 1/2 - 14 gallons

- Close the container.
- Shake the container for 10 seconds or roll it around if it is a large container or drum. Make sure the rinse water (rinsate) reaches the entire interior surface of the container.
- Drain the rinsate into the spray tank for 10 seconds.
- **Repeat the above steps at least 2 additional times.**
- The rinsate can be emptied into the spray tank and applied to the application site.
- Remove the label and the cap.
- Puncture the plastic container to prevent reuse.
- Store emptied and rinsed containers in a separate area until they can be collected for recycling or disposal.
- Some containers, such as pesticide bags, cannot be rinsed. They should be emptied as much as possible, closed, and stored together in a secured area prior to proper disposal.

Note: Partially empty pesticide containers can go back into the locked pesticide storage area.



Photo courtesy of Penn State Extension, The Pennsylvania State University



Photo courtesy of Penn State Extension, The Pennsylvania State University

Pesticide measuring utensils, devices, and scales must also be cleaned, labeled “for pesticide use only,” and locked in a storage area so people do not use them for any other purpose.

Final Step in Loading the Tank

The handler can now add more water to the mixture in the spray tank, but must take precautions to **avoid back-siphoning the pesticide into the water source.**

Back-siphoning can occur if a handler allows the water pipe or hose to sit on or below the surface of the liquid pesticide mixture. When the handler turns off the water it creates a vacuum, which sucks the pesticide back through the pipe or hose and into the groundwater. A simple way to prevent this from happening is to hold the hose at least 6 inches above the surface of the liquid when filling the tank. Some employers install back-siphoning devices or check-valves onto the pumping equipment to make it easier for the handler and safer for the environment.



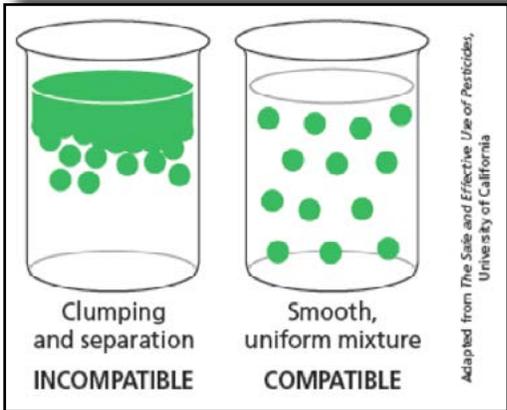
Photo courtesy of Penn State Extension, The Pennsylvania State University

Mixing More than One Pesticide (Tank Mixing)

Handlers may be asked to mix two or more pesticides together and apply them at the same time. **This is referred to as “tank mixing.”** For example, an employer may ask a handler to mix two herbicides together that are effective in controlling different types of weeds.

Tank mixing can be both convenient and cost effective as it reduces the time and labor involved in applying multiple products. Unfortunately, tank mixing can be a difficult task for handlers if the mixture of products is incompatible, creates a hazardous situation, or needs constant agitation.

One way handlers can check to see if two or more products are compatible is by performing a “**jar test.**” During a jar test, the handler mixes small but comparable amounts of each product with an appropriate amount of water in a jar prior to mixing them. After the mixture sits for 10-15 minutes, the handler can check the mix for separation, clumping, flaking, crystallization, gel formation or extreme heat. These conditions indicate that the products cannot be safely or effectively mixed together. The handler should talk to their employer about the possibility of adding a compatibility agent to the tank or applying the products separately.



Note: Trainers who are interested in providing handlers with additional information and procedures for creating tank mixes can refer to the National Pesticide Applicator Core Manual's Tank Mixing Order Table. See Chapter 10 for a list of resources.

Leaving the Mixing and Loading Site

Before heading to the application site, the handler must make sure the mixing and loading site is safe and secure, especially if it is left unattended.

The employer must provide additional decontamination supplies the handler can use for routine decontamination and emergency eyewash when applying pesticides. The items are similar to those mentioned earlier and include

- at least 3 gallons of water per handler,
- soap,
- single-use towels,
- one clean change of clothing, such as coveralls, for each handler to use in an emergency, and
- at least an additional pint of water for eyewash if the label requires that the handler wear eye protection when applying the pesticide.

These decontamination supplies must be located

- outside a treated area or an area under REI, unless the soap, water, single use towels, and change of clothing are protected from pesticide contamination in closed containers; and
- not be more than 1/4 of a mile from, or the nearest point of vehicular access to, the handler's and early-entry worker's working site.

Handlers must also have available all of the protective clothing and/or PPE listed on the label for the pesticide application task, even when working in enclosed cab tractors. They should also take spill cleanup supplies, extra nozzles, and tools needed to adjust or repair application equipment to the application site.

ADDITIONAL WPS TRAINING TOPICS FOR HANDLERS

Surveying the Application Site

CHAPTER 6-4

Contents

6-4: Surveying the Pesticide Application Site	102
Sensitive Areas near the Application Site	102
Buffer Strips to Protect Sensitive Areas	102
Weather Conditions	102
Table 6.3: Impacts of Applying Pesticides During Inclement Weather Conditions	103
Inversion Condition.....	104
Wind Speed	104
Application Equipment	105
Soil Type and Groundwater	105



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCsupport@ucdavis.edu.

6-4: Surveying the Pesticide Application Site

After mixing and loading the pesticide into the tank and prior to the application, it is important for the handler to survey the area again to make sure it is safe to apply the pesticide.

Sensitive Areas near the Application Site

Handlers must look all around the application site for the presence of people, animals, or sensitive areas that might be negatively impacted by the pesticide. Sensitive areas include places where people live, work, play or through which they travel. They also include water sources and sites where livestock, wildlife, and pets reside.



Photo courtesy of Dr. Kurt D. Nolte, University of Arizona Cooperative Extension

Handlers need to be exceptionally careful when applying pesticides near or adjacent to

- crops or plants other than those being treated;
- surrounding homes and buildings;
- parks;
- forests;
- rivers, lakes, ponds and streams;
- wildlife and beneficial insect habitats;
- livestock areas including fields used for grazing;
- schools and daycare centers;
- hospitals;
- gardens and yards;
- roads; and
- sidewalks, paths or trails.

Buffer Strips to Protect Sensitive Areas

Some agricultural employers and handlers choose to protect sensitive areas by creating an unsprayed area between the application site and the sensitive areas. This unsprayed area is referred to as a buffer strip. The width of the buffer strip is usually equal to the width of one spray swath.

Weather Conditions

Weather has a significant impact on pesticide applications. As is displayed in the following table, extreme heat, cold, rain and wind can negatively impact the application and the pesticide's effectiveness on the pest. Applying pesticides during inclement weather conditions may also damage the plants or the environment.

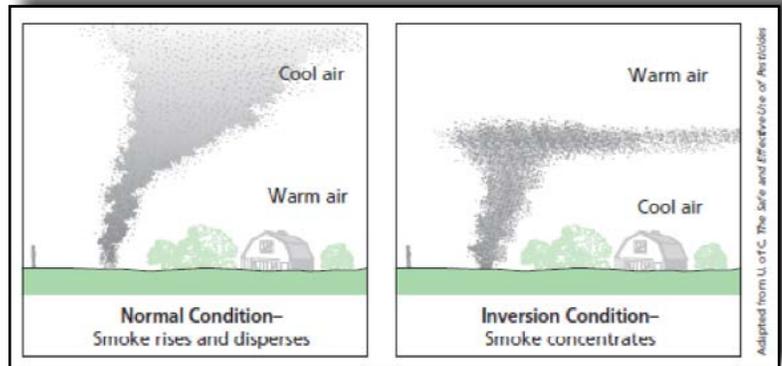
Table 6.3: Impacts of Applying Pesticides During Inclement Weather Conditions

Weather	Impact on Pesticide Application	Impact on Environment
Extreme Heat	When applied during extreme heat, pesticides can break down and evaporate quickly resulting in poor pest control.	Applying a pesticide during extreme heat can damage the plants. Extreme heat can evaporate or volatilize the pesticide droplets, which makes them smaller and lighter, potentially leading to drift onto other plants, people or sensitive areas.
Extreme Cold	If the pesticide gets too cold it could crystalize, making it difficult to mix and apply. If applied when it is extremely cold, the active ingredients can separate from the solvents, emulsifiers and other ingredients. Extreme cold may reduce the effectiveness of some pesticides.	Applying a pesticide when it is extremely cold, may result in plant injury. Pesticide applications during extremely cold weather may lead to the pesticide not being well absorbed by the plants or soil. As a result, the pesticide can move from the site and contaminate other areas.
Rain	Rain can dilute or wash the pesticide away resulting in poor pest control.	Applying a pesticide when it is raining or shortly before it rains, can result in runoff or pesticide movement due to flooding. This can contaminate non-target areas, including rivers, lakes and streams that may be near the application area. Pesticide applications during or shortly before a rain may result in soil and groundwater contamination if the pesticide leaches or filters down through the soil.
Wind and Fog	Wind and fog can carry the pesticide away from the application area, which can lead to uneven distribution of pesticide and poor pest control.	Applying a pesticide when it is windy or foggy may cause pesticides to drift onto other fields, resulting in damage to or illegal residues on crops. A pesticide applied when it is windy or foggy could also drift onto people, animals or sensitive areas.

Inversion Condition

An inversion condition occurs when the air closest to the ground is cooler than the air above. This condition can trap the stable air containing the pesticide droplets and carry them horizontally for considerable distances away from

the application site. Inversion conditions can occur at any time and at any distance from the ground. However, the condition most frequently occurs at dusk when the ground temperature is cooling and the warm air begins to rise. Some handlers check for inversion layers prior to the application by creating a small burn pile (when permitted) and watching the way the smoke rises or settles in the air.



Adapted from University of California,
Safe and Effective Use of Pesticides

Wind Speed

Some handlers believe that in order to avoid drift, pesticides can only be applied when there isn't any wind. On the contrary, applying pesticides at a time when the wind speed is between 0-3 mph can lead to drift, as well. In these conditions the air is stable. It is hard to determine which direction the wind could blow if the wind speed picks up.

The optimal wind speed for applying pesticides is between 3-7 miles per hour. This speed allows the handler to monitor the wind direction. After surveying the area for the presence of people or sensitive areas downwind of the application site, the handler can determine if they can safely apply the pesticide without creating harm to others or the environment.

Wind speeds greater than 7 mph could lead to drift and the handler must not spray in these conditions even if instructed to do so.

Application Equipment

Certain types of application equipment designed to create fine droplets delivered through a high-pressure sprayer increase the potential for drift. These include

- mist blowers or air-blast sprayers,
- high-pressure sprayers,
- power dusters,
- fog generators,
- aerosols, and
- high-pressure, overhead application equipment.

The smaller the droplet, the lighter it is, making the pesticide more prone to being carried off with the air movement. High pressure sprayers are often used to push the pesticide droplets out at a faster rate to reach pests in the tree canopies. The pressure, combined with the distance between the ground and the target site, also make the droplets more susceptible to drift by wind or inversion conditions.

Soil Type and Groundwater

Handlers who apply pesticides to areas where sandy soils are prevalent must take extra precautions to prevent equipment leaks or spills. Sandy soils are porous. Therefore, pesticides can filter or leach through sandy soils easily and can contaminate groundwater. This is especially hazardous in areas with shallow water tables because pesticides can reach the groundwater fairly quickly.

Although a pesticide will pass through soil that contains a high amount of organic material or clay at a much slower rate than it will pass through sandy soil, it is equally important for handlers to take the same safety precautions to prevent contamination of groundwater. Pesticides have a tendency to bind to clay and organic particles and remain in the soil for a longer period of time.

Handlers can reduce the risk of contaminating the environment by using pesticides safely and following label instructions. They must also be aware of the weather conditions, soil type, pesticide formulation, and the application equipment. The following list of questions will help handlers as they survey an area and assess the measures they can take to protect people and the environment.

Before applying pesticides, handlers should ask themselves the following questions.

- What sensitive areas exist in, near or adjacent to the application site?
- What are the current weather conditions?
- How might the current weather conditions impact the application or the pesticide's ability to contaminate the environment?
- Should I and can I delay the application until conditions improve?
- What type of soil exists in the area I would like to treat?
- How can I adjust my application equipment to reduce the risk of drift?
- Is there something I can add to my spray tank, such as a sticker or spray retardant that will reduce the chance that the material will drift offsite?
- What precautionary measures can I take to prevent contaminating people, animals, sensitive areas or the environment?

ADDITIONAL WPS TRAINING TOPICS FOR HANDLERS

Applying Pesticides Safely

CHAPTER
6-5

Contents

6-5: Applying Pesticides Safely and Effectively	108
Warning Sign Posting Requirements.....	108
The Application Exclusion Zone (AEZ)	108
Table 6.4: Application Exclusion Zone Distances.....	110
Application Procedures	111
Additional Safety Measures for Handheld or Backpack Sprayers	111
Table 6.5: Ways to Prevent Pesticide Exposure when Using Backpack and Handheld Sprayers.....	112



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCsupport@ucdavis.edu.

6-5: Applying Pesticides Safely and Effectively

Warning Sign Posting Requirements

It is possible the application area will need to have posted warning signs prior to the application. As was highlighted in Chapter 5, warning sign posting is required when applying a pesticide with an REI greater than 48 hours (outdoors) or 4 hours (enclosed space production areas). Posting is also mandatory when required on the label.



Photo courtesy of Elizabeth Buffington
Iowa State University Extension



Photo courtesy of Elizabeth Buffington
Iowa State University Extension

The employer is responsible for checking the label for the REI and posting requirements. The employer must also make sure the application area is posted, if required.

However, the employer may request the handler assist with the responsibility by placing, turning down, or flipping over the warning sign in the area prior to the application.

Once it has been determined the area is clear, the weather conditions are right, and the warning sign is in place (if posting is required), the handler can begin the application.

The Application Exclusion Zone (AEZ)

If at any time people not involved in the application enter or attempt to pass through the area, the handler must shut off the application equipment and wait until the “**Application Exclusion Zone**” is clear again, or certain criteria are met, before continuing with the application. While this was explained in Chapter 5, it is worth mentioning again.



Photo courtesy of Chazzbo Media

The AEZ is the area around the pesticide application equipment that is considered potentially hazardous for people to enter, other than properly trained and equipped handlers involved in the application.

The AEZ is a 100 foot radius around application equipment delivering pesticides

AS A

- fumigant
- fog
- mist
- smoke

OR THROUGH

- aerial application
- an air-blast sprayer
- nozzles that produce fine or small droplets

The AEZ distance is reduced to 25 feet for pesticides that are delivered through nozzles that produce medium- to coarse-sized droplets and from a height greater than 1 foot from the ground.

Droplet Size and Relation to AEZ
ASABE Standard S-572.1

Sidebar 4. Spray quality categories. ASABE Standard S-572.1 ^a	
Category (symbol) ^b	Color Code ^c
Extra Fine (XF)	Purple
Very Fine (VF)	Red
Fine (F)	orange
Medium (M)	yellow
Coarse (C)	Blue
Very Coarse (VC)	Green
Extra Course (XC)	White
Ultra Coarse (UC)	Black

100 foot
AEZ

25 foot
AEZ

Photo courtesy of North Carolina Cooperative Extension

The following table is used as a tool to simplify the general concept of the AEZ for training purposes. More detailed information can be found on EPA's website and in the How to Comply Manual.

Table 6.4: Application Exclusion Zone Distances

Pesticide is applied through aerial application, air blast application, or as a fumigant, smoke, mist or fog.		
Nozzle Size	Distance from Nozzle to Ground	Restrictions and Actions Taken
All Droplet Sizes	Any distance from the ground.	<p>Handlers must make sure no one is within 100 feet of the application equipment.</p> <p>If people are present, the handler must suspend the application until the area is cleared or certain criteria are met.</p> <p>The agricultural employer must keep workers and other people at least 100 feet from the application equipment during the application.</p>
All other methods of application not listed above		
Nozzle Size	Distance from Nozzle to Ground	Restrictions and Actions Taken
Fine to Small Droplets	Any distance from ground	<p>Handlers must make sure no one is within 100 feet of the application equipment.</p> <p>If people are present, the handler must suspend the application until the area is cleared or certain criteria are met.</p> <p>The agricultural employer must keep workers and other people at least 100 feet from the application equipment during the application.</p>
Medium to Coarse Droplets	Greater than 12" from the ground	<p>Handlers must make sure no one is within 25 feet of the application equipment.</p> <p>If people are present, the handler must suspend the application until the area is cleared.</p> <p>The agricultural employer must keep workers and other people at least 25 feet from the application equipment during the application.</p>
Medium to Coarse Droplets	Less than or equal to 12" from the ground	Application Exclusion Zone restrictions do not apply. The AEZ is therefore 0 feet.

Application Procedures

To ensure the product is being applied safely and accurately, handlers must stay alert during the entire application task and frequently check the area and application equipment to ensure that

- the pesticide is reaching the target site;
- the equipment is providing good coverage and even distribution;
- tank mixes are properly agitated, appear uniform, are not separating or clumping; and
- hoses, valves, nozzles, hoppers, and other equipment parts are functioning properly.

If a handler notices a problem, such as uneven distribution of the pesticide, the handler should shut off the equipment or take off the backpack sprayer and inspect the equipment hoses, valves, nozzles, and other parts. If the problem is due to a clogged nozzle, the handler should replace or clean the clogged nozzle at the application site.

Clogged nozzles must be cleaned with a small brush, compressed air, or soap and water. Some people may try to clean nozzles with a small wire, toothpick, or by blowing through the nozzle with their mouth. None of these methods are recommended. Wires can damage nozzles made of softer materials, such as plastic or ceramic and toothpicks can break off inside the nozzle while cleaning. Finally, handlers can expose themselves to the pesticide if they attempt to blow out the clog with their mouth.

Additional Safety Measures for Handheld or Backpack Sprayers

Handlers who apply small amounts of pesticides through a handheld or backpack sprayer may find the task to be somewhat easy. However, handlers must be aware of the potential hazards when using these types of equipment and the ways that they can prevent exposure.



Photo courtesy of Penn State Extension, The Pennsylvania State University



Photo courtesy of Penn State Extension, The Pennsylvania State University

Table 6.5: Ways to Prevent Pesticide Exposure when Using Backpack and Handheld Sprayers

Potential Exposure Hazard	Ways to Prevent Exposure
Pesticide leaks or drips out of the equipment.	Check nozzles, hoses, gaskets, and connections prior to application. Repair, replace or adjust if necessary.
Contaminating hands, skin, or eyes when trying to adjust nozzles, hoses or other equipment parts.	Always wear gloves and protective eyewear when adjusting application equipment to avoid touching equipment with bare skin. Use the pressure release valve before attempting to repair, replace or adjust equipment to prevent pesticide from spraying into your face or eyes.
Contaminating footwear by walking through the area during the application.	Some handlers walk backwards as they apply pesticides, but others fear they might trip or fall if they can't see where they are walking. Wear shin- or knee-high chemical-resistant boots or shoe coverings during the application. Wash them with soap and water after the application task and store them at the worksite.

**MANDATORY****Monitoring Handlers During Applications**

Handlers who apply pesticides that contain the words “Danger/Poison” and a picture of a skull and crossbones on the label must be monitored during the application. The same rule applies to handlers who apply fumigants inside enclosed spaces.

