



# PURDUE PESTICIDE PROGRAMS

Purdue University Cooperative Extension Service

## Pesticides and Container Management

*Fred Whitford and Andrew G. Martin, Purdue Pesticide Programs*

*Joseph D. Becovitz, Office of the Indiana State Chemist*

*Edited by*

*Arlene Blessing, Purdue Pesticide Programs*

*Frank Koontz, Russ Merzdorf, Agricultural Communication Service*

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Proper management of pesticide containers generally is a straightforward procedure, but it requires careful thought and a proper attitude. Appropriate transportation and storage of pesticides help protect the environment, assure worker safety, save money, and avoid legal problems.

## Transporting Pesticides Safely

Once you purchase a pesticide, you are responsible for its safe transportation. Accidents can occur when transporting pesticides even a short distance. Careless transportation can result in broken containers and spills that might contaminate the environment or cause personal injury. Know how to prevent transportation problems, and be prepared for an emergency.

### Transportation

- Vehicles *must* be in safe operating condition.
- The back of an open pickup truck is the best mode. Vans, minivans, and station wagons, although less than ideal, may be used if the windows are left open to prevent vapor accumulation.
- *Pesticides should **not** be transported in compact or mid-size automobiles* except as a last resort. If a car must be used, place the containers in the trunk and make certain that both the trunk and passenger space are well ventilated; i.e., leave the trunk lid ajar and open the windows.
- Travel at a reduced speed and, when necessary, use slow-moving-vehicle emblems.
- *Never*
  - transport pesticides in the passenger space of a closed vehicle;
  - allow passengers or pets to ride with the pesticides;
  - leave an unsecured vehicle unattended if it contains pesticides.



**Transporting pesticides**

*Always transport pesticides in an open or well-ventilated vehicle. (Photo courtesy of Illinois Cooperative Extension Service)*

### Loading and Unloading

- Inspect each container before loading, and confirm that
  - labels are attached and legible;
  - all caps are tightly closed and properly sealed;
  - the outside is not contaminated with pesticide;
  - a current Material Safety Data Sheet (MSDS) accompanies each pesticide.
- Always transport pesticides in their original, labeled containers.
- Avoid carrying glass containers; if there is no alternative, wrap them in foam packing materials to prevent breakage.
- Protect pesticide bags from punctures, tears