

# ADDITIONAL WPS TRAINING TOPICS FOR HANDLERS

## Pesticide Labels

### CHAPTER 6-1

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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.

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**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**

**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			
	Layby	2 pints	25 to 50	5 to 15			
	Layby to boll opening	2 pints	—	5 to 15			

**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.

**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"> <li>• Emulsifiable concentrates</li> <li>• Flowables</li> <li>• Liquid baits and gels</li> <li>• Solutions</li> </ul>	<ul style="list-style-type: none"> <li>• Dusts</li> <li>• Wettable powders</li> <li>• Pellets</li> <li>• Granules</li> </ul>	<ul style="list-style-type: none"> <li>• Aerosols</li> <li>• Foggers</li> <li>• Soil fumigants</li> <li>• Fumigants for grain bin pests or burrowing rodents</li> </ul>

**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

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## 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.



Photo courtesy of Penn State Extension, The Pennsylvania State University

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.

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

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## 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><b>Step 1</b></p> <p>Pour dry soil or an absorbent material like cat litter around the spill to prevent it from spreading.</p>	<p><b>Step 1</b></p> <p>Use a shovel to remove the contaminated soil.</p>	<p><b>Step 1</b></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><b>Step 1</b></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><b>Step 2</b></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><b>Step 2</b></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><b>Step 2</b></p> <p>Once contained, sweep up the moistened pesticide with a broom and dust pan.</p>	<p><b>Step 2</b></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><b>Step 3</b></p> <p>Put the spilled material and any contaminated cleanup supplies into sealable plastic containers.</p>	<p><b>Step 3</b></p> <p>Place the soil in sealable plastic buckets.</p>	<p><b>Step 3</b></p> <p>Place in a sealable plastic container.</p>	
<p><b>Step 4</b></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><b>Step 4</b></p> <p>Label the buckets with information about the pesticide.</p>	<p><b>Step 4</b></p> <p>Label the bag with information about the pesticide.</p>	
	<p><b>Step 5</b></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><b>Step 5</b></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.

<b>Container Size</b>	<b>Amount of Water for Rinsing</b>
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.

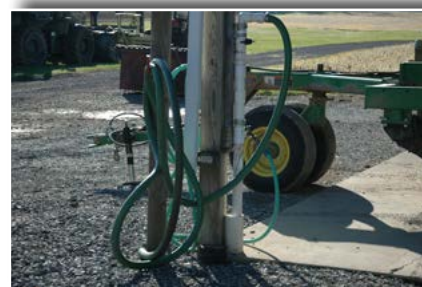


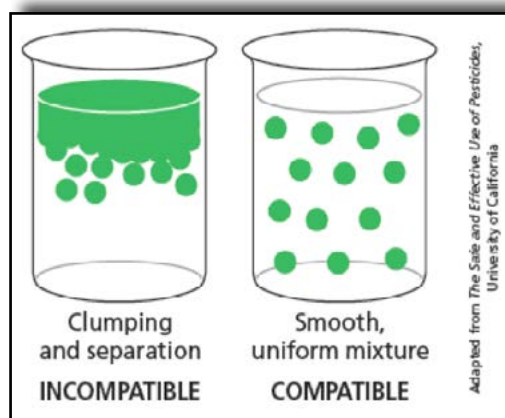
Photo courtesy of Penn State Extension, The Pennsylvania State University

### 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

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## 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.

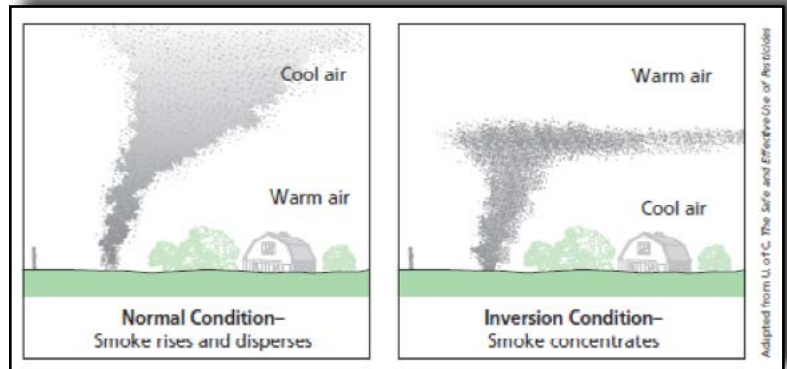
**Table 6.3: Impacts of Applying Pesticides During Inclement Weather Conditions**

<b>Weather</b>	<b>Impact on Pesticide Application</b>	<b>Impact on Environment</b>
<b>Extreme Heat</b>	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.
<b>Extreme Cold</b>	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.
<b>Rain</b>	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.
<b>Wind and Fog</b>	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

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## 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 <sup>a</sup>	
Category (symbol) <sup>b</sup>	Color Code <sup>c</sup>
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**

<b>Pesticide is applied through aerial application, air blast application, or as a fumigant, smoke, mist or fog.</b>		
<b>Nozzle Size</b>	<b>Distance from Nozzle to Ground</b>	<b>Restrictions and Actions Taken</b>
<b>All Droplet Sizes</b>	Any distance from the ground.	<p>Handlers must make sure no one is within <b>100 feet of the application equipment.</b></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>
<b>All other methods of application not listed above</b>		
<b>Nozzle Size</b>	<b>Distance from Nozzle to Ground</b>	<b>Restrictions and Actions Taken</b>
<b>Fine to Small Droplets</b>	Any distance from ground	<p>Handlers must make sure no one is within <b>100 feet of the application equipment.</b></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>
<b>Medium to Coarse Droplets</b>	Greater than 12" from the ground	<p>Handlers must make sure no one is within <b>25 feet of the application equipment.</b></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>
<b>Medium to Coarse Droplets</b>	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

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## 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

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**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**

<b>ALWAYS</b>	<b>NEVER</b>
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](https://tpsalliance.org) for more information.



Photo courtesy of Jennifer Weber, Arizona Department of Agriculture