The person who is monitoring the handler during the application must also be a trained handler and have the label-required PPE within reach in case they need to enter the application area to rescue or respond to the handler.

Reason: These products are extremely toxic through the eyes, skin, nose, or mouth.

Frequency: Check on the handler at least every 2 hours during the application of a “Danger/Poison” pesticide. Fumigators must be monitored continuously.

Monitoring System: Check on the handler by sight (visually) or voice (phone).

IMPORTANT

Monitoring through text messaging is not acceptable. The handler would have to hear the text message, take off their gloves, and type on the phone’s screen in order to respond to the contact person’s text message.

ADDITIONAL WPS TRAINING TOPICS FOR HANDLERS

Cleanup Information

CHAPTER
6-6

Contents

6-6: Cleaning up at the End of the Handling Task.....	116
Cleaning Application Equipment.....	116
Cleaning and Removing PPE After Use.....	117



This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License by The Regents of the University of California, Davis campus, 2017. For information contact PERCSupport@ucdavis.edu.

6-6: Cleaning up at the End of the Handling Task

Cleaning Application Equipment

Cleaning pesticide application equipment thoroughly after use reduces pesticide residues and prevents the equipment from becoming clogged. Handlers should do the following:

- Check the pesticide label to see if it has a separate list of personal protective equipment (PPE) for cleaning the application equipment. If not, they must wear the required PPE for handling the pesticide product. To protect themselves, they could also wear a chemical resistant apron and eye protection.
- Check with their employer to ask if they need to use special cleaning agents or high water pressure.
- Clean the inside and outside of the equipment, including nozzles and hopper openings.
- Prevent all cleaning agents and rinse water (rinsate) from entering water sources.
- Collect rinsate and apply it to the application site at or below the labeled rate, if it will not harm the area or impact the application.



Photo courtesy of Elizabeth Buffington
Iowa State University Extension

Cleaning and Removing PPE After Use

The employer must ensure that when handlers finish using pesticides, they clean their reusable PPE items with soap and water before taking them off. This is a good time to inspect the PPE again to see if any of items have been damaged during the handling tasks. If so, the handlers should notify their employers to request replacement parts or new PPE for the next use.

The following is a list of tips trainers can provide to handlers:

- When washing PPE, avoid getting pesticide residues on your skin or into your eyes. One way to do this is to have extra gloves and goggles to use during cleaning.
- If you are wearing different PPE items such as safety glasses, goggles, or boots, keep your gloves on while you wash those items with soap and warm water.
- Wash gloves with soap and warm water while you are still wearing them. This will prevent you from touching the outside of your gloves with your bare hands.
- After you have removed all of your PPE, wash your hands, face and any other skin that might have been exposed to pesticides.
- Dry and store your PPE at work so you don't risk contaminating your car or home. When storing PPE at work, store it in a place other than the pesticide storage area.
- Throw away any "disposable" PPE, such as disposable gloves, suits, or dust masks that cannot be cleaned.
- Separate your work clothes from your family laundry when you get home and wash these items separately.



Photo courtesy of Elizabeth Buffington
Iowa State University Extension



Photo courtesy of Ed Crow, Penn State
Pesticide Education Program

ADDITIONAL WPS TRAINING TOPICS FOR HANDLERS

Pesticide Containers

CHAPTER
6-7

Contents

6-7: Transporting, Storing and Disposing of Pesticides and Their Containers.....	120
Transporting Pesticides	120
Table 6.6: Tips for Safely Transporting Pesticide Containers.....	120
Storing Pesticides and Containers	121
Damaged Containers.....	122
Empty Pesticide Containers and Leftover Pesticides	122



This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License by The Regents of the University of California, Davis campus, 2017. For information contact PERCSupport@ucdavis.edu.

6-7: Transporting, Storing and Disposing of Pesticides and Their Containers

Transporting Pesticides

Handlers may need to transport pesticides from one location on an establishment to another or from the storage area to a mixing site. When transporting pesticides, especially containers that have already been opened, there are a few things handlers can do to prevent exposure and pesticide spills.

Table 6.6: Tips for Safely Transporting Pesticide Containers

ALWAYS	NEVER
Transport pesticides in the truck bed, cargo area or on the back of the spray rig.	Carry pesticides in the passenger compartment of any vehicle.
Check the containers for leaks before loading and unloading.	Transport food, animal feed, or clothing in the back of the vehicle or cargo area with the pesticide.
Protect containers from rain and other potential weather damage.	Expose pesticide containers to weather conditions such as extreme heat or rain.
Secure or tie down all pesticide containers in the cargo area.	Place loose or unsecured containers in the back of the vehicle.
Monitor the containers at all times during transportation. Keep them in a locked area, if possible.	Leave pesticide containers unattended.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Storing Pesticides and Containers

Pesticides should be stored in an area that is not easily accessible to the general public and away from areas where employees eat, drink, smoke, or take breaks.

Never store pesticides with fertilizers or flammable materials. When storing liquid pesticides in the same area as dry pesticides, the containers should be stored in a way that prevents the liquids from spilling onto and damaging the dry products. Containers must also be clearly labeled and in good condition. Certain states have regulations requiring certain quantities of stored pesticides to be reported to the local fire department or first responders.

It is also important the storage area

- is locked when not in use;
- contains a sign indicating that pesticides are stored inside;
- has good lighting and is well organized so it is easy for employees to find the pesticides;
- is well ventilated, dry and cool (if possible);
- is checked frequently for containers that are damaged or leaking; and
- is located in an area far away from children, food, animals, and animal feed.



Photo courtesy of Penn State Extension,
The Pennsylvania State University

Damaged Containers

The temperature inside a storage area can directly impact pesticides and their containers. If containers get too hot they can expand, leak, and create fire hazards. Humidity can cause dry products to clump and pesticide labels to peel. Extremely cold temperatures may cause the products to crystalize and be difficult to mix.

If a container is torn, damaged, or if the pesticide is leaking, the handler should immediately stop the leak from spreading and transfer the product into a new container and label it. The handler should then refer to and follow the disposal instructions listed on the label. If the label has been damaged, the employer or handler can contact the manufacturer for a copy of the pesticide label. Most manufacturers have versions of the label they can quickly send electronically.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Empty Pesticide Containers and Leftover Pesticides

Agricultural employers and/or handlers often have questions about what to do with leftover or unusable pesticides and empty containers. They can check with pesticide dealers or local regulatory agencies to ask about container recycling services and pesticide collection programs in their area. The Pesticide Stewardship Alliance lists state-specific contact information for pesticide disposal programs and container recyclers. See tpsalliance.org for more information.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Contents

Presenting Effective WPS Training.	124
Passive Versus Interactive Training Techniques	124
Examples of Interactive Training Techniques	125
Discussion	125
Sharing Personal Experiences	127
Images	128
WPS Flipcharts.	130
Audiovisual Tools - Videos/DVDs, and Digital Presentations.	131
Case Study	133
Role Play	134
Hands-on Activities	135
Fluorescent Tracer Powder or Lotion	137
Games and Quiz Shows	138



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCsupport@ucdavis.edu.

Presenting Effective WPS Training

Developing and presenting Worker Protection Standard (WPS) training classes can be a challenge, especially since pesticide safety is a serious subject. It is not only important the information provided to workers and handlers is accurate, but it also must be presented in a manner that is easily understood and maintains their attention. Obtaining accurate information can be easy, but in order to make your training effective and interesting, you should understand the difference between passive and interactive training techniques.

Passive Versus Interactive Training Techniques

Passive training requires little or no active exchange between the trainer and the trainees. Lectures, reading assignments, and audio-visual presentations can all be passive techniques or tools, because they don't require active participation by the trainees. It is difficult for trainers to monitor trainees' concerns or knowledge about the topic when only passive techniques are used.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Interactive training includes techniques that encourage trainees to participate in activities or discuss the topic. Training is more effective and enjoyable for the trainees when they are directly involved in the learning process. Examples of interactive training include discussion, hands-on activities, role-playing, and games.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Choose the training technique that is best suited for your training objectives, the training site, number of participants, and the time you will have allotted to conduct the training.

Examples of Interactive Training Techniques

The following information is a description of several interactive training techniques. Advantages, limitations, and tips are included to help you decide which methods will work best for your training sites and situations. Finally, activities are included as examples of how each technique could be used in WPS training.

Discussion

The easiest way to turn a lecture into an interactive training session is to combine your presentation with a discussion or a question and answer session. This allows trainees to participate in the training, and helps you monitor how well they understand the information.

Advantages

- Discussion sessions allow trainees to be directly involved in the learning process.
- Trainees have the opportunity to share previous experiences and knowledge that may bring new ideas and information to the course.
- When trainees are asked questions or invited to share their ideas, they are more likely to maintain interest and pay attention to details.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Limitations

- Discussion sessions can be time consuming especially if group members stray from the main topic.
- Even if encouraged to participate, some trainees may be hesitant to share their experiences or knowledge, while others dominate the discussions.

Tips for Discussions During Training. Some trainees may have had prior pesticide safety training or experience with pesticides and will be familiar with the subject. If so, take advantage of this knowledge. Ask these trainees questions, and let them provide the answers. You can follow by asking other group members if they have additional information they would like to add. This will allow knowledgeable trainees to take part in the teaching process and will encourage others to do the same.

Ask questions that will lead trainees to the correct conclusions and encourage everyone in the group to participate. Create questions that encourage discussion instead of a simple “yes” or “no” response. Questions that encourage discussion begin with words such as “who”, “what”, “how”, “which”, or “why.” For example, the question, “What are some of the ways that people can come into contact with pesticides or pesticide residues?” prompts trainees to list different areas around their workplace or home where they might encounter pesticides.

Allow trainees a moment to think and respond to your questions before providing the correct answer. If someone provides an incorrect answer, politely correct the misinformation.

Reinforce key points by repeating some of the concepts that were discussed in the session. Writing these points on flip chart paper or a dry erase board might encourage others to add their ideas to the list and helps to keep the discussion on track. This list can also assist you when summarizing the topic at the end of the session.

Topic Ideas for Discussion Sessions

- 1. Routes of Entry**
- 2. Steps to Prevent Pesticide Exposure at the Worksite**
- 3. Preventing Pesticide Exposure at Home**
- 4. Routine and Emergency Decontamination**
- 5. The Role Weather Plays on Pesticide Applications**
- 6. Risks to the Environment**
- 7. Pesticides Used at Work**
- 8. Pesticide Formulations**

Sharing Personal Experiences

When focusing on a specific aspect of pesticide safety you can take advantage of trainees' knowledge and experiences. Sometimes sharing a personal experience drives a point home better than simply explaining the steps to take or warning trainees about the consequences of a particular action.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Advantages

- Recounting personal experiences tends to be interesting for everyone.
- Storytelling emphasizes the importance and reality of the issue when trainees hear stories from their peers.
- One person's experience may cause other people to recall similar experiences, which can stimulate more discussion.

Limitations

- This technique can be time consuming if several people want to share their experiences, one person has an exceptionally long story to tell, or the stories lead to discussion on other issues.
- Trainees may be hesitant to share a story, especially if their employer is present.

Tips for Using a Personal Experience During Training. Present the point you want to cover, and then ask if anyone in the training is familiar with a situation that relates to the topic. If someone has had a similar experience, ask the person if they would like to tell the group about the situation and its outcome. Prepare your own story or a story you have heard as a backup in case no one has a personal experience to share.

Make sure this activity relates to the points you are trying to cover. If the trainees begin to stray from the point, assure them their stories are very interesting but it is important to keep the discussion focused on the topic.

Don't let too many people tell their stories at the same time. Have the group listen to one story and then lead discussion related to it before going on to the next story. Always thank people for sharing their experiences with the group.

Topic Ideas for Sharing Stories or Personal Experiences

1. **Pesticide Exposure Situations**
2. **First Aid for Pesticide Illnesses and Injuries**
3. **Environmental Hazards**
4. **Pesticide Spill Clean-up Procedures**
5. **Cleaning Clogged Nozzles**
6. **Pesticide Application Equipment Safety Measures**
7. **Experiences with Application Exclusion Zones**

Images

A good way to get trainees to analyze a situation or resolve a problem is by showing images in combination with the discussion technique. You can find photos and drawings that relate to pesticide safety or exposure situations by searching for images on the internet, in agricultural magazines, general safety publications, and EPA-approved training materials.

Advantages

- This technique allows trainees to visualize a situation.
- It is an effective way to introduce a topic before analyzing or discussing it.

Limitations

- Locating appropriate photos or drawings may be difficult and time consuming.
- Poor picture choices may be offensive to the trainees or may cause them to draw the wrong conclusions about the situation.

Tips for Using Images During Training.

Select images related to the work of the trainees. For example, if you will be training at a fruit or vegetable farm, choose pictures of people working in row crops or orchards. If you will be training at a golf course, nursery or forest, choose images that more closely depict those agricultural production areas.



Photo courtesy of Jennifer Weber,
Arizona Department of Agriculture

Make sure the images are big enough for everyone to see them, and do not stand between the trainees and the picture. If you will be training a large group, photocopy or tape the images onto card stock and ask volunteers to hold up the images and walk around the room to show each person individually. If you have access to electricity, a laptop, and projector, you can also project larger images onto a screen or light-colored wall.

Finally, allow trainees enough time to think about the situation depicted in the image before asking them to analyze and discuss it.

Topic Ideas when Using Images

- 1. Situations that Could Result in Pesticide Exposure**
- 2. First Aid for Pesticide Illnesses and Injuries**
- 3. Routes of Entry**
- 4. Environmental Hazards**
- 5. Application Exclusion Zones**
- 6. Parts of the Pesticide Label**
- 7. Pesticide Spill Clean-up Procedures**

WPS Flipcharts

An EPA-approved WPS portable flipchart is available, which covers the information required for WPS worker training. The flipchart allows workers to see the drawings on the front of each page while the trainer uses the descriptive safety training text in a trainer guide or on the back of each page of the flipchart. The text includes training objectives, a script with the required information, and review questions for you to ask trainees after each section.

Advantages

- WPS flipcharts are portable and can be placed on a table, a truck tailgate, or over your arm.
- The flipchart is a great tool for WPS training in a field, on a bus, or any area without access to electricity.
- Flipcharts are available in a 3-ring version, which enables trainers to remove and rearrange the pages in an order they prefer.



Photo courtesy of J. Hollyer, University of Hawai'i at Mānoa.

Limitations

- Small WPS flipcharts are only practical for training a small group of 10 workers or less.
- Due to the flipchart design, some trainers may simply read the text from a script or the back of each page, rather than make eye contact with the workers and engage them in training.

Tips for Using the WPS Flipchart During Training. Study the information included in the script so you can speak to the group instead of reading the text directly from the flipchart. Maintain eye contact with the trainees so you don't give the impression that you are simply reading to them. Use the questions included in the text and encourage them to ask additional questions and make comments during the presentation. Only use the small flipchart if you are working with a small group so everyone can see the drawings.

Discussion Point Ideas when Using the WPS Flipchart

1. **Routes of Exposure**
2. **Routine Decontamination Procedures**
3. **Ways to Prevent Exposure**
4. **Laundering Work Clothing at Home**
5. **Application Exclusion Zones**
6. **Field Posting Signs and Oral Warnings about Applications**
7. **Central Posting Area and Safety Data Sheets**

Audiovisual Tools - Videos/DVDs, and Digital Presentations

Many instructors like to use videos or DVDs and digital slides (i.e., PowerPoint®) to combine visual and discussion techniques.

Advantages

- Videos/DVDs and digital presentations allow trainees to see and hear the information presented.
- A digital presentation can be designed to serve as your presentation outline, which can make it easier for you to stay on track.
- A video can help instructors cover several important points in a short amount of time.
- Videos/DVDs and digital presentations can be used very effectively as interactive training tools when combined with other training methods and activities.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Limitations

If used in a passive manner, audiovisual presentations limit trainees' chances of taking an active role in the learning process.

When an instructor shows an audiovisual presentation without interruption, trainees are unlikely to retain all of the information.

There may be little opportunity to clarify the information or answer trainees' questions during the presentation. By the time the presentation has ended and the instructor invites the trainees to comment and ask questions, they may have forgotten questions they had while watching the video.

Audiovisual presentations usually require a dark room, which may be difficult to find. Trainees may also fall asleep during the video if the room is too dark.

Tips for Using Audiovisual Tools During Training. Resist the temptation to just let the video or digital program do the training. These audiovisual tools can be more effective when combined with interactive teaching methods.

Interrupt the presentation and lead a discussion following each section. This will allow you to gauge the understanding of the information being presented, or to get trainees' feedback on the key points. Trainees are more likely to stay alert during an audiovisual presentation if they are frequently called upon to comment on or ask questions about the information that they have just viewed. This also allows trainees to discuss issues that are still fresh in their minds, or share their own experiences related to the topic.

There are many reasons to review your video or Digital presentation before training. Use that time to decide where you will pause the program to initiate discussion and to make sure the information is accurate. Since laws and regulations can change, you must make sure the information in the audiovisual presentation is accurate. Also, many pesticide-related videos contain information about federal regulations, but you may also have to provide trainees with information on state or local requirements.

You may occasionally find something in a video that you believe is misleading, incorrect, or inappropriate for your area. At the end of the section you can use these inconsistencies to generate discussion, but make sure trainees understand which information is correct and which is incorrect. If there is work-specific or state-specific information that was not covered in the presentation, remember to cover this information in your class discussion.

Topic Ideas when Using Audiovisual Tools

1. **Parts of the Pesticide Label**
2. **Selecting PPE**
3. **Triple-Rinsing Pesticide Containers**
4. **Cleaning up Pesticide Spills**
5. **Application Procedures**
6. **Cleaning up at the End of the Work Shift**
7. **How to Protect Family Members from Pesticide Exposure**

Case Study

Another interactive training tool is the case study. A case study involves a story and a series of questions to help identify or solve a problem. You can write a fictitious story or base a story on a real experience. Questions follow the story to help trainees think about the situation and lead them to the right conclusions.

Advantages

- A case study helps trainees identify and solve problems through discussion and participant feedback.
- Case studies can be easy to create and can be used to make several points with one story.

Limitations

- It may be time consuming to create a case study that addresses all of the points you want to cover.
- It can be challenging to develop appropriate questions that lead trainees to the right conclusions.
- You may need to make sure the trainees do not misinterpret or stray from the main points of the story.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Tips for Using a Case Study During Training. Begin with a clear idea of what you want to communicate before writing or selecting a story. Write a story or select a scenario from a newspaper article or regulatory agency case that could actually happen to the people you are training. Give your characters names to help trainees identify with them.

When creating questions to follow the story, make sure they lead trainees toward the right conclusions and discussion rather than a simple “yes” or “no” answer. This will allow trainees to fully analyze and solve the problem.

Topic Ideas for Case Studies

1. **Employers' Responsibilities**
2. **Employee Rights**
3. **Responding to Pesticide Illnesses and Injuries**
4. **Heat Stress**
5. **Application Exclusion Zones**
6. **Restricted-Entry Intervals**
7. **Failing to Follow Pesticide Label Instructions**

Role Play

Role play involves a situation trainees act out to address a particular issue or topic. Role plays can be created to examine several issues or can be used as a hands-on activity for practicing important skills, such as first aid.

Advantages

- Role play encourages interactive involvement in the training process.
- By acting out roles, trainees may become aware of their own attitudes and concerns and may remember more details about the topic than they would if they were listening to a lecture or reading the information in a booklet.

Limitations

- A role play takes time and may require the use of props.
- A role play may be ineffective if trainees are uncomfortable acting in front of a group.

Tips for Using a Role Play During Training. Keep the scenarios simple by limiting the number of characters, props, and messages.

Provide “actors” with thorough descriptions or pictures of the scenes they will present to the group and encourage actors to respond as if they were in a real situation.

Leave time for discussion following each scenario. Make sure you know the points you want to address for each scene so you can clarify or correct any misinformation at the end of the activity.

Topic Ideas for Role Plays

1. **Recognizing Pesticide Exposure Symptoms**
2. **First Aid for Pesticide Exposure**
3. **Spill Clean-up**
4. **Employers’ Responsibilities**
5. **Employee Rights**
6. **Heat Stress**
7. **Attitudes about the Importance of Pesticide Safety**



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Hands-on Activities

Hands-on activities provide trainees with the opportunity to develop, practice, or master a skill.

Advantages

- Hands-on training can be designed to enable a group of trainees with diverse educational backgrounds, languages, and literacy skills to participate on the same level.
- When trainees practice skills they are likely to remember the information or skills involved in the activity.

- You will be able to gauge the trainees' knowledge before training and their comprehension of information during training.
- Hands-on activities keep trainees engaged and awake during training.

Limitations

- Hands-on training activities can be time consuming.
- They may also require additional props and materials.
- You must monitor the activity to make sure it is demonstrated correctly.
- Trainees may be unsure and need guidance.

Tips for Using Hands-on Activities During Training. Practice the techniques you will teach prior to training to make sure that you know how to demonstrate them and that the props work correctly.

Make sure everyone can see and hear what is happening and has an opportunity to participate. Find a place reasonably quiet and free from distractions.

It is also very important trainees learn the correct skill or response. Pause periodically to ask for comments, questions, or critiques.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Topic Ideas for Hands-on Activities

1. **Selecting PPE Listed on the Label**
2. **Cleaning Up a Pesticide Spill**
3. **Inspecting Equipment Prior to Use**
4. **Mixing and Loading Pesticides into a Tank**
5. **Responding to Pesticide Exposure**
6. **Finding Information on Pesticide Labels and Safety Data Sheets (SDS)**
7. **Triple-Rinsing Pesticide Containers**

Fluorescent Tracer Powder or Lotion

A very popular pesticide safety training tool is the fluorescent tracer, a non-toxic substance available as a powder or lotion. The fluorescent tracer is not visible in normal lighting, but glows brightly under a black light.

Advantages

- This is a great visual training tool that shows immediate effects.
- It is portable and economical.

Limitations

- In order for the tool to be effective, you must have access to an area that can get dark enough to see the fluorescent tracer under a black light.
- You will have to provide trainees a place to wash the tracer off after the activity.
- You may also have to clean tables, equipment, or other items used during the activity.

Tips for Using Fluorescent Tracer During Training. Before including a fluorescent tracer activity, make sure you have access to an area dark enough to show the tracer under a black light.

Explain that the substance is not toxic and is only being used to simulate a pesticide during the training.

Make sure everyone can either participate or see what is happening during the activity by inviting them to the front of the class when you are shining the black light on the individual, props, or surfaces.



Photo courtesy of Jennifer Weber,
Arizona Department of Agriculture

Topic Ideas when Using Fluorescent Tracer

1. Importance of Washing Hands Before Eating, Drinking, Smoking or Using the Restroom
2. Pesticide Residue Transfer to Items Such as Cellphones, Keys, and Boots
3. The Importance of Proper Cleaning, Use, and Removal Of PPE
4. Pesticide Residues on Produce
5. The Importance of PPE for Mechanics who Repair or Clean Pesticide Application Equipment
6. Pesticide Residue Transfer from One Person's Hands to Other People or Surfaces
7. Pesticide Drift

Games and Quiz Shows

When you are training people who have attended pesticide information courses, or who believe they already know enough about the subject, it may be difficult to keep their attention. Games can turn what seems like a boring session into an interesting and enjoyable training experience. Games and quiz shows can also be used at the end of a training session to see if trainees have retained the information you presented.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Advantages

- Games can be an enjoyable way to cover a topic because they are interactive and can generate enthusiasm.
- Participants may pay attention because they want to “win.”
- A game gives trainees a chance to show what they've learned while trainers gauge whether they have achieved their training objectives.

Limitations

- Designing a game may require a lot of preparation time and materials.
- Playing a game during a workshop can be time consuming.
- The enthusiasm a game generates can be disruptive in certain training locations and may require you to keep the situation under control.

Tips for Using Games and Quiz Shows as a Training Technique. Set aside time to prepare and play the game. Games are more effective if you wait until the end of a training session to play them. This will allow you to be a little more flexible with your time and will also help you determine if trainees have learned what you taught them in previous sessions.

When playing a question-and-answer game, make sure your questions help the participants retain or repeat the information you want them to learn. Providing prizes, such as candy, hats, or gift certificates, to trainees who answer questions correctly may provide them an extra incentive to concentrate and participate in the activity.

If you don't have the time, materials, or ability to build a game board, there are several Digital game show templates that can be downloaded from the Internet for free. Game templates include Jeopardy, Survivor, Cash Cab, Spin-the-Wheel, and Are you Smarter than a 5th Grader? You can also make simple and inexpensive word games to review information on pests and personal protective equipment.

Ideas for Game and Quiz Show Categories

1. Care and Maintenance of PPE
2. Pesticide Exposure Scenarios
3. Environmental Hazards
4. Parts of the Pesticide Label
5. Responding to Pesticide Emergencies
6. Laws and Regulations
7. First Aid for Pesticide Exposure
8. Transporting, Storing and Disposing of Pesticides and Their Containers

Contents

Sample Training Activities.....142

Activity 1: Pesticide and Pesticide Residues at Work..... 143

Activity 2: Pesticides and Pesticide Residues at the Worksite and Home. 145

Activity 3: Preventing Pesticide Exposure for Agricultural Workers..... 149

Activity 4: Recognizing and Preventing Exposure for Pesticide Handlers. 157

Activity 5: Routes of Pesticide Exposure 161

Activity 6: Routine Decontamination After Working with Pesticides 163

Activity 7: Symptoms of Pesticide Exposures 167

Activity 8: Employees’ Rights in Cases of Pesticide Exposure 169

Activity 9: First Aid for Pesticide Exposure 173

Activity 10: Pesticide Toxicity: LD₅₀ 177

Activity 11: Selecting Personal Protective Equipment (PPE) 181

**Activity 12: Factors that Could Contribute to Surface Water and
Groundwater Contamination 183**

Activity 13: Cleaning up Pesticide Spills..... 187

Activity 14: Pesticide Drift 191

Activity 15: Anonymous Questions (The Snowball Fight) 195



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCsupport@ucdavis.edu.

Sample Training Activities

This chapter contains 15 sample training activities trainers can use during a Worker Protection Standard (WPS) pesticide safety training class.

Each activity includes the training theme, content objective, type of training techniques, the intended audience (e.g., workers or handlers), a list of materials and props, and the activity instructions. Many of the activities have been adapted to the situations and challenges that workers and handlers may face when working with pesticides.

Activity 1: Pesticide and Pesticide Residues at Work

Content Objective:

Trainees will become familiar with many of the areas and surfaces that might contain pesticides or pesticide residues at work.

Training Technique:

Workplace tour

Intended Audience:

Agricultural workers and pesticide handlers

Time:

10-20 minutes



Materials and Props:

Pre-selected areas or items that might contain pesticides or pesticide residues

Examples:

Storage areas, mixing and loading sites, fields, enclosed space production areas, protective clothing, personal protective equipment (PPE), or pesticide application equipment



Activity 1: Pesticide and Pesticide Residues at Work**Instructions**

- Pre-select areas you can visit in the amount of time you have available during training. This will be easy if you are training at your own worksite. If not, ask someone to help you find some interesting locations at the training site where pesticides are used or stored.
- At the beginning of this activity, explain to the trainees they will tour several areas at the worksite. During the tour they will talk about where they might find pesticides or pesticide residues on certain items or in different areas of the agricultural establishment.

Activity 2: Pesticides and Pesticide Residues at the Worksite and Home

Content Objective:

Trainees will gain a better understanding of how they could become exposed to pesticides or pesticide residues at home and in their worksite, which can increase their knowledge of ways to minimize the risk of pesticide exposure.

Training Technique:

Discussion

Intended Audience:

Agricultural workers and pesticide handlers

Time:

5-10 minutes



Materials and Props:

Prepared questions

Flipchart paper, easel and thick markers

or

Dry erase board and dry erase markers

Activity 2: Pesticides and Pesticide Residues at the Worksite and Home

Instructions

- Draw two columns on flipchart paper or a dry erase board.
- Title one column, “Worksite” and another column “Home.”
- Ask trainees to think about their worksites and the areas around their homes.
- After they have had a moment to think about the areas, ask them the questions listed below.
- Write trainees’ answers on the flipchart or dry erase board.
- Discuss important issues or areas of concern as they are presented.

Question #1: How could a person come into contact with pesticides or pesticide residues at work?

Possible Answers

- An agricultural worker could be exposed to pesticides if he or she enters an area that is still under a restricted-entry interval.
- A pesticide handler could be exposed to pesticides if they fail to wear the proper protective clothing or PPE.
- People could become exposed to pesticides if they are working near an application site and pesticide drifts onto them.
- Sometimes pesticides are applied through an irrigation system. If a person decides to rinse off their hands in the water from a sprinkler, they could become exposed to pesticides.
- A person who packs produce in the field can get exposed if the chlorine solution used to rinse the produce splashes in their eyes.

Activity 2: Pesticides and Pesticide Residues at the Worksite and Home

Question #2: What are some of the ways a person could come into contact with pesticides at home?

Possible Answers

- A child could get into pesticides or pesticide containers that are not stored in a secured location.
- Exposure could occur if pesticide contaminated work clothes, hats, shoes, or boots are left out or mixed in with the family's wash.
- Families that live near or on the edge of an agricultural field, may be exposed through pesticide spray drift.
- A person could accidentally ingest pesticides that someone has illegally stored in a food or beverage container or uses an empty pesticide container to store other liquids.
- Children often play with their parents' keys and cellphones. If these items were exposed to pesticides at work, they could come into contact with pesticide residues that might still be on these items.

Activity 3: Preventing Pesticide Exposure for Agricultural Workers

Content Objective:

Trainees will learn how to prevent three possible pesticide exposure scenarios and similar situations that might occur at the worksite.

Training Technique:

Question and answer activity with drawings of potential pesticide exposure scenarios

Intended Audience:

Agricultural workers

Time:

5-10 minutes



Photo courtesy of Todd Fitchette. Western Farm Press

Materials and Props:

Drawings of hazardous situations

Prepared questions for each drawing

Activity 3: Preventing Pesticide Exposure for Agricultural Workers

Instructions

- Display or present pictures to trainees that illustrate agricultural workers in potentially dangerous situations.
- Ask trainees questions about the pictures and discuss how pesticide exposure can occur in each situation.
- Ask trainees to explain what they can do in the workplace and home to prevent similar situations.

Illustration A

Present “Illustration A” to the trainees and ask the following questions.

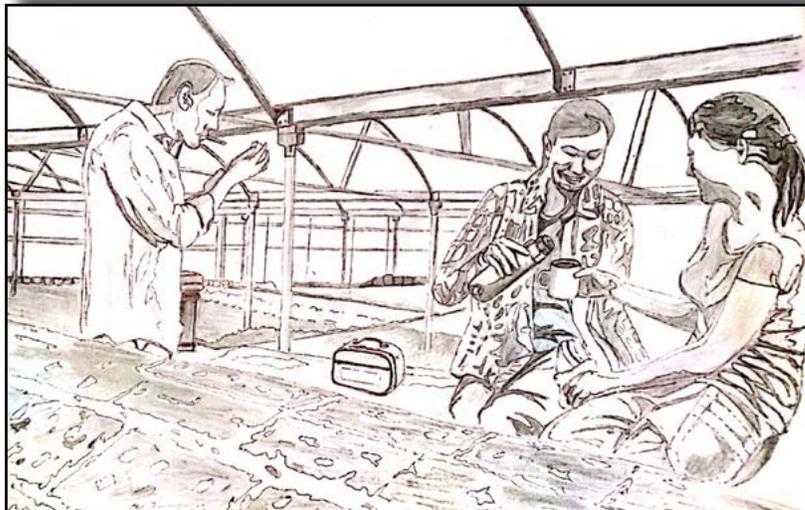


Image courtesy of Max Weber

Question #1: What are the agricultural workers doing in this picture?

Possible Answers:

- They are taking a lunch or coffee break inside a greenhouse.
- The man is also smoking a cigarette in an area where there might be pesticide residue.

Activity 3: Preventing Pesticide Exposure for Agricultural Workers

Question #2 – What are the potential health hazards for the agricultural workers?

Possible Answers:

- The man could inhale pesticides through the cigarette or contaminate the cigarette if he touches it with contaminated hands.
- One woman has a sandwich in her hand and she is touching the cup with her bare hand. If she has pesticide residues on her hand, she could transfer the residues to the sandwich or cup and get pesticides in her mouth.

Question #3 – What must agricultural workers do before they eat, drink, smoke, or use the restroom?

Possible Answer:

- They must wash their hands with soap and water.
- They also need to find a pesticide free area to take their lunch and cigarette breaks.

Question #4 - What items must the employer provide to agricultural workers so they can wash and dry their hands and where must these items be located?

Possible Answers:

- The employer needs to provide decontamination supplies no more than a 1/4 of a mile from where agricultural workers are working.
- The employer has to provide water, soap and towels.
- The employer needs to have soap, towels and a least 1 gallon of water available for each employee at the beginning of their workshift.

Activity 3: Preventing Pesticide Exposure for Agricultural Workers

Illustration B

Show the trainees “Illustration B” and ask the following questions.



Image courtesy of Max Weber

Question #1 - What is happening in this picture?

Possible Answers:

- Someone took their work boots into the house.
- The dog is chewing on one work boot and the baby is almost touching the other work boot.

Question #2 - Could the baby and the dog get exposed to pesticides in this situation? If yes, how?

Possible Answers:

- Yes, both the baby and the dog can get exposed to pesticides through their mouth or skin.
- Children are more sensitive to pesticides because they are small and their bodies are still developing.
- The baby has a lot of bare skin in this picture, plus babies often put their hands in their mouths.

Activity 3: Preventing Pesticide Exposure for Agricultural Workers

Question # 3 - What must agricultural workers do to prevent this type of situation?

Possible Answers:

- Agricultural workers can prevent this from happening by removing their boots before going inside.
- Agricultural workers can put their boots and other work clothing outside or in an area that is not accessible to children.
- They can prevent this situation by removing their work clothes and work boots when they get home, showering immediately, and changing into clean clothes. They should also make sure that their work clothes are stored and washed separately from the other family laundry.
- Children also like to play with their parents' cell phones and keys. Agricultural workers should also store these items out of the reach of children just in case the phones or keys have pesticide residues or other contaminants on them.

Activity 3: Preventing Pesticide Exposure for Agricultural Workers

Illustration C

Show the trainees “Illustration C” and ask the following questions.



Image courtesy of Max Weber

Question #1 - What is happening in this picture?

Possible Answers:

- The agricultural worker is drinking water from an irrigation ditch.
- The man is filling up his water bottle with canal water.

Question #2 - Why is this a hazardous situation?

Possible Answers:

- Sometimes pesticides are applied through an irrigation system. This process is called chemigation. Pesticides and other chemicals can also drift or run off into a canal or ditch water. The agricultural worker in this picture may be drinking and touching contaminated water.
- If pesticides were applied through the irrigation system before that day, residues could still be present in the water.
- Nobody should drink irrigation water. It can contain other contaminants and bacteria.

Activity 3: Preventing Pesticide Exposure for Agricultural Workers

Question #3 - How might pesticides or pesticide residues enter his body?

Possible Answers:

- He could get the pesticides on his skin when he touches the water.
- He could swallow pesticide residues when he drinks the water.
- He could get pesticides in his eyes if he touches his eyes with contaminated hands.

Question #4 - Who is responsible for providing clean water for agricultural workers?

Possible Answers:

- The employer is responsible for providing clean water for all agricultural workers.
- The employer needs to provide water, soap, and single-use towels and these must be located no more than a 1/4 of a mile from the area where agricultural workers are working.

Activity 4: Recognizing and Preventing Exposure for Pesticide Handlers

Content Objective:

Trainees will learn to recognize situations that could lead to pesticide exposure and how to prevent these situations from happening at work.

Training Technique:

Question and answer with photos of potential exposure scenarios

Intended Audience:

Pesticide handlers

Time:

10-15 minutes



Materials and Props:

3-4 photos or drawings of situations that could lead to pesticide exposure

Activity 4: Recognizing and Preventing Exposure for Pesticide Handlers

Instructions

- Before training, select photos showing situations that might lead to pesticide exposure. Print the photos or put them in a digital slide so the trainees can see them clearly.
- Use the photos to lead a discussion on how to prevent pesticide exposure at work. The following are four staged photos with associated activity ideas. You can also find or stage your own photos for this activity.

Photo A



Question: What is happening in this picture?

Answer: The man cut a hole in his mask so he could smoke a cigarette while he works.

Question: How could he get exposed?

Answer: He could inhale the pesticide through the cigarette and through the damaged mask.

Question: How can handlers prevent this exposure situation?

Answer: Pesticide handlers must not alter PPE in any way. Handlers who smoke cigarettes should take cigarette breaks away from areas with pesticides or pesticide residues and never carry a packet of cigarettes when working with pesticides.

Activity 4: Recognizing and Preventing Exposure for Pesticide Handlers

Photo B

Question: What is happening in this picture?

Answer: He is trying to adjust a spray nozzle.

Question: How could this person get contaminated?

Answer: He could get pesticides on his hands because he is not wearing gloves. The sprayer could be pressurized and spray pesticides in his eyes or onto his face.



Question: How can he prevent exposure?

Answer: He should wear the required PPE whenever he adjusts or opens pesticide sprayers.

Photo C



Question: What is happening in this picture?

Answer: The pesticide handlers are sitting at a picnic table. They still have their PPE on and their spray equipment is next to them. There are drink cups on the table near them, as well.

Activity 4: Recognizing and Preventing Exposure for Pesticide Handlers

Question: How could pesticides enter the employees' body?

Answer: They could inhale pesticide residues from the air since the top of the sprayer is off. They could get pesticides on their skin or clothes from residues on the table or bench. If they don't wash their hands, they could ingest residues from contaminated food when they pick it up to eat it.

Question: How can they prevent exposure?

Answer: They should wash their hands before they eat, drink, smoke, use a cell phone, or go to the restroom. They shouldn't have PPE or application equipment near areas where people eat or store food.

Photo D

Question: What is happening in this picture?

Answer: A man is cleaning up a spilled pesticide from a public parking lot.

Question: How could he get exposed?



Answer: He is not wearing PPE, such as gloves or a mask, so he could inhale the pesticide or get it on his skin.

Question: How can he prevent exposure?

Answer: He should wear label-required PPE and make sure the area is secure so other people, pets, or wildlife do not come in contact with the spilled pesticide.

Activity 5: Routes of Pesticide Exposure

Content Objective:

Trainees will be able to list the four routes through which pesticides can enter the body and understand how exposure can occur.

Training Technique:

Sharing stories or personal experiences

Intended Audience:

Agricultural workers and pesticide handlers

Time:

10-15 minutes

**Materials and Props:**

At least one story about a pesticide exposure case as backup

Activity 5: Routes of Pesticide Exposure

Instructions

Begin this activity by asking the trainees,

- “What are the four routes of entry? How could pesticides get into your body?”

Give them time to think and respond to the question. Most will come up with at least two of the four routes of exposure.

- The correct answer is, “Pesticides can enter through your skin, eyes, nose (inhalation), and through your mouth if you swallow a pesticide.”

Ask trainees if they or someone they know has been exposed to pesticides and if they would please share the story with the class. They can share a story about something that happened at work, at home, or a story they heard in the news.

Have a story ready just in case the trainees are not able to think of a story or are too embarrassed to share a story with the rest of the class.

If you don't have a story of your own, search the Internet for a story that was in the newspaper. You can also ask someone from a regulatory agency to give you an example of a case that involved a person in the agricultural industry.

Several states maintain databases of pesticide illnesses and injuries cases. For example, the California Department of Pesticide Regulations has a Pesticide Illness Surveillance Program. The results are available on-line and may be great tools for this activity. The data can be found on the following site.

cdpr.ca.gov/docs/whs/pisp.htm

Activity 6: Routine Decontamination After Working with Pesticides

Content Objective:

Trainees will understand the importance of washing their hands with soap and water after working with pesticides.

Training Technique:

Role play and demonstration with fluorescent tracer

Intended Audience:

Agricultural workers and pesticide handlers

Time:

10-15 minutes



Materials and Props:

Glo Germ® kit that includes Glo Germ® powder or lotion and a black light

A room that gets dark enough or has a light switch so trainees can see the powder or gel under the black light



Activity 6: Routine Decontamination After Working with Pesticides

Instructions

- Before the activity (and when no one is watching), put Glo Germ® powder on your hands. Try to put just enough powder on your hands so it can transfer from your hand to other people or objects, but not enough for trainees to notice you have something on your hands.
- This is a good activity to start after a break so you have time to prepare for it.
- When trainees return, your hands will be “contaminated” with the powder.
- If you have an opportunity, shake a trainee's hand, hand out paperwork, or ask if you can borrow a person's pen or booklet for a moment.
- Continue training through the next topic. If you ask volunteers to write their ideas on a flipchart or dry erase board, make sure you touch the pen or marker that they will use first before you hand it to them.
- After about 5-10 minutes, tell trainees that during the break you helped to clean up a pesticide spill and forgot to wash your hands afterwards.
- Tell them you may have “accidentally contaminated” them or other objects in the room.

Activity 6: Routine Decontamination After Working with Pesticides

- Now turn off the room's light and shine the fluorescent light on your hands. Tell them that what you actually have on your hands is called Glo Germ®. It is not toxic, but is used to show people how easily pesticides can transfer from one place or person to another.
- Shine the fluorescent light around the room and show trainees all of the items that you contaminated because you didn't wash your hands after you touched pesticides.
- Tell trainees that this activity demonstrates the importance of washing their hands after using pesticides and before eating, drinking, smoking, chewing gum, or using the restroom.
- If you are training pesticide handlers, tell them it is important to wash their hands with soap and water after they touch pesticide containers, application equipment, tractors, and personal protective equipment.
- This activity was adapted from the Fluorescent Tracer Manual: An Educational Tool for Pesticide Safety Training Educators. Pacific Northwest Agricultural Safety and Health Center (PNASH). Additional training ideas can be found in their training booklet: deohs.washington.edu/pnash/fluorescent_tracer/#ftmanual
- The Glo Germ® kit can be ordered at glogerm.com or by calling 800-842-6622.

Activity 7: Symptoms of Pesticide Exposures

Content Objective:

Trainees will be able to list symptoms that might occur immediately after someone is exposed to pesticides and give examples of health effects that could result from long-term exposure to pesticides.

Training Technique:

Question and answer session

Intended Audience:

Agricultural workers and pesticide handlers

Time:

5-10 minutes



Materials and Props:

Flipchart paper, pens and an easel, or

Dry erase board, eraser and dry erase pens

Activity 7: Symptoms of Pesticide Exposures

Instructions

- Tell trainees you are going to talk about symptoms that might occur if a person is exposed to pesticides.
- Ask everyone to give you an example of symptoms a person might experience immediately after being exposed to pesticides. Most trainees' answers will include headache, upset stomach, dizziness, or a rash.
- If trainees have a hard time thinking of possible symptoms prompt them with some of the following questions:
 - “What might happen if you splash a pesticide in your eye?”*
 - “How might you feel if you swallowed a pesticide or entered an area that someone had recently sprayed with pesticides?”*
 - “What types of symptoms could you have if you spilled a pesticide on your hand?”*
- Now ask them to give you examples of long-term health effects that might be linked to pesticide exposure. This is a more difficult question so you may want to wait 10 seconds for a response. If trainees haven't answered, explain that doctors and scientists who study pesticides have discovered that some have been associated with cancer, fertility problems, birth defects, Parkinson's disease, and chemical sensitivity.
- Explain that not everyone will get sick or have symptoms if they are exposed to pesticides. It depends on the pesticide involved, the toxicity and the amount of the product, the way a person was exposed to it and how often. Each person is also different and some people may be more sensitive to pesticides than others. Some people develop an allergic reaction to pesticides over time. There are many factors and therefore it is important that people who use pesticides take safety measure seriously so they can reduce exposure.

Activity 8: Employees' Rights in Cases of Pesticide Exposure

Content Objective:

Trainees will have a better understanding of the pesticide application information that is available to them at the worksite and what they should do if they suspect they have been exposed to pesticides.

Training Technique:

Case study

Intended Audience:

Agricultural workers and pesticide handlers

Time:

10-15 minutes



Materials and Props:

A story about a pesticide exposure situation (a real story or one you created)

At least 5 questions following the story so trainees can discuss their rights to receive medical care if they are exposed to pesticides at work.



Image courtesy of J. Hollyer, University of Hawai'i at Mānoa

Activity 8: Employees' Rights in Cases of Pesticide Exposure

Instructions

Read the following story to the trainees and tell them something similar could happen at a nursery on a busy day. After reading the story, ask them the questions. If they can't come up with the right answers, be sure to tell them the correct response.

Rash and a Rush

A worker was working her normal shift watering and removing dead leaves off of plants at a nursery. It was a very hot and humid day. Her hands were so sweaty that her work gloves kept slipping off. She decided to take off her gloves and continue working. After a few minutes she noticed she was getting a rash on her wrists and forearms. She tried to rinse them in cool water, but they were still bothering her. Her arms seemed to burn more because she was sweating. She told her supervisor she needed to take a break to go home to get some allergy medicine or cream for the rash she got after touching the plants.

Unfortunately, her supervisor just got a call that a truck full of plants was going to arrive in 5 minutes and he needed her to stay to help unload the plants. He told her that after she was finished unloading the truck she could go home and take the rest of the day off.

Question 1:

What should the worker in this story have done if she thought she was exposed to pesticides at work?

Answer: She should have told her boss or supervisor immediately.

She should have found out the name of the pesticide that caused her symptoms and get medical help.

Question 2:

How can workers find out about pesticide applications at work?

Activity 8: Employees' Rights in Cases of Pesticide Exposure

Answer: The employer must keep a list of pesticide applications at a location that is accessible to all employees during their normal work hours.

Question 3:

How can workers know if plants in an enclosed space, such as a greenhouse, have been sprayed with pesticides?

Answer: Before each shift, workers can check the pesticide application records for locations of pesticide applications at the worksite. All enclosed space production areas require posting if the pesticide's restricted-entry interval is greater than 4 hours.

Question 4:

What should the supervisor have done in this situation?

Answer: If the agricultural worker told her supervisor that she was exposed to pesticides, the supervisor should have helped her decontaminate her skin and have someone transport her to a doctor, if needed.

The supervisor must provide a copy of the SDS to the medical provider directly or through the worker.

Question 5:

What were the agricultural worker's rights if she thought she was exposed to pesticides at work?

Answer: Even though this is a difficult situation for the supervisor because of the timeliness of the plant delivery, the worker's health and safety was important. The worker had the right to receive medical attention and transportation to a nearby medical facility for workplace illnesses and injuries. She should never have been instructed to drive herself home for medicine or rest if she was feeling ill.

Activity 9: First Aid for Pesticide Exposure

Content Objective:

Trainees will learn the steps to properly respond to pesticide exposure by following first aid instructions listed on pesticide labels

Training Technique:

Role play, hands-on activity

Intended Audience:

Pesticide handlers

Time:

20-25 minutes



Materials and Props:

Illustrations of pesticide exposure scenes (samples in activity 4)

One pesticide label or safety data sheet (SDS) per exposure scene



Activity 9: First Aid for Pesticide Exposure

Instructions

- Explain that you are going to review the proper way to respond to a pesticide exposure situation, followed by a role play activity that will allow trainees to practice following pesticide label first aid instructions from the label or SDS.
- Ask trainees the following questions.

Question: How can you help a handler who gets pesticide in their eyes?

Answer: Hold their eyes open and rinse with a soft, steady stream of clean water. Rinse their eyes for 15 minutes, if possible. **Do not use eye drops.** Get medical attention.

Question: How can you help someone who has pesticide on his or her skin?

Answer: Remove contaminated clothing and wash the skin with plenty of water and soap. If symptoms develop, get medical attention.

Question: What is the first thing you should do to properly assist someone who has swallowed a pesticide?

Answer: Read the label or SDS directions to determine if vomiting should be induced or if drinking water, milk, or another substance is recommended. Some labels or SDS may recommend administering activated charcoal because the pesticides will bind to the charcoal. Never induce vomiting or give liquids to an unconscious person. Some pesticides are corrosive and may cause internal damage by vomiting. Many others contain petroleum distillates, which may get into the lungs and cause serious damage if the victim vomits. If neither the label nor SDS is available, call 911 or Poison Control for guidance.

Activity 9: First Aid for Pesticide Exposure

In all cases of swallowed pesticides, get medical help immediately. Do not spend time provoking vomiting or administering treatments unless there isn't a medical facility close by.

Question: What is the first step you should take if you are responding to someone who has inhaled pesticide vapors?

Answer: If a person is overcome by pesticide vapors in an enclosed area, open doors and turn on ventilation to the area, if possible. Put on an appropriate respirator before entering then move the injured person to an open area for fresh air. Next, help to restore breathing if needed and only if you are trained in first aid and CPR and have no risk of becoming contaminated in the process. Get the victim medical help immediately.

- Set up five or six stations around the room for the role play activity.
- Each station should have a photo or drawing of a pesticide exposure scene and a pesticide label or SDS. Sample photos have been included in activity 4, but you may take photos of situations that better represent the worksite or your area.
- Ask trainees to form small groups (one group for each station).
- After they have formed their groups, ask each group to go to one of the stations.
- Explain that each station will have a picture of a pesticide exposure scene and a pesticide product label or SDS. One person will play the role of the victim as shown in the picture. The others will respond to the emergency and attempt to help the victim by following the first aid instructions on the pesticide label or SDS.

Activity 9: First Aid for Pesticide Exposure

- Each group will spend about five minutes at each station and will rotate clockwise to the next station. When they reach a new station, they should change roles so that everyone has an opportunity to play the role of a victim and a responder.
- Instruct trainees to look at the pictures and read the first aid information on the pesticide label or SDS to help them decide how to correctly respond to each scenario.
- After they have had an opportunity to rotate through at least three different stations ask the following questions:

Questions:

- Were any of these situations difficult to respond to? If so, why?
- Were you able to find the first aid information easily on the pesticide label or the SDS?
- Which pesticide labels or SDSs were most difficult to follow?
- Why is it important that pesticide handlers read and understand the label before they begin to work with a pesticide?
- How might these situations be difficult for people who are not familiar with pesticide labels and SDSs?
- How would these situations be even more difficult for people who have difficulties reading labels and SDSs, which are often only available in English?

Activity 10: Pesticide Toxicity: LD₅₀

Content Objective:

Trainees will have a better understanding of the different toxicity levels of the pesticides they use at work and how those levels are determined

Training Technique:

Role play

Intended Audience:

Pesticide handlers

Time:

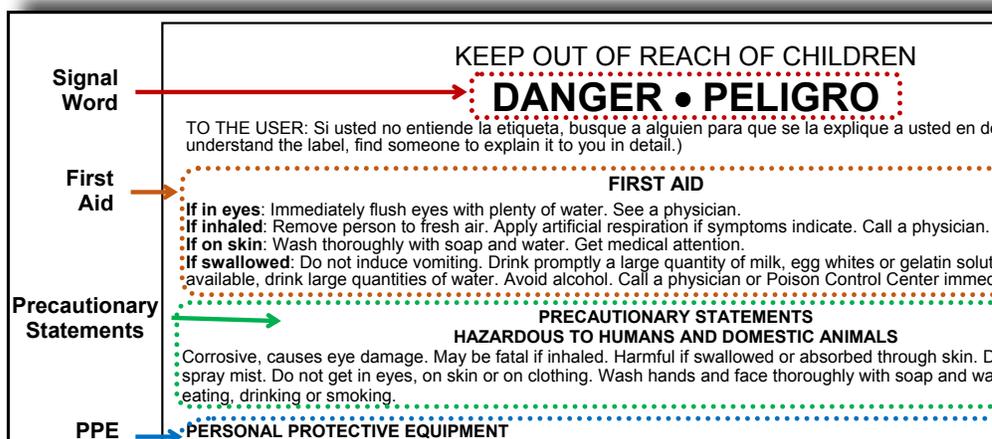
10-15 minutes



Materials and Props:

Individually-wrapped candy (the worst tasting the better)

7 volunteers



Activity 10: Pesticide Toxicity: LD₅₀

Instructions

- Explain to the trainees that pesticides are divided into four toxicity levels. Each level is represented by a signal word: Danger, Warning and Caution.

*The most toxic pesticides will have the word “**Danger**” on the label.*

*The pesticides in the second toxicity category will have the word “**Warning**” on their labels.*

*Pesticides in the third category will have the word “**Caution**” on their labels.*

*The fourth toxicity category may also carry the word “**Caution**” on the label, **but a signal word is not required.***

- Tell the trainees that this will be a very simple demonstration to show them how pesticide toxicity levels are determined.
- Ask for seven volunteers to come to the front of the room for an activity involving candy. One person will play the role of a pesticide manufacturer while the others will pretend to be laboratory animals. They can choose to be guinea pigs, mice, etc.
- Tell the volunteers that the pesticide manufacturer has a great new product they would like to register but first they have to run several tests on the pesticide. One test determines the toxicity level of the product.
- The toxicity level is tested using **LD₅₀**, which stands for Lethal Dose = 50%. The **LD₅₀** is the amount of the pesticide that it would take to kill half (50%) of the laboratory animals in the study. This is complicated, but the activity will simplify the concept.

Activity 10: Pesticide Toxicity: LD₅₀

- Give the bag of candy to the trainee who volunteered to be the pesticide manufacturer.
- Tell the manufacturer that each piece of candy is one dose of pesticide and that he or she needs to find out how many doses it will take to kill half of the lab animals.
- Ask the manufacturer to give each “lab animal” a piece of candy.
- Tell the “lab animals” to eat their “dose of pesticide” at the same time. Note: Some people can pretend to eat the candy if they prefer not to eat it.
- Ask them, “Did any of you die from that first dose?”
- One person usually acts like they are dying at this point. So ask the audience, “If one of the six lab animals dies, is that half of the original population?” It is not, since 1 is not half of 6.
- Tell the manufacturer that it is time to give the second dose. The manufacturer must give each of the remaining 5 lab animals a piece of candy, which is another pretend dose of pesticide.
- Ask the lab animals, “Did any of you die from that first dose?” At this point, two more people usually act like they died from the second dose.
- Ask the audience, “Now we have three dead lab animals out of the original six. Is that half of the original population?” The answer is yes. Therefore, that amount is the **LD₅₀**.
- In summary, a pesticide with a low **LD₅₀** is more toxic than one with a high **LD₅₀** because it takes only a small amount to kill half of the test animals. A pesticide with a very low **LD₅₀** would have the signal word “Danger” on the label, followed by “Warning,” which is moderately toxic, and then “Caution,” a slightly toxic pesticide.

Activity 11: Selecting Personal Protective Equipment (PPE)

Content Objective:

Trainees will be able to select the correct personal protective equipment listed on a pesticide label for the task they will perform.

Training Technique:

Small group, hands-on activity

Intended Audience:

Pesticide handlers

Time:

20 minutes



Materials and Props:

2 or 3 different pesticide labels - you can find copies of labels for training purposes at:

cdms.net/Label-Database

Various types of PPE listed on the pesticide labels that you have pre-selected for this activity



Activity 11: Selecting Personal Protective Equipment (PPE)

Instructions

- Divide the class into three groups, and provide each group with a different pesticide label, flipchart paper and pens.
- Instruct them to each take a role for this activity. They will need a person to read the PPE section of their label aloud, another person will write the PPE items on the flipchart paper, the third person will select and dress up in the PPE listed on their label. The fourth person will present their findings to the rest of the class while referring to the list they created on the flipchart paper and their model “pesticide handlers.”
- Ask trainees to locate the PPE section of their labels and decide what PPE is required to be worn when handling the pesticide.
- If they find that the label contains different PPE for different tasks (i.e., overhead spraying, cleaning equipment, etc.) ask them to select one and specify the task when they present it to the class.
- Place PPE items on a table so they are easily accessible for the trainees.
- Instruct the groups to look through the PPE and to select those items that are listed on their pesticide label.
- One person should put on the PPE or set it aside to hold up during the presentation.
- At the end of this activity, have the trainees present what they selected based on the label instructions for their chosen pesticide handling task.
- Have the correct answers in case the trainees do not select the correct PPE.

Activity 12: Factors that Could Contribute to Surface Water and Groundwater Contamination

Content Objective:

Trainees will become aware of ways water sources (such as lakes or streams) can become contaminated.

Training Technique:

Hands-on demonstration

Intended Audience:

Pesticide handlers

Time:

15-20 minutes



Photo courtesy of Catherine Weber

Materials and Props:

6 plastic disposable transparent cups

A jug or bottle of water

Food coloring (at least 3 colors)

5 volunteers

Activity 12: Factors that Could Contribute to Surface Water and Groundwater Contamination

Instructions

- Ask 5 people to volunteer to participate in the activity.
- Ask the volunteers to stand side-by-side in front of the class so that the other trainees can see them.
- Provide each volunteer with a plastic cup.
- Explain to the volunteers that they will assume a new identity and a job that may require them to use a pesticide. You may give them ideas such as a store owner, a gardener, or someone who works in a laboratory.
- After they have had a moment to choose their “new identity” ask the first participant to tell the class who they are and why they use a pesticide. **For example:**

“I am a homeowner and I use pesticides on the weeds in my yard.”

- After the first volunteer has presented their situation, put one drop of food coloring and about a 1/2 cup of water into their glass to represent the chemical they are using.
 - Ask the next volunteer to share a different scenario. **For example:**
- “I own a restaurant and I use pesticides to kill the cockroaches in the kitchen.”*
- Add water and a different color to the second volunteer’s cup to represent the pesticide that they use.
 - Continue this process until each volunteer has had a chance to present a scenario.
 - Now introduce yourself.

“I am the river.” (You may make it more personal by naming a local river).

Activity 12: Factors that Could Contribute to Surface Water and Groundwater Contamination

- Add a little water to your plastic cup. Walk up to the first person and ask,
“How could your pesticide get into the river?”
- The participant might answer,
“I poured my leftover pesticide down the drain” or
“I sprayed pesticides outside on a windy day.”
- After each volunteer presents a way they could contaminate the river, ask them to pour a little bit of the liquid from their cup into your cup.
- Continue until each volunteer has poured a bit of the liquid from their cup into your cup.
- At the end of the activity, the water in the cup representing the river should be very brown. Hold the cup of water up so everyone can see it.
- Ask the trainees if they would like to drink the water, fish in it, or swim in it.
- Explain this activity is a bit exaggerated, but it demonstrates how different situations could lead to water contamination. It is important everyone (in addition to people who work in agricultural production) thinks about their actions when handling various types of pesticides, chemicals, or hazardous substances. We all have a role in protecting our environment.
- Surface water, such as irrigation canals, rivers, streams, lakes and groundwater are sensitive to pesticide contamination. Drift from nearby pesticide applications and runoff from rain or irrigation can carry pesticides into surface water. Rain and irrigation water can also carry pesticides down to groundwater. This creates a serious problem because of our need for water for irrigation, drinking, and human recreation. Effects on aquatic life and other animals can also impact the entire ecosystem.

Activity 13: Cleaning up Pesticide Spills

Content Objective:

Trainees will learn the proper way to clean up small pesticide spills to prevent environmental contamination.

Training Technique:

Discussion and hands-on practice

Intended Audience:

Pesticide handlers

Time:

20 minutes



Materials and Props:

Water to simulate pesticides

Kitty litter or soil

Small hand broom

Dust pan

Concrete surface

Buckets to hold hazardous waste

Caution tape

3 volunteers

Activity 13: Cleaning up Pesticide Spills

Instructions

- Begin this activity by assessing trainees' knowledge by asking them if they have ever had experience cleaning up a pesticide spill.
- Ask trainees why it would be important to clean up a pesticide spill quickly and correctly. Follow this with a discussion of the importance of cleaning up pesticide spills immediately and effectively as a way to protect the environment, groundwater, soil, people, etc.
- Explain they will now have an opportunity to practice or observe how to properly clean up a liquid pesticide spill on concrete. They will also discuss how to correctly clean up other types of spills such as a powdered pesticide spill on concrete and a liquid spill on soil.
- If weather and location permit, do this activity outdoors on a flat surface, as it might be messy.
- Begin the activity by pouring water on the concrete. This will represent a liquid pesticide spill on a concrete surface.
- Ask for three volunteers. One will isolate the area. Another volunteer will explain the steps to take to clean up the spill. The third volunteer will follow the clean-up instructions provided by the second volunteer. If no one in the group feels comfortable providing instructions, you can provide the instructions as the second volunteer carries out the actions.
- Tell the volunteers they may use the materials that have been provided to clean up the spill. They will have a roll of caution tape, an absorbent material (such as non-clumping kitty litter, soil, or sawdust), a small hand broom and dust pan to brush up the spill, and buckets in which to place the material once they have cleaned it up.

Activity 13: Cleaning up Pesticide Spills

- Ask one volunteer to unroll the caution tape around the hazardous area to prevent others from getting too close to the spill.
- Ask another volunteer (or you) to explain the steps to clean up the spill as volunteer #3 follows those instructions. Encourage the other trainees to watch to make sure that the volunteers are properly responding to the situation. The correct steps to take when cleaning up a liquid spill are to put on the PPE listed on the pesticide label. Starting at the edges of the spill and working inward, cover the spill with something absorbent, such as kitty litter or soil. Sweep this into sealable plastic bags or buckets. If the pesticide is highly toxic or if the spill is large, a professional spill team should be called to do the cleanup. The bag or bucket must be labeled with all of the information pertaining to the spill such as the name of the owner or company, a contact person and their phone number, the name of pesticide, date, etc.
- Continue the activity by leading the following discussion on how to properly respond to other spill situations.

Question: What is the proper way to clean up a powdered pesticide that has spilled onto concrete?

Answer: First, lightly wet the powdered material or cover it with a tarp to prevent it from blowing away. Continue with the above steps that were listed for cleaning up a liquid spill on concrete.

Question: What is the proper way to clean up a liquid spill on soil?

Answer: Dig out the spilled pesticide with a shovel and place the contaminated material in a bucket or bag. Make sure you have removed all of the pesticide in the soil by digging out the area 6 inches deeper and wider than the area that is wet. The bag or bucket must be labeled with all of the information pertaining to the spill, such as the name of the owner or company, contact person and phone number, name of pesticide, date, etc.

Activity 13: Cleaning up Pesticide Spills

Question: How should you respond to any type of pesticide spill on a public roadway or public area?

Answer: Isolate the area of the spill and call the appropriate local hazardous material response team—this may be “HazMat” or the local fire department.

Question: Once the hazardous material has been placed in a bucket or plastic bag and properly labeled, where should this hazardous waste be disposed?

Answer: Call the local regulatory agency for instructions and phone numbers. The local regulatory agency may have specific programs to assist with this type of situation, as well. Employers should have emergency procedures and phone numbers in place in case of such an incident.

Question: How can pesticide handlers reduce the chance of spilling pesticides?

Answer: Follow safe practices and concentrate on their actions when working with pesticides. Employers must provide pesticide handlers with yearly training so they know how to properly mix, load, and apply pesticides and how to correctly respond to emergency situations, such as spills.

Activity 14: Pesticide Drift

Content Objective:

Trainees will gain an understanding of how pesticides can drift onto non-target areas, and ways to prevent drift when they work with pesticides.

Training Technique:

Question and answer session with discussion

Hands-on demonstration of how pesticide drift could occur

Intended Audience:

Pesticide handlers

Time:

20 minutes



Materials and Props:

Electric fan

Extension cord

New backpack sprayer (never contained pesticides)

Water (poured into backpack sprayer)

Water-sensitive paper

Plant (a house plant would be sufficient)

Prepared questions and possible answers

1 volunteer

Note: Depending on the trainees' experiences and prior knowledge these questions might be difficult for trainees to answer. Prepare possible examples to prompt them to think about situations.

Activity 14: Pesticide Drift

Instructions

- Introduce this topic by talking about various factors that contribute to environmental contamination and asking the following questions.

Question: What are some of the ways in which pesticides can leave an application site?

Possible Answers: Pesticides might leach through the soil, evaporate, or run off if it rains shortly after an application. People might pick fruit that has pesticide residue on it. If someone drives a tractor through a field, pesticide residues might stick to the wheels. A pesticide might drift onto other areas if it is applied on a windy day.

Question: What percentage of a pesticide could potentially leave the application site during or following an application?

Possible Answers: Trainees will guess various percentages of pesticide that might leave the site if some of the above situations occur.

Actual Answer: In good conditions, nearly all of the pesticide stays on the application site. However, in poor conditions or if the application is not managed well, it has been estimated that as much as 55% of the applied pesticide can potentially leave the application site due to several factors, such as those already mentioned.

- Tell the trainees that the example of applying pesticides during a windy day is a very important concern and one that you will focus on next. Continue to build on their knowledge of the topic by asking if anyone wants to share a story about a pesticide drift situation, such as when a pesticide drifted from an application

Activity 14: Pesticide Drift

site and contaminated the environment, other crops, homes, or people. Note: prepare a story that you can share just in case the trainees don't know of a particular drift situation.

- Explain that the next activity will demonstrate how pesticides can drift from an area if applied on a windy day.
- This activity should be performed outdoors in an area where there is no wind or one that is blocked from wind by a wall or barrier.
- Begin by asking the trainees to think about the areas where they will apply pesticides. What are their concerns in those areas? Are there water sources, wildlife, or beneficial insects they want to protect from pesticide spray drift?
- Explain that the activity is designed to help them understand some of the factors that cause pesticides to drift away from the target area, the effects of drift, and how it can be prevented.
- Take the group outside to the area where the demonstration will occur.
- Set up the activity area with an unused backpack sprayer filled with water, an electric fan plugged into an electrical outlet, and a plant.
- Ask for a volunteer to play the role of a negligent or improperly trained pesticide applicator. The volunteer will put the backpack sprayer on and will prepare to apply “pesticides” (water in the sprayer to simulate a pesticide) to the plant.
- Ask other trainees to form a half circle facing the pesticide applicator. Provide each person with a piece of water-sensitive paper and ask them to hold the yellow side out so it is facing the pesticide applicator. Explain to the class that the paper is currently yellow but will turn blue if it gets wet.

Activity 14: Pesticide Drift

- Ask the volunteer handler to spray the plant. After a few seconds, ask the other trainees to check to see if their water-sensitive paper has changed color. Ideally, without a wind present, the papers should still be yellow, indicating that the pesticide has not drifted from the target site (the plant).
- Now turn on the fan and tell the trainees that the handler did not pay attention to the weather patterns and decided to apply pesticides on a windy day. Ask the volunteer handler to spray the plant (the fan should be placed behind the participant so that it is blowing the pesticide toward the plant.)
- Ask the trainees to check their water sensitive paper to see if it has changed color. Because of the presence of wind created by the fan, some papers should now have blue spots, indicating that the pesticide has drifted off the target site and has contaminated other areas.
- Ask the trainees to list some ways to prevent pesticide drift.

Possible Answers:

- Use the correct nozzle size for the pesticide you are applying. For example, a very small nozzle would create tiny spray droplets that are lighter in weight and would easily be transported by air currents.
- Concentrate on the pressure of your sprayer and follow the manufacturer's instructions. An extremely high pressure could cause the spray droplets to drift from the target site.
- "Adjuvants" can be added to the tank. Some adjuvants help to prevent drift by making the spray droplets larger, weighing the pesticide down, or causing the pesticide to stick to the plant.
- Most importantly, pay attention to weather conditions when you are applying pesticides.

Activity 15: Anonymous Questions (The Snowball Fight)

Content Objective:

Trainees will have an opportunity to have their questions or concerns about pesticide exposure and safety heard and answered anonymously.

Training Technique:

Small group question and answer activity

Intended Audience:

Agricultural workers and pesticide handlers

Time:

15-20 minutes



Materials and Props:

Several pieces of blank paper

Pencils or pens

Activity 15: Anonymous Questions (The Snowball Fight)

Instructions

Workers and handlers often have questions they are hesitant to ask during training. They may feel everyone else will know the answer and they won't appear as smart as everyone else, or perhaps their mind had wandered when the information was covered. There are other instances that may include a workplace situation that needs to be discussed but people would like to remain anonymous when they ask about the situation.

- Divide the group into small groups of 3-4 people.
- Provide each group with a blank piece of paper and a pencil or pen.
- Ask each group to write down one question they have about pesticide safety. It can be something they didn't understand during the presentation or a unique situation that occurred at the worksite they want clarified.
- Instruct them to write one question only. They don't have to write the answer to the question.
- When everyone is ready, ask one person from each group to volunteer to the front with the piece of paper.
- Have the volunteers at the front of the room stand fairly far apart, but facing each other.
- Ask the entire group, "What happens in the mountains in the wintertime?"

Hopefully someone will eventually say, "It snows."

- Ask the group, "What do you like to do in the snow?"

Eventually someone will say, "Have a snowball fight", which is the answer you will need for this activity.

Activity 15: Anonymous Questions (The Snowball Fight)

- Instruct the volunteers to crumple up the paper to create a “snowball.”
- Give them 15 seconds to have snowball fight with their papers.
- When the 15 seconds is up, have each person pick up the snowball closest to them or in their hand, open it up and read the question aloud.
- The entire group can try to answer the question and if they need a little more clarification or correction, you can provide it.
- The benefit of this activity is the questions are anonymous. Everyone has a chance to participate in writing and answering a question (sharing their expertise) and each group gets their question answered.

Contents

Gathering Information. 200

 Current Federal Regulation. 200

 State, Tribal, and Local Regulations. 200

 The Agricultural Workforce 201

 Type of Training Needed. 201

 Trainees' Backgrounds 205

 Agricultural Workers 205

 Pesticide Handlers. 205

 Crops and Cropping Cycles. 206

Organizing Your Training 206

 Training Length. 210

 Training Objectives 210

 Materials and Handouts 212

 Interpreters 213

 Activities 213

 Class Outline 214

 Equipment and Supplies 215

Additional Considerations 216

 Timing 216

 Training Site. 217

 Personal Safety. 217

 Class Size 218

 Room Arrangement. 218



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCsupport@ucdavis.edu.

Once you are familiar with the Worker Protection Standard (WPS) regulations, training topics, and different ways that you can present such information, you can prepare for your training class. Training preparation can be time consuming, but the training class is likely to be more effective and successful if you are better prepared.

Gathering Information

Current Federal Regulation

It is important to stay current with federal pesticide regulations as they can change. You can do this by reviewing new or revised training materials, attending industry and association meetings, and searching the Internet for pesticide safety updates. Possible sources are U.S. EPA (epa.gov), local Cooperative Extension Service, Pesticide Educational Resources Collaborative (pesticideresources.org) and National Pesticide Information Center (npic.orst.edu).



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

State, Tribal, and Local Regulations



Photo courtesy of Stewart Jacobson, Arizona Department of Agriculture

Federal pesticide laws are the minimum national guidelines that everyone must follow. A state or tribe may have stricter rules, regulations, guidelines, or laws governing pesticide use and safety.

Before training, contact local state or tribal pesticide regulatory agencies, or visit their websites to become familiar with additional information you may need to include when training. Some states may have more than one agency that regulates pesticide use and pesticide safety training. State

Departments of Agriculture, Occupational Safety and Health, Labor, and Environmental Quality are good sources for area requirements on training, hazard notification, field sanitation, decontamination supplies, environmental impacts, and worker safety issues.

The Agricultural Workforce

Groups of employees can vary greatly and may consist of workers or handlers from diverse ethnic, cultural, and language backgrounds as well as different educational levels. If you would like to gather information on the characteristics of the local agricultural workforce, contact local service agencies that assist agricultural employees, such as migrant health clinics, migrant education programs, job training programs and employment agencies, farmworker organizations, and agricultural associations.

Type of Training Needed

If an agricultural employer needs assistance in deciding which employees need to attend WPS training and the type of training (i.e., training for workers or handlers), you can help them by asking a series of questions about the tasks or activities each person will perform.

Table 9.1: Type of WPS Training Required by Activity

Activity	Condition	Type of Training
Harvests, thins, or prunes as part of a labor contracting crew	The employee works in a “treated area.”	Agricultural Worker
	The employee does not work in a “treated area” at any time.	No WPS Training Required
Controls weeds	The employee weeds by hand or with a tool, while working in a “treated area.”	Agricultural Worker
	The employee uses an herbicide to control weeds in an agricultural production area.	Pesticide Handler
	The employee uses an herbicide to control weeds in a non-crop area, such as on a sidewalk.	No WPS Training Required
Helps with the harvest as a volunteer or gleaner	The volunteer or gleaner works on an agricultural establishment but receives no financial compensation.	No WPS Training Required However, agricultural worker training is encouraged.

Activity	Condition	Type of Training
<p>Packs produce</p>	<p>The employee harvests and packs produce in a “treated area” such as a field or orchard.</p>	<p>Agricultural Worker</p>
	<p>The employee packs produce while working inside a packing shed or other type of building.</p>	<p>No WPS Training Required</p>
<p>Controls rodents, such as gophers, voles, and rats</p>	<p>The employee uses pesticides to control rodents in the agricultural production area.</p>	<p>Pesticide Handler</p>
	<p>The employee uses pesticides to control rodents outside of the agricultural production area (e.g., in a building).</p>	<p>No WPS Training Required</p>
	<p>The employee uses traps or non-chemical means to control rodents in a “treated area.”</p>	<p>Agricultural Worker</p>
<p>Works on a project as an agricultural research student</p>	<p>The student receives direct financial compensation in the form of a salary or wage to handle pesticides.</p>	<p>Pesticide Handler</p>
	<p>The student receives direct financial compensation in the form of a salary or wage to perform agricultural worker tasks.</p>	<p>Agricultural Worker</p>
	<p>The student does not receive direct financial compensation in the form of a salary or wage to handle pesticides or perform agricultural worker tasks.</p>	<p>No WPS Training Required</p> <p>However, the appropriate type of WPS training (worker or handler) is encouraged.</p>
<p>Performs hand labor tasks following a fumigation</p>	<p>The employee performs any task following a fumigation, such as turning over soil, removing tarp, or irrigating.</p>	<p>Pesticide Handler</p>
<p>Works for a nursery located inside a government/public park or botanical garden</p>	<p>The employee is only caring for and cultivating plants.</p>	<p>Agricultural Worker</p>
	<p>The employee is handling pesticides or moving pesticide containers to the storage room.</p>	<p>Pesticide Handler</p>

Activity	Condition	Type of Training
<p>Works as a salesperson at a retail nursery or greenhouse where pesticides with the WPS (“Agricultural Use Requirements”) statement on the label are used</p>	<p>The salesperson occasionally touches the leaves or growing compound of a plant or surface that had a pesticide applied directly onto it and where a restricted-entry interval (REI) has been in effect in the previous 30 days.</p> <p>The salesperson will only work the cash register and has no potential of coming into contact with a treated area, plant or surface.</p>	<p>Agricultural Worker</p> <p>No WPS Training Required</p>
<p>Handles pesticides at a golf course</p>	<p>The handler is also a certified applicator, as is often the case for Golf Course Superintendents.</p> <p>The handler works for a golf course that purchases replacement sod and other plants from a separate company.</p> <p>The handler works for a golf course that applies WPS pesticides to an area where they grow their own replacement sod or other plants for the golf course.</p>	<p>No WPS Training Required</p> <p>No WPS Training Required</p> <p>Pesticide Handler</p>
<p>Irrigates</p>	<p>The irrigator works with equipment used for chemigation (the application of pesticides through an irrigation system).</p> <p>The irrigator assists the pesticide handler when it is time to “water-in” the pesticide as part of the application process prescribed by the pesticide label.</p> <p>The irrigator is occasionally asked to use an herbicide to “clean up” the irrigation ditches (non-crop areas).</p> <p>The irrigator does not participate in any of the above activities and won't be in the area during an application or REI.</p>	<p>Pesticide Handler</p> <p>Pesticide Handler</p> <p>No WPS Training Required</p> <p>However, pesticide handler training is encouraged.</p> <p>Agricultural Worker</p>

Activity	Condition	Type of Training
<p>Repairs or cleans farm equipment</p>	<p>The mechanic, while working for his or her employer, repairs or cleans equipment, tractors or all-terrain vehicles that contain pesticide residues.</p> <p>The mechanic, while working for a person other than his or her employer, repairs or cleans equipment, tractors or all-terrain vehicles that contain pesticide residues.</p> <p>The mechanic does not come into contact with pesticides or pesticide residues at any time.</p>	<p>Pesticide Handler</p> <p>No WPS Training Required.</p> <p>However, this person must be told that the equipment may have residues and given steps on how to protect themselves</p> <p>No WPS Training Required</p>
<p>Works as a truck driver or hauler</p>	<p>The employee drives a truck into an agricultural area to pick up harvested crops.</p> <p>The employee drives a tractor and equipment into a “treated area” to assist with the harvest and transfer of the crop.</p> <p>The person is a delivery truck driver (i.e., UPS or FedEx) who drives through a treated area to get to the main office.</p>	<p>No WPS Training Required</p> <p>Agricultural Worker</p> <p>No WPS Training Required</p>
<p>Receives deliveries of agricultural pesticides</p>	<p>The employee handles open containers at any time.</p> <p>The employee puts opened and unopened pesticide containers in the storage area and may come into direct contact with pesticide residues on open containers, shelves, and other surfaces.</p> <p>The employee works in an office and will only receive the delivery and paperwork.</p>	<p>Pesticide Handler</p> <p>Pesticide Handler</p> <p>No WPS Training Required</p>
<p>Works at an organic farm where pesticide products with the WPS language (“Agricultural Use Requirements”) on the label are used</p>	<p>The employee performs agricultural worker tasks in a “treated area.”</p> <p>The employee performs pesticide handling tasks.</p>	<p>Agricultural Worker</p> <p>Pesticide Handler</p>

Trainees' Backgrounds

Background information about trainees can help you tailor the training resources and activities to their informational needs. If you are unable to gather information about the trainees before class, you can spend a few minutes at the beginning of class to get to know them by asking a few work- and training-related questions. The following are examples of questions you can ask workers and handlers:

Agricultural Workers

- How long have you worked here?
- What kind of agricultural work have you done in the past?
- What type of work will you do here?
- Have you attended a WPS training?

Pesticide Handlers

- How long have you worked here?
- What types of pests do they control at this location?
- Do you know the names of any of the pesticides you will use?
- Have you ever attended a WPS training for pesticide handlers?
- Have you worked with pesticides in the past?

It is also helpful for trainers to know if the trainees are migrant, seasonal, or permanent employees. Migrant workers move from one area to another to find agricultural work. Seasonal employees live in the area in which they work but are only employed as agricultural workers during the growing or harvest season. Permanent employees live and work in the area and are employed by the same agricultural establishment on a year-round basis.

Crops and Cropping Cycles

It is helpful to become familiar with crops and cropping cycles, seasonal labor requirements, and typical tasks of agricultural employees in the areas where you train. This information is available from State Departments of Agriculture, Departments of Labor, University Extension offices, an local organizations that provide outreach to agricultural employees and agricultural associations. Knowing the cycles of the various crops and peak harvest times will help you identify the best time to provide WPS pesticide safety training in a particular geographical area. Information on crop profiles can be found at the following website:

ipmcenters.org/cropprofiles

Organizing Your Training

Once you have studied the required topics, have updates, and know if you will train agricultural workers or pesticide handlers, it is time to get organized.

Write the topics down in the order that you would like to present them during your course. You may want to start by looking at your list of topics and separating them into themes that blend well together.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture



Photo courtesy of Dr. Kurt D. Nolte, University of Arizona Cooperative Extension

In the following example, the trainer is planning to present WPS pesticide safety training to pesticide handlers. The trainer begins by grouping all pesticide-related health topics together, followed by details about the pesticide label, and information on how to use pesticides safely and effectively. The trainer finishes with employer responsibilities and employee rights.

Table 9.2: Sample Training Plan**TOPICS FOR PESTICIDE HANDLER TRAINING**

The first section will include general pesticide-related health information for people who will work directly with agricultural pesticides. It will include

- an overview of agricultural pests at their worksite and the different types and formulations of pesticides they might use to control these pests;
- where and in what form pesticides and their residues may be found at work;
- routes through which pesticides can enter the body;
- signs and symptoms of exposure, plus the health hazards of pesticides resulting from toxicity and exposure including acute effects, chronic effects, delayed effects and increased sensitivity; and
- potential hazards to pregnant women and children from pesticide exposure.

This section of the training will focus on ways to recognize, prevent and treat pesticide exposure and will include

- minimum age requirements for pesticide handling activities;
- decontamination requirements and supplies at the various worksite locations;
- protective clothing and/or PPE listed on label;
- recognizing, preventing and treating heat illness;
- ways to protect family members, such as the importance of keeping family away from pesticides and pesticide treated areas;
- hazards from residue on clothing and how to care for and wash work clothing;
- emergency first aid for pesticide injuries or poisonings and how to obtain emergency medical care and information about the pesticides used at work (central location); and
- hazards from residue on clothing and how to care for/wash work clothing.

This section will pertain to the pesticide label. Trainees will review sample product labels to practice locating and following health, safety and pesticide use information from a label. It will include

- the different sections of a pesticide label;
- how to find health and safety information such as precautionary statements, PPE, and first aid information;
- how to find and follow use instructions to determine the pests that are controlled by the product, the sites to which the pesticide can be applied, and any application limitations or restrictions; and
- product-specific information listed on the label, such as the type of pesticide, active ingredients, formulation of the product, toxicity level, and environmental impacts.

This section will focus on working safely when mixing, loading and applying pesticides. Trainees will also learn about environmental concerns such as water contamination and how to respond to emergency situations such as pesticide spills and leaking containers. It will include

- need for PPE, including respirators if applicable;
- proper use, cleaning, and maintenance of PPE;
- safe practices when mixing, loading, and applying pesticides;
- ways to protect the environment when working with pesticides;
- pesticide Application Exclusion Zones (AEZs) and other ways to prevent pesticides from drifting onto and/or contaminating other people;
- safely transporting, storing and disposing of pesticides and their containers; and
- steps for cleaning up pesticide spills.

The last section will focus on the employer's responsibilities and employee's rights. It will include

- employer's responsibility for providing the handler with the respirator, medical evaluation, fit testing, and respirator training before the handler uses a respirator required by the label;
- employer's responsibility for providing, maintaining, replacing, and storing PPE;
- employee's rights to information about pesticides used at work and the ways that the employer must provide this information;
- employee's protection against anti-retaliation; and
- employee's right to a copy of the training record and application information.

Training Length

As you prepare your training, think about how much time you will need to cover all of the required topics. Also take into consideration that the following situations may add extra time to your training:

- using an interpreter;
- presenting the training bilingually;
- including training activities such as role play, games, or demonstrations;
- distributing handouts;
- signing training records;
- trainees arriving late;
- noise or distractions
- audiovisual equipment set up; and
- glitches with training tools or equipment.



Photo courtesy of Penn State Extension, The Pennsylvania State University

Training Objectives

After you have organized your topics, you can focus on the information, skills, and attitudes you would like your trainees to gain through the class. One way to do this is to develop a list of training objectives. Training objectives are simple sentences that describe what you would like the trainees to learn, know, demonstrate, or be able to do as a result of your training. Your objectives should

- be clear and concise;
- take into consideration the work situations and environment of the people who will attend the training;
- reflect the skills, knowledge, and attitudes that you want the trainees to have at the end of the session; and
- include activities that encourage trainees to participate in the learning process.

The following are three examples of training objectives with different levels of trainee participation.

“Through this class, trainees will learn several ways they can prevent pesticide exposure at their worksites.”

“By the end of this session, trainees will be able to recognize potential pesticide hazards in a series of photos and talk about ways to prevent similar exposure situations when they are working with pesticides.”

“During this activity, trainees will demonstrate one way to prevent pesticide exposure by reading a pesticide label and selecting the proper PPE.”

The first objective states that you, the trainer, will provide the trainees with the information they need to know in order to prevent exposure to pesticides at work.

The second objective covers the same type of information but requires trainees to participate in a hazard identification activity. The activity has been tailored to the work of the trainees by including photos of situations that might occur at their worksites.

The third objective requires trainees to become more involved in the learning process as they demonstrate how to select the PPE that is required on the label.

You can also list your objectives as a set of skills that you would like trainees to have at the end of the training, for example

Skills: After participating in the training, trainees will know how to:

- recognize pesticide exposure risks and explain how to prevent them at work, and
- read and follow label instructions for selecting the PPE they must wear to protect themselves from exposure to the product.

Materials and Handouts

There are many pesticide safety training materials available including flipcharts, DVDs, online videos, digital presentations, booklets, pamphlets, and games. Pesticide labels are also great training tools, especially when they represent the products the trainees will use at work. You can find resources through PERC, EPA, NPIC, or pesticide chemical companies.

When selecting training materials and handouts, make sure they

- cover the required information,
- can be easily supplemented with additional information if necessary,
- are correct and up-to-date with current laws and regulations,
- are approved by EPA,
- are in a language trainees understand,
- are accurate and clearly worded (especially if they have been translated),
- reflect the trainees' work or worksite as much as possible,
- include local information if possible, and
- can be presented in a way that enables trainees to participate in the training and ask questions.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

Always review your training materials before you present them in class. Even if a booklet or video has been approved by EPA, the laws may have been revised since the date the materials were produced. Additionally, the materials may not be appropriate for your particular situation or you may need to incorporate local state or tribal regulations into your training.

If you use training materials in a language that is not your native language, pay close attention to the translation to make sure that the information is correct and the translation is accurate. You should ask an interpreter to help you with this review if you cannot read the materials yourself.

Interpreters

If you speak English and the trainees do not, you must also arrange for an interpreter. You may need to rely on other employees who are bilingual, professional interpreters, or bilingual community members who may volunteer to translate training material for your presentation. Other possible sources of translation services are community-based organizations, medical personnel, other employers, the Farm Bureau, the University Extension office, farm worker associations, and migrant health clinics. If they do not have a staff member who provides these services, they may be able to provide a referral to an individual or group that can help.

If you use an interpreter, it is important that the person has a clear understanding of pesticide terminology before training. Provide the interpreter with a copy of the training materials you plan to use and discuss these with him or her.

Activities

Activities keep the trainees engaged in the course and allow them to participate in the learning process. Activities can be simple, such as a question-and-answer session about pesticide products or more complex, such as a mock pesticide spill clean-up activity. Look at your topics and objectives to help you decide which activities would fit in nicely with your training, while helping you to meet your training objectives. Sample activities have been included in Chapter 8 of this manual. Each activity includes a suggested training theme, objective, activity duration, materials or props, and instructions.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

After you have selected your materials, handouts, and activities, you can create a list of items you will need to take to the training class, as shown in the following example:

Table 9.3: Sample Training Activities Plan

Topic	Activity	Props and Equipment	Materials and Handouts
First Aid	Role play	Soda bottle Picture of scenario Pesticide label	Copy of the first aid recommendations from Chapter 5
Pesticide Labels	Label information search	None	“Acaramort” mock label training tool displaying different parts of the pesticide label Copies of labels of two actual pesticide products
Personal Protective Equipment	Hands-on activity with PPE and labels	PPE that must be worn with each of the products you selected for this activity	Document showing effectiveness of different types of glove material
Pesticide Storage	Photo – Hazard Identification	Laminated photos with examples of good and bad storage	None

Class Outline

Like objectives and skill sets, an outline is a necessary tool that serves as a guide for trainers. A good outline will provide you with all of the information you need to know to conduct the training session in an organized way, and can also help you gauge the amount of time you will need for each topic and activity. Organize the outline so that it is easy to follow, such as is shown in the following example. As you gain more training experience, you may discover a simpler way to organize your topics, activities, handouts, and materials.

Table 9.4: Sample Class Outline

Topic	Activity	Time	Materials
Trainee Introductions	Ice Breaker	5-15 minutes	Dry erase board and pens
Pesticides at work	Small group activity with lists of sites	10 minutes	Lists of sites (one copy per group)
Definitions of pests and pesticides	Question and answer	5 minutes	None
Routes of exposure	Hazard Identification	10 minutes	Photos of potential pesticide exposure situations
First Aid	Label information search	10 minutes	Labels and photos of potential pesticide exposure situations

Equipment and Supplies

Now you can focus on the training equipment and supplies. Make a list of everything you will need to conduct your training. You can avoid carrying extra equipment by checking to see if items are available at the training site. Once you know what is already available, decide what items you will need to bring. The following is an example of a checklist of equipment and supplies for a more formal pesticide safety training class, during which the trainer will use a digital presentation, case study, and label activities.

Table 9.5: Sample List of Training Equipment and Supplies

Equipment/Supplies	Need	Provided at Site	Need to Bring
Laptop	✓		✓
Projector	✓		✓
Extension Cord	✓	✓	
Screen	✓	✓	
TV/VCR/DVD Player			
Writing Surface/Pens	✓	✓ (dry erase board)	
PPE	✓	✓ (employer purchased new PPE for training)	
Pesticide Labels	✓		✓
Case Study	✓		✓

Additional Considerations

Timing

Training sessions are more effective when trainees are able to concentrate on the information. Therefore, the best time to train may be in the morning when everyone is alert. If the morning is not a convenient time and you need to present the class in the afternoon, provide short breaks and refreshments, if possible.

The employer or supervisor can help determine the best time of day for training. Many agricultural employees work at least 10 hours per day, 6 days a week. Therefore, you may be asked to present the class in the evening or during a weekend.

The training schedule may vary depending on the season, type of agricultural establishment (farm, forest, nursery, or enclosed space production area), and needs of the trainees.

Training Site

A good training site will contribute to the success of the training. You may not always have control over training locations, but when you do, choose a place that is quiet, conducive to learning, and where there will be few outside disturbances.

If the class is presented indoors, minimize distractions by closing doors and windows. If the class is held in a farm shop, warehouse, or in a field, it will be more difficult to minimize distractions. You may discover you will need to use more hands-on activities and discussion to keep the group focused when training outdoors.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture

When you train at a new location, find out as much as you can about the training site. If you know about problems in advance, you may be able to change sites or arrange to minimize or eliminate situations that could be distracting during the class. The type of training location can also influence the training methods you will be able to use.



Photo courtesy of Association of Farmworker Opportunity Programs

Personal Safety

Always make sure the training location does not present any hazards to you or trainees. Dress appropriately for the conditions and site. Consider wearing a hat, sun visor, or putting on sunscreen. Bring plenty of water if you will present your training outdoors or in the heat.

Likewise, wear warm clothes and a jacket if you will be training outdoors or in cold weather.

Be aware of possible tripping and electrical hazards when using extension cords for training equipment.

Take additional safety precautions if you travel and train alone or after dark. Make sure you have enough light to see where you are going to avoid potential hazards. If you do not feel safe on your own, ask someone to accompany you.

Class Size

It is much easier to train a small group of 15 people than it is to train a large group of 50 or more. Trainees in smaller groups are better able to hear you and see the information and have more opportunities to participate and ask questions. Furthermore, you will have more control over the course and will find it easier to keep all trainees focused on training. When it is necessary to train a large group, have trainees form smaller subgroups to work on activities such as problem-solving exercises. Move around the room so you can give the groups more individualized attention.

Room Arrangement

When arranging the room, think about the class size and training activities. The room should be set up so all trainees will be able to see and hear well.

If you use a table, flipchart, dry erase board or props, place these items off to one side. This will provide you with more room to conduct the course and activities and will eliminate a barrier between the trainees and you. Setting a flipchart or dry erase board off to the side of the room will enable you to face the class as much as possible as you write. In this way, you will create a much friendlier training atmosphere.

Contents

Language Skills, Literacy Levels, and Educational Backgrounds . . . 222
Cultural Backgrounds 226
Knowledge About Pesticides and Workplace Experience 226
Personalities and Learning Styles 228
Generations 231
Attitudes About Safety 232
Additional Trainer Resources 236



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCsupport@ucdavis.edu.

Training Scenario: It is 2007. You recently attended a very informative Worker Protection Standard (WPS) Train-the-Trainer Workshop and leave with a stack of books and a ton of ideas. A month after the class you receive a request to provide WPS training to 10 English- and Spanish-speaking pesticide handlers. You are nervous but excited to teach your very first pesticide safety class.

You purchase a 45-minute pesticide safety video that has all of the information required for WPS training. You also make 10 photocopies of a pesticide label so everyone will have a copy during a label reading activity.

You have studied the materials and feel well-prepared. The training class is going well and then it happens.

During your very first pesticide safety training

- two men answer three phone calls,
- one woman falls asleep while watching the video, and
- four people struggle through the pesticide label reading activity.

Fast forward ten years...

It is now 2017. You have 10 years of training experience and have taught 230 classes. You are confident, prepared, and still excited about training.

You begin each training session by asking everyone to silence their phones to avoid interruptions. You have reformatted your training so you don't rely on the video to do all of the teaching. In fact, you only show a 10-minute segment of an EPA-approved pesticide safety video that demonstrates how to safely transport, store, clean, and dispose of pesticide containers. You use other training methods to cover additional WPS information. Since many of the people you train speak either English or Spanish, you also make it a practice to provide training materials in both languages.

You feel experienced, knowledgeable and overly-prepared. The training class is going well and then it happens.

During your 231st training

- two women send ten text messages,
- one man falls asleep while watching the short video clip, and
- four people struggle through the pesticide label activity.

Unfortunately, this can be a reality for pesticide safety trainers. No matter how many years of experience or hours of preparation, trainers will encounter new situations.

Providing effective training classes can be a challenge, especially when you are working with a group of people from different generations and diverse

- language skills,
- literacy levels,
- educational backgrounds,
- cultural backgrounds,
- knowledge about pesticides,
- workplace experience,
- personalities,
- learning styles, and
- attitudes about safety

This chapter describes and addresses several situations pesticide safety educators might encounter during training. Each situation is presented in the form of a question followed by suggestions and solutions from experienced trainers. As you gain more experience as a pesticide safety trainer, you will be able to develop your own strategies for dealing with similar situations.

Language Skills, Literacy Levels, and Educational Backgrounds

Situation #1 – I've been asked to provide training in a language I don't speak very well. Where can I find a translator?

Trainer A – Some trainers use professional translators and others find translators through local agricultural associations, farmworker or refugee service providers, rural health clinics, regulatory agencies, schools or community-based organizations. Bilingual community members or an employee at the worksite might also be happy to assist you.

Trainer B – Call your local State Department of Agriculture, Cooperative Extension Office or Tribal Authorities.

Trainer C - Sometimes, the ag-establishment may also have bilingual employees that can assist.

Trainer D – Be aware that not all immigrants have the same origin nor the same customs. In the case of immigrants working in agriculture, even though we talk about a community, it really includes people from diverse ethnic, social, and cultural origin, so, be sure the translator you pick understands about diversity.

Situation #2 – A community leader has offered to serve as my pesticide safety training translator. How will I know if he is translating the information correctly?

Trainer A – It will be very difficult for you to know if the leader is translating information correctly, especially if it is a language that you don't speak or understand. Invite the leader to attend a training you will present at a different site, prior to the one that he will help translate. Schedule a follow-up meeting, phone call, or e-mail exchange to answer any questions the leader might have about terminology or the regulation. Provide him with written materials he can use to study and translate before the training session.

Trainer B – I agree with **Trainer A** – however, this item should be part of the trainer preparation. Contacting a translator from a good source should be done well in advance.

Trainer C - If there is a great need for translation services in the language spoken by the community leader, ask him if he would like to attend a local pesticide safety train-the-trainer workshop so that he can serve as the pesticide safety trainer for people in his community.

Situation #3 – I have found lots of pesticide safety training resources available in English and Spanish. Where can I find resources in other languages?

Trainer A - The EPA has educational materials in languages other than Spanish. Many times when individuals from a specific ethnic group move into an area, community leaders that provide services to that group, or growers for whom they work or will work may help you locate resources in a specific language. If not, at the very least you will be able to document that such resources are unavailable, and there is a need to produce them.

Trainer B – Try your pesticide regulatory agency. The California Department of Pesticide Regulation (CDPR) has pesticide safety resources in other languages. They translate their Pesticide Safety Information Series into Spanish, English and Punjabi (cdpr.ca.gov/docs/whs/psisenglish.htm). They also funded short videos on pesticide safety that they translated into Mixteco and Zapateco (youtube.com/playlist?list=PLgU4sA8HrUfpESWV6Mp4o690S-oQeXtxG). How about a community group? There are Mixteco organizations, for example, that would probably be willing to help translate. Note: the challenge is that it's a non-written language.

Situation #4 – There are usually one or two people in my training classes that don't participate in activities that involve reading. I don't want to embarrass them or put them on the spot, but I am worried that they might miss out on important information. How will I know if they understand the information?

Trainer A – When working with small groups, go around and participate with each group for a little bit, answering any questions or concerns and facilitating them to keep on task.

Trainer B –

1. Make sure written materials are explained verbally and have illustrations that can help them understand the information.
2. Ask questions to ensure all participants understand the information.

Trainer C – If you plan to use written materials or activities that require participants to read, divide the participants into small groups of 3 or 4 people and ask each person to take a different role. For example, one person can read a section of the label, another person can select the PPE that is required for mixing the pesticide, a third person can put on the appropriate PPE, and a fourth person can describe the PPE that was selected. This allows you to combine the activity with hands-on practice or skill demonstrations, which makes training more enjoyable. It also enables each person in the group to participate and show that they understand the information. This technique takes the pressure off of the people who do not have strong reading skills.

Trainer D – Remind them that it is their employer's responsibility to ensure the handler has read, or someone has explained to them, the parts of the label on safe use of the pesticide, entry restrictions, AEZs and REIs. If they are unable to read or understand the label, they should ask their employer for directions.

Situation #5 – I provide pesticide safety training services for hire and don't work at the farms where I teach. How can I help pesticide handlers who are not able to read a pesticide label, since they need to follow it each time they use a pesticide?

Trainer A –

1. Use examples of pesticide labels and help them find key information regarding safety so that they can protect themselves.
2. Pesticide handler supervisors/employers are required to provide label information to employees before they start handling pesticides.

Trainer B – You can match pesticide handlers who have limited reading skills with coworkers who can assist them. During training, explain to everyone that the pesticide label is a very important document that must be followed because it contains safety, health

and use information. Ask if there is anyone in the group who would be willing and available to serve as a resource for coworkers who are not able to read the label. Ask if there are any bilingual pesticide handlers who can also serve as translators for people who are unable to read the label, which is often available only in English. If pesticide handlers would benefit from a bilingual English/Spanish pesticide label terminology list, they can find one on the Arizona Department of Agriculture's website: agriculture.az.gov/sites/default/files/labelvocabpamphlet.pdf

Trainer C – An alternative is to ask class participants to highlight or circle the most important places where they will find information that they have to know before they apply pesticides.

Situation #6 – I am working with a group of trainers that would like to design pesticide safety training materials. Someone told me to make sure that all reading materials are written at a third grade reading level. Another person said a seventh grade reading level was best. Which person is correct?

Trainer A – I have heard similar advice and am not certain which level is the correct level for adults with limited reading skills or formal education. However, despite the level you choose, please remember that the final product will be used by adults. Some groups have developed comic books, or novelas, which have proven to be a very popular and fun way to learn about pesticide safety. The most effective illustrations are those that depict real-life situations adults may encounter at their worksites or in their homes.

Trainer B – Make sure reading materials not only convey information in the appropriate language, but that the visuals and the examples portray people from that community so that the participants can personally relate to the information.

Trainer C – Role play and hands-on activities will also work well in those situations, although time constraints should be taken into consideration.

Cultural Backgrounds

Situation #1: What if you are called to provide training to agricultural employees and you learn that in their country of origin, agricultural work is thought of as an activity performed by strong individuals, who are not afraid of pesticides. People they know, or even themselves, have always worked with pesticides without getting sick or injured. You also learn that in their view, getting injured by pesticides only happens to weak individuals who should not be working in agriculture in the first place. What can a trainer do in this situation?

Trainer A – Culture plays an important role in how people view, respond, or perceive pesticide safety. In many cases, agricultural employees come from a country or culture where pesticide safety training may not be viewed as a priority, is not provided regularly as a health measure, or it is not required by a rule or regulation. It is important for trainers to identify the cultural background of the agricultural employees in the audience in order to effectively get the message of pesticide safety and pesticide exposure prevention across to them.

Trainer B – Make sure everyone understands how pesticides, specifically insecticides, are designed to kill insects. Explain that insecticides attack parts of the insect's body or organism that are also present in humans. Explain that this is why it is important for us to be careful when working around pesticides and that pesticide injury can happen to anyone, even to strong individuals.

Knowledge About Pesticides and Workplace Experience

Situation #1 – Most agricultural employers want all of their employees to go through WPS training together. I know that many of the older foremen and supervisors have already gone through several classes and have a lot of experience working with pesticides. Do you have any tips on how to train a group with mixed knowledge and experience? I want to make sure that new employees get all of the necessary information, but I don't want the class to be too easy or boring for the employees who have been around for a few years.

Trainer A – Before the training (during the registration process), we ask attendees how long they have worked around pesticides. We divide all attendees into groups according to experience, purposely putting people with more experience into groups with those who have less experience. When it's a mixed training, we split people who work at the same place into different groups (unless there are so many from one organization that there is more than one per group). If I notice that one group or person seems to have more knowledge or experience, I assign them activities that are more detailed or difficult. For example, I would assign them a presentation on spill cleanup rather than proper pesticide storage, because it requires a more detailed response.

Trainer B – Ask the more experienced employees to assist with some of the activities so they have an opportunity to share their experience. In the process, the older employees will get to show off their knowledge and the newer employees get to see that their supervisors are a great resource should they have questions in the future.

Trainer C – Provide all the required WPS information. If there are people in the group with a lot of experience and knowledge, ask them to participate by complementing/providing information on how it applies to their particular situation at their worksite. Additionally, ask those with experience to share some of their experience in reference to the information being provided.

Trainer D – Also be aware that in some workplaces there can be issues among workers that might arise during training. Sometimes issues might be sparked by inviting more experienced workers or supervisors to offer their knowledge, especially when hierarchies are involved, which can prevent new workers from engaging in the learning experience.

In addition, you also can invite those with less experience to ask what they would like to know or better understand.

Personalities and Learning Styles

Situation #1 – It never fails that at least one person falls asleep or stares off into space during training. Does anyone else have a problem with sleepy people? How can I keep everyone awake and alert during the training?

Trainer A – It is very important that everyone receives the information, but sleepy people are a reality in agriculture. You may find out that the drowsiest person is the night irrigator, a parent of a newborn, or has been up since 4:00 a.m. There are so many factors that you can't control, so try not to take it personally. Of course if everyone in your training is sound asleep, you may want to revisit your training methods. Include several activities that require people to work in small groups. You can also ask the sleepest people to participate in activities that require them to stand up or move around. This will help them to stay alert during the class.

Trainer B – Use interactive training methods such as hands-on or group discussion – they work very well to maintain people's interest.

Situation #2 – Do you have any suggestions on how to work with people who are so enthusiastic about the training that they dominate the discussions and don't allow others a chance to ask or answer questions?

Trainer A – As a trainer, you want to encourage everyone in the group to participate. However, occasionally there will be one or more people in the class who are so eager to participate that other people do not have a chance to get involved in the discussion. Most likely, the enthusiastic person just really enjoys learning, participating in activities, and assisting instructors in the teaching process. It is also possible that the person feels bad that other people are not participating in the training and doesn't want you to feel uncomfortable by the silence. Since the enthusiastic person means well, use their energy to your advantage and get them involved in the teaching process.

Trainer B – Invite them to help train and to volunteer on different task – use their enthusiasm in a positive way.

Trainer C – I try to find a way to capitalize on their knowledge and enthusiasm. I sometimes do this by asking the enthusiastic person to give a summary of a concept instead of having to explain it myself. I ask a question like, “I know you have a lot of experience with respirators. Can you explain the difference between a filtering facepiece and a pre-filter?” It saves my voice!

Trainer D – Another idea to take into consideration is the arrangement of the class seating. Having people sitting in an old school style classroom, with the professor in front, sometimes facilitates those who are shy to hide and for those who are outspoken to take over the conversation. Having a U shape arrangement, or a circle, helps to have everyone face each other, which makes it easier to facilitate the participation of each person. Finally, it is the trainer’s responsibility to make eye contact with everyone and keep everyone’s attention on the subject matter and the group.

Trainer E – There are methods you can use that will give others an opportunity to speak and participate in the activities. One solution is to compliment the individual for bringing up excellent points and mention that it would be interesting to hear what others in the group have to say about these comments, too. By inviting others to participate, you open the discussion to the whole group while responding to the enthusiastic individual. You may even try to give the enthusiastic person the job of engaging the other participants by asking something like, “Thank you for all of your great ideas and for eagerly participating. Will you please select three people to volunteer for our next hands-on activity?”

Situation #3 – What is the most appropriate way to respond to someone who disrupts class by trying to prove he knows more than the trainer?

Trainer A - Initially, you can address the behavior, acknowledging if you've said something incorrect or uncertain of the answer, or letting the person know the comment is off topic. You could try saying something like, "That's really good additional information for those of you in charge of [fill in the blank], but it's not something we need to address in this class." If the taunting persists, I would not show a reaction and basically act like the person didn't say anything. If he/she says something insightful or gives a good answer, then I would give a lot of praise for it. I would try to give positive attention to other trainees and not give the taunter negative attention.

Trainer B – You may come across a person who tries to disrupt the class by verbally attacking or criticizing you. It may take the form of an attack on the accuracy of your information or the person may constantly interrupt you with inappropriate or unrelated comments. The first thing to remember in this situation is to keep your temper under control and be polite, no matter how unpleasant or rude a trainee's behavior. Remind him or her that if you are unable to complete training, the rest of the trainees will not get the information that could protect their health or even save lives. When you do this, other people may provide the peer pressure needed to restrain their coworker from acting out during training.

Trainer C – If nothing seems to be working with the individual's behavior, wait for a break to talk to them after class but not in front of the group. You might also have to, as a final resort, ask the individual to leave class.

Situation #4 – I took classes on adult education and learned that people have different learning styles and preferences. How can I set up training so that everyone can learn the same information at the same time?

Trainer A – Educational research is very interesting and it is true that most of the time you will have a group consisting of people who prefer to learn in different ways. A few people might find it easy to learn simply by listening to a lecture. Other people remember most of the information that they see and hear during a video. Some people like to analyze situations and come up with ideal solutions, while others prefer to practice a task during a hands-on activity. If possible, combine different training methods or use a few that allow trainees to simultaneously hear information, see examples, solve problems, and practice skills.

Generations

Situation #1 – Is it my imagination or is the younger generation much shyer than we were back in the day? They clam up when I ask them questions and don't want to participate in anything that requires them to stand up in front of a group of people. How can I make them feel comfortable enough in a training environment to want to participate in activities?

Trainer A – You bring up a good point. It is possible that the younger generation feels more comfortable communicating through social media than they do in real-life social situations, such as during a pesticide safety training. If you find over time that the majority of the younger people you train are apprehensive about standing in front of a large group, don't force the issue. Instead, set aside some time to ask a few of your younger trainees how they learn best. You may find that high school teachers and college professors have created some very innovative ways to educate the younger generation. Some of these methods might transfer nicely into a pesticide safety training.

Trainer B - Use training methods that involve different learning styles. One of the methods may click for them.

Trainer C – I think the resistance to opening up and participating may be related to not really knowing who is in the room with them. A lot of the trainings and large group meetings I have been to have started out with an ice breaker before the presentation. I know some of them are lame or corny, but it usually loosens people up!

Situation #2 – *I recently graduated from college and will eventually take over my family's farm. One of our mechanics has been working with my family for 45 years and has known me since I was a kid. I've tried to convince him that he needs to be careful when he works with the application equipment because it could have pesticide residues on it. He insists that if something were going to happen to him, it would have happened already. He thinks my generation is too paranoid and that we would be a lot healthier if we got our hands dirty every once in a while. How can I convince him to take my pesticide safety advice seriously when he still sees me as a little kid?*

Trainer A – Talk to him about consequences and the possibilities of pesticides having greater effects on his health now that he is older.

Trainer B – Get your hands dirty with him and offer some examples of real life stories, photos, while you are working alongside him.

Attitudes About Safety

Situation #1 – *An employer asked me for advice. One of the pesticide handlers at his farm refuses to wear the required respirator even though he has completed the respirator medical evaluation questionnaire; attended respirator use, maintenance, and care training; and has a respirator that fits him. What can the employer do to make sure the handler follows the label and wears the required equipment?*

Trainer A

- Have a safety protocol/policy in place and ensure all employees are aware of it, and explain the consequences of not following the protocol.
- Enforce protocol/policy
- Apply corrective measures

Trainer B – This is a common question in warmer states. Pesticide handlers complain about wearing PPE when it is hot and humid outside. Adjusting work schedules to cooler hours is one solution, however some people may still complain that the PPE is uncomfortable. If a pesticide handler is provided with PPE that fits but refuses to wear it even though they have been trained on the importance of following the label and protecting themselves from pesticide exposure, the employer may have to draw up a contract stating that all employees must agree to wear the label-required PPE or risk termination.

Situation #2 – *I taught a WPS course to a group of about 40 agricultural workers the other day. About 15 minutes into the class, I caught a man playing a video game on his phone. He laughed when I caught him and said he didn't need training because he won't be using pesticides. His comment and attitude surprised me and I didn't know how to respond. If something like this happens again, what should I tell him? I am worried that if he has a pesticide incident at work, I will be held liable since I was the pesticide safety trainer. Can I be held liable?*

Trainer A – To answer the question about if the trainer is liable – no. It is the agricultural employer's responsibility to ensure workers are trained, and it is the trainer's responsibility to provide training in a manner the trainee understands, answer all questions, and cover all training topics. It is the employees' responsibility to use the information given in training to protect himself. If the trainer feels comfortable, he could tell the employer/supervisor about the interaction so he knows the employee likely didn't get the information.

As for the trainee – I wonder if you could use peer pressure. Ask the audience how they would feel if they heard their son or daughter (or mom or dad, or uncle, or...) give the same response. Ask what they would say to convince that person that they are exposed to pesticides even if they aren't handling pesticides, and to explain that their health and safety matters to the rest of the family.

Trainer B

1. Explain to the person that even though he won't be using pesticides, he may enter into areas that have been treated with pesticides and that pesticide residues may still cause him and his family harm.
2. Tell him it is a requirement as part of his employment in agriculture.

Situation #3 – My employer just hired an employee who will be responsible for coordinating the workplace safety program for all harvesting crews. She seems overwhelmed with all of the programs and paperwork that we need to complete at the beginning of harvest season and has told us that we are only allowed to spend 15 minutes on pesticide safety training. I don't think this is enough time for me to cover everything that is required in the new Worker Protection Standard. Is there a minimum amount of time required for agricultural worker training? If not, how much time do you think we should spend training?

Trainer A – This is a really good question. The Environmental Protection Agency has not set a minimum amount of time for WPS training, however you are required to present it in a manner and language that attendees understand and allow time for trainees to ask questions. Some trainers show a pesticide safety video while agricultural workers are being transported to the field. However, several have mentioned that they worry about people being able to see or hear the video. If you have doubts about the effectiveness of a 15-minute pesticide safety training class, talk to your employer about your concerns. Print off a copy of the points that must be included and your ideas for the presentation. You can also put together a lesson plan, such as the one provided in the training preparation chapter. This will allow you to show your employer your ideas and the amount of time that you feel is sufficient for the training. Don't forget to add extra time to complete a training sign-in sheet.

Situation #4 – What can I do when trainees tell me that their employer is not following the WPS regulations? They would like me to do something about it but in a way that won't get them in trouble.

Trainer A - If trainees have concerns about their workplace conditions or their employers' compliance with the WPS, be supportive by listening to their concerns. As appropriate, encourage them to discuss their concerns with their employers, appropriate regulatory agencies, or farmworker-oriented social service agencies. Keep in mind that agricultural workers may have concerns about possible employer retaliation. Remain neutral and avoid expressing personal opinions you may have about a particular situation. It is also possible that the employer's only knowledge about the WPS is that his or her employees must be trained. If you feel comfortable doing so, invite the employer to a pesticide safety training session. You can also offer the employer a "compliance assistance" visit to discuss any WPS requirements that might be new to the employer. Bring along an extra copy of the How to Comply Manual and other materials to leave with the employer.

Trainer B – Remind them that the contact information for the regulatory agency is listed at the central posting information site. They can contact the agency to explain the situation and their concerns. Many agencies allow the caller to remain anonymous.

Trainer C - Encourage them to talk to their supervisor about their concerns and if things do not change, provide participants with contact information of local authorities to address their concerns.

Additional Trainer Resources***Situation #4 – Who can I contact if I have questions or need resources for workers, handlers, or their employers?***

The following is a list of organizations and websites that may be helpful.

1. State pesticide regulatory agencies

npic.orst.edu/reg/state_agencies.html

2. Tribal pesticide regulatory agencies

npic.orst.edu/reg/tribes.html

3. University Cooperative Extension Pesticide Safety Education Program

npic.orst.edu/pest/countyext.htm

4. American Association of Pesticide Safety Educators (AAPSE)

aapse.ext.vt.edu

5. Federal and Regional Environmental Protection Agency (EPA)

npic.orst.edu/epamlr.html

6. Pesticide Educational Resources Collaborative (PERC)

pesticideresources.org

7. Migrant clinician's network, or similar organizations

migrantclinician.org

8. Farmworker organizations or associations

afop.org

9. State Contacts for Health Departments

npic.orst.edu/shemlr.html

10. State Contacts for Information about the Worker Protection Standard in Agriculture & Forestry

npic.orst.edu/wpsmlr.html

The following is a list of additional agencies or organizations that may be able to provide information and services.

1. State agencies that regulate Farm Labor Contractors
2. Rural health clinics
3. Social service agencies, which might provide services to farmworkers and their families

Trainers can find WPS training materials and supplemental pesticide safety and use information through the following websites.

1. PERC WPS Inventory of Training Resources

www.pesticideresources.org/wps/inventory.html

2. EPA Safety Information Related to the Worker Protection Standard

epa.gov/pesticide-worker-safety

3. National Pesticide Information Center

npic.orst.edu

4. National Pesticide Applicator Certification Core Manual, 2014

Note: This manual does not include WPS-specific information. However, it is a good resource for trainers who would like additional information about pesticide safety.

nasda.org/9381/Foundation/11379/11383/30485.aspx

Glossary

Acaricide — A pesticide used to control mites.

Active ingredient — Any substance that will prevent, destroy, repel, or mitigate any pest, or that functions as a plant regulator, desiccant, defoliant, synergist, or nitrogen stabilizer.

Acute illness — An illness that becomes apparent soon after an exposure to a pesticide occurs.

Acute onset — The commencement of symptoms of pesticide-related injury that appear soon after the exposure incident.

Agricultural employer — Any person who is an owner of, or is responsible for the management or condition of, an agricultural establishment, and who employs any worker or handler for a salary or wages (financial compensation).

Agricultural establishment — Any farm, forest operation, or nursery engaged in the outdoor or enclosed space production of agricultural plants. An establishment that is not primarily agricultural is an agricultural establishment if it produces agricultural plants for transplant or use (in part or their entirety) in another location instead of purchasing the agricultural plants.

Agricultural plant — Any plant, or part thereof, grown, maintained, or otherwise produced for commercial purposes, including growing, maintaining or otherwise producing plants for sale, trade, for research or experimental purposes, or for use in part or their entirety in another location. Agricultural plant includes, but is not limited to, grains, fruits and vegetables; wood fiber or timber products; flowering and foliage plants and trees; seedlings and transplants; and turf grass produced for sod. Agricultural plant does not include pasture or rangeland used for grazing.

Agricultural worker — Any person, including a self-employed person, who is employed for a salary or wages (financial compensation) and who is performing activities relating to the production of agricultural plants on an agricultural establishment. See definitions for worker and handler.

Agricultural worker training — Specific training mandated by the U.S. Environmental Protection Agency to assist agricultural workers in protecting themselves from pesticide and pesticide residues when they work in areas that have received pesticide applications.

Application exclusion zone (AEZ) — The area surrounding the application equipment that should be free of all persons other than appropriately trained and equipped handlers during pesticide applications.

Attractant — A substance that attracts a specific species of pest. Attractants are considered to be pesticides when they are manufactured to attract pests for trapping or are used in poisoned bait.

Brand name — The registered or trade name given to a pesticide by its manufacturer or formulator. A specific pesticide may be sold under several brand names.

Cardiopulmonary resuscitation (CPR) — A procedure designed to restore normal breathing after breathing and heartbeat has stopped.

Caution — The signal word used on labels of pesticides having the least capacity for hazards.

Certified applicator — A person who is certified to use or supervise the use of any restricted-use pesticide covered by his certification.

Chemical name — The official name given to a chemical compound to distinguish it from other chemical compounds.

Chemigation — The process of applying pesticides or fertilizers through irrigation systems.

CHEMTREC — A chemical industry-supported organization that provides assistance and advice on pesticide emergencies. The telephone number of CHEMTREC is 800-424-9300.

Chronic illness — An illness that will last for long periods of time. Cancer, respiratory disorders, and neurological disorders are examples of chronic illnesses that have been associated with exposures to some types of pesticides.

Chronic onset — The commencement of symptoms of pesticide poisoning that occur days, weeks, months, or years after the actual exposure.

Closed system — An engineering control used to protect handlers from pesticide exposure hazards when mixing and loading pesticides.

Commercial pesticide handler employer (CPHE) — Any person, other than an agricultural employer, who employs any handler to perform handler activities on an agricultural establishment. A labor contractor who does not provide pesticide application services or supervise the performance of handler activities, but merely employs laborers who perform handler activities at the direction of an agricultural or handler employer, is not a commercial pesticide handler employer.

Commercial pesticide handling establishment — Any enterprise, other than an agricultural establishment, that provides pesticide handler or crop advising services to agricultural establishments.

Common name — The recognized name of a pesticide, separate from the brand name and chemical name.

Compatible — When two or more chemicals can be mixed together without reducing the effectiveness or characteristics of any individual chemical in the mixture.

Confined area — An area, such as a building or greenhouse that may have restricted air circulation and, therefore, promotes the buildup of toxic fumes or vapors from a pesticide application.

Corrosive material — A chemical that reacts with metals or other materials. Some pesticides are corrosive and special handling requirements are needed when using these.

Crop advisor — Any person who is assessing pest numbers or damage, pesticide distribution, or the status or requirements of agricultural plants.

Danger — The signal word used on labels of pesticides that are highly toxic to people. This signal word is used on pesticides having an oral LD₅₀ less than 50 mg/kg or a dermal LD₅₀ less than 200 mg/kg.

Decontaminate — To remove or degrade a chemical residue from the skin or on a surface.

Defoamer — An additive that eliminates foaming of a pesticide mixture in a spray tank.

Defoliant — A pesticide used to remove leaves from target plants, often as an aid in harvesting the plant.

Dermal — Pertaining to the skin. One of the major ways pesticides can enter the body to possibly cause poisoning.

Desiccant — A pesticide that destroys target pests by causing them to lose body moisture.

Designated representative (DR) — Any persons designated in writing by a worker or handler to exercise a right of access on behalf of the worker or handler to request and obtain a copy of the pesticide application information and safety data sheets.

Directions for use — The instructions found on pesticide labels indicating the proper use of the pesticide product.

Dose — The measured quantity of pesticide. Often the size of the dose determines the degree of effectiveness, or, in the case of poisoning of nontarget organisms, the degree of injury.

Drift — The movement of pesticide dust, spray, or vapor away from the application site.

Early entry — Entry by a worker into a treated area on the agricultural establishment after a pesticide application is complete, but before any restricted-entry interval for the pesticide has expired.

Early-entry worker — An employee who enters a pesticide treated area on an agricultural establishment after a pesticide application is complete, but before any restricted-entry interval for the pesticide has expired, to conduct worker tasks.

Emergency exemption from registration — A federal exemption from regular pesticide registration sometimes issued when an emergency pest situation arises for which no pesticide is registered that has a tolerance on the crop in question.

Employ — To obtain, directly or through a labor contractor, the services of a person in exchange for a salary or wages, including piece-rate wages, without regard to who may pay or who may receive the salary or wages. It includes obtaining the services of a self-employed person, an independent contractor, or a person compensated by a third party, except that it does not include an agricultural employer obtaining the services of a handler through a commercial pesticide handler employer or a commercial pesticide handling establishment.

Employer — See definitions for agricultural employer and commercial pesticide handler employer.

Enclosed cab — A cab with a nonporous barrier that totally surrounds the occupant(s) of the cab and prevents dermal contact with pesticides that are being applied outside of the cab.

Enclosed space production — Production of an agricultural plant indoors or in a structure or space that is covered in whole or in part by any nonporous covering and that is large enough to permit a person to enter.

Establishment number — A number assigned to registered pesticides by the U.S. Environmental Protection Agency which indicates the location of the manufacturing or formulation facilities of that product.

Exposure — Contact with pesticides or pesticide residues by people, other organisms, or the environment.

Field worker — An employee of a farming operation who engages in agricultural production tasks. See definition for agricultural worker.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) — The Federal law that governs the registration, sale, and use of pesticide products in the U.S.

First aid — The immediate assistance provided to someone who has been exposed to a pesticide. First aid for pesticide exposure usually involves removal of contaminated clothing and washing the affected area of the body to remove as much of the pesticide material as possible. First aid is not a substitute for qualified medical treatment.

Foliage — The leaves of plants.

Formulation — A mixture of active ingredient combined with inert materials during the pesticide manufacturing process. Inert materials are added to improve the mixing and handling qualities of a pesticide.

Fumigant — Vapor or gaseous form of a pesticide used to penetrate porous surfaces for control of soil dwelling pests or pests in enclosed areas or storage.

Fungicide — A pesticide used for control of fungi.

Fungi (Fungus) — A multicellular lower plant lacking chlorophyll, such as a mold, mildew, or plant rust.

Hand labor — Any agricultural activity performed by hand or with hand tools that causes a worker to have substantial contact with plants, plant parts, or soil or other surfaces that may contain pesticide residues, except that hand labor does not include operating, moving, or repairing irrigation or watering equipment or performing crop advisor tasks.

Handler — Any person, including a self-employed person, who is employed by an agricultural employer or commercial pesticide handler employer and performs any of the following activities:

- Mixing, loading or applying pesticides,
- Disposing of a pesticide,
- Handling opened containers of pesticides, emptying, triple-rinsing, or cleaning pesticide containers according to pesticide product labeling instructions or disposing of pesticide containers that have not been cleaned,
- Acting as a flagger,
- Cleaning, adjusting, handling, or repairing the parts of mixing, loading or application equipment that may contain pesticide residues,
- Assisting with the application of pesticides,
- Entering an enclosed space after the application of a pesticide and before the inhalation exposure level listed in the labeling has been reached or one of the ventilation criteria established by WPS or the labeling has been met to operate ventilation equipment, monitor air levels, or adjust or remove coverings used in fumigation,
- Entering a treated area outdoors after application of any soil fumigant during the labeling-specified entry-restricted period to adjust or remove coverings used in fumigation, and
- Performing tasks as a crop advisor during any pesticide application or restricted-entry interval, or before the inhalation exposure level listed in the pesticide product labeling has been reached or one of the ventilation criteria established by WPS or the pesticide product labeling has been met.

Handler employer — Any person who is self-employed as a handler or who employs any handler.

Herbicide — A pesticide used to control weeds.

Hygiene — As it applies to pesticide exposure, hygiene involves washing exposed body areas promptly to remove pesticide residues.

Incompatible — Two or more materials that cannot be mixed or used together.

Immediate family — Is limited to the spouse, parents, stepparents, foster parents, father-in-law, mother-in-law, children, stepchildren, foster children, sons-in-law, daughters-in-law, grandparents, grandchildren, brothers, sisters, brothers-in-law, sisters-in-law, aunts, uncles, nieces, nephews, and first cousins. “First cousin” means the child of a parent’s sibling, i.e., the child of an aunt or uncle.

Inert ingredient — Any substance other than an active ingredient that is intentionally added to a pesticide product, such as solvents, stabilizers, spreaders or stickers, preservatives, surfactants, defoamers, etc.

Insect growth regulator (IGR) — A type of pesticide used for control of certain insects. Insect growth regulators disrupt the normal process of development from immature to mature life stages.

Insecticide — A pesticide used for the control of insects. Some insecticides are also labeled for control of ticks, mites, spiders, or similar pests.

Labeling — The pesticide label and all associated materials, including supplemental labels, and manufacturer’s information.

Labor contractor — A person, other than a commercial pesticide handler, who employs workers or handlers to perform tasks on an agricultural establishment for an agricultural employer or a commercial pesticide handler employer.

LC₅₀ — The lethal concentration of a pesticide that will kill half of a test animal population. LC₅₀ values are given in micrograms per milliliter of air or water (mg/ml).

LD₅₀ — The lethal dose of a pesticide, applied to the skin or taken internally, that will kill half of a test animal population. LD₅₀ values are given in milligrams per kilogram of test animal body weight (mg/kg).

Long-term health problem — A pesticide-related illness or disease which may extend over months, years, or a lifetime.

Medical facility — A clinic, hospital, or physician's office where immediate medical care for pesticide-related illness or injury can be obtained.

Miticide — A pesticide used to control mites.

Mitigate — The process of making a problem less severe.

Mouth-to-mouth resuscitation — Rescue breathing, given mouth-to-mouth, to assist or restore breathing to a person who is not breathing or is experiencing breathing difficulty.

Nematicide — A pesticide used to control nematodes.

Nematode — Elongated, cylindrical, nonsegmented worms. Nematodes are commonly microscopic; some are parasites of plants or animals.

No observable effect level (NOEL) — The NOEL is the maximum dose or exposure level of a pesticide that produces no noticeable toxic effect on test animals.

Ocular — Pertaining to the eye. This is one of the routes of entry of pesticides into the body.

Oral — Pertaining to the mouth. This is one of the routes of entry of pesticides into the body.

Offsite movement — Any movement of a pesticide from the location where it was applied. Offsite movement occurs through drift, water runoff, crop harvest, blowing dust, and by being carried away on people, animals, or equipment.

Outdoor production — Production of an agricultural plant in an outside area that is not enclosed or covered in any way that would obstruct the natural airflow.

Owner — Any person who has a present possessory interest (fee, leasehold, rental, or other) in an agricultural establishment. A person who has both leased such an agricultural establishment to another person and granted that same person the right and full authority to manage and govern the use of such an agricultural establishment is not an owner under the WPS.

Personal protective equipment (PPE) — Devices and garments that protect handlers from exposure to pesticides. These include coveralls, eye protection, gloves and boots, respirators, aprons, and hats.

Pesticide — Any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, nematodes, fungi, bacteria, or weeds, or any other forms of life declared to be pests; and any other substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

Pesticide use hazard — The potential for a pesticide to cause injury or damage during handling or application.

Plant growth regulator (PGR) — A pesticide used to regulate or alter the normal growth of plants or development of plant parts.

Posting — The placement of warning signs around a pesticide treated area, if required by the pesticide label or by the WPS based on the length of the REI. This serves to provide information about treated areas under an REI.

Precautionary statement — The section on pesticide labels where human and environmental hazards are listed. Personal protective equipment requirements are listed here, as well as first aid instructions and information for physicians.

Protective clothing — Garments that cover the body, including arms and legs.

Registration number — Identification numbers assigned by the U.S. Environmental Protection Agency and found on pesticide labels.

Repellent — A pesticide used to keep target pests away from a treated area by saturating the area with an odor that is disagreeable to the pest.

Residue — Traces of pesticide that remain on treated surfaces after a period of time.

Respiratory equipment — A device that filters out pesticide dusts, mists, and vapors to protect the wearer from respiratory exposure during mixing and loading, application, or while entering treated areas before the restricted-entry interval expires.

Restricted-entry interval (REI) — A period of time that must lapse between application of an agricultural pesticide and when it is safe to allow agricultural workers into the treated area without requiring they wear personal protective equipment and receive early-entry worker information.

Restricted-use pesticide (RUP) — A highly hazardous pesticide that can only be purchased, possessed or used by a person who is a certified applicator or under the supervision of a certified applicator.

Restricted-use statement — A statement on a pesticide label that restricts the use of that pesticide to specific areas or by designated individuals.

Rodenticide — A pesticide used for control of rats, mice, gophers, squirrels, and other rodents.

Route of exposure — The way a pesticide gets onto or into the body. The four routes of exposure are dermal (on or through the skin), ocular (on or in the eyes), respiratory (into the lungs), and oral (through swallowing).

Runoff — The liquid spray material that drips from the foliage of treated plants or from other treated surfaces. Also the rainwater or irrigation water that leaves an area.

Safety data sheet (SDS) — A document available from the manufacturer that provides information on chemical properties, toxicity, first aid, hazards, personal protective equipment, and emergency procedures to be followed in the event of a spill, leak, fire, or transportation crisis.

Sensitization — An allergic reaction to pesticides.

Signal word — One of three words (danger, danger-poison, warning, or caution) found on pesticide labels to indicate the relative hazard of the chemical.

Skin absorption — The passage of pesticides through the skin into the blood stream or other organs of the body.

Supplemental label — Additional instructions and information that are not found on the pesticide label but is considered to be part of the pesticide labeling.

Symptom — Any abnormal condition that can be caused by a pesticide exposure that can be seen or felt or can be detected by examination or laboratory tests.

Tolerance — The maximum amount of pesticide residue that may legally remain on or in food or feed commodities at harvest or slaughter; established by the EPA for each crop and every pesticide used on a specific crop.

Toxicity — The potential the pesticide has for causing harm.

Toxicity testing — A process in which known doses of a pesticide are given to groups of test animals and the results observed.

Training record — A document intended to record the date, type of pesticide safety training, and names of the attendees. This requirement varies from state to state; contact state and local pesticide regulatory agencies for guidance.

Treated surface — The surface of plants, soil, or other items that were treated with pesticides.

Treated area — Any area to which a pesticide is being directed or has been directed. In some places, the manual further limits the definition of a treated area as any site where a pesticide has been applied and a REI has been in effect within the last 30 days.

Use — As in “to use a pesticide” means any of the following:

- Pre-application activities, including, but not limited to:
 - Arranging for the application of the pesticide,
 - Mixing and loading the pesticide,
 - Making necessary preparations for the application of the pesticide, including responsibilities related to worker notification, training of workers or handlers, providing decontamination supplies, providing pesticide safety information and pesticide application and hazard information, use and care of personal protective equipment, providing emergency assistance, and heat stress management.
- Application of the pesticide.
- Post-application activities intended to reduce the risks of illness and injury resulting from handlers’ and workers’ occupational exposures to pesticide residues during and after the restricted-entry interval, including responsibilities related to worker notification, training of workers or early-entry workers, providing decontamination supplies, providing pesticide safety information and pesticide application and hazard information, use and care of personal protective equipment, providing emergency assistance, and heat stress management.
- Other pesticide-related activities, including, but not limited to, transporting or storing pesticides that have been opened, cleaning equipment, and disposing of excess pesticides, spray mix, equipment wash waters, pesticide containers, and other pesticide containing materials.

Warning — The signal word used on labels of pesticides having an oral LD_{50} between 50 mg/kg and 500 mg/kg and a dermal LD_{50} between 200 mg/kg and 2000 mg/kg.

Worker — Any person, including a self-employed person, who is employed for a salary or wages (financial compensation) and performs activities directly relating to the production of agricultural plants on an agricultural establishment. See agricultural worker.

Worker housing area — Any place or area of land on or near an agricultural establishment where housing or space for housing is provided for workers or handlers by an agricultural employer, owner, labor contractor, or any other person responsible for the recruitment or employment of agricultural workers.

Worker Protection Standard (WPS) — Regulation in 40 CFR Part 170 which contains a national standard designed to reduce the risks of occupational illness or injury resulting from worker and handler exposure to pesticides used in the production of agricultural plants on farms or in nurseries, greenhouses, and forests and also from the accidental exposure of workers and other persons to such pesticides. It requires workplace practices like the pesticide safety training of agricultural workers and pesticide handlers, central information postings, and procedures for responding to exposure-related emergencies.



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/). © 2016 The Regents of the University of California, Davis campus. For information contact PERCsupport@ucdavis.edu.

Pesticide Educational Resources Collaborative

UC Davis Extension
1333 Research Park Dr.
Davis, CA 95618
pesticideresources.org



U.S. Environmental Protection Agency
Office of Pesticide Programs (MC 7506C)

1200 Pennsylvania Ave., NW
Washington, DC 20460
epa.gov/pesticides

EPA 730-B-16-001
Publication date:
November 2016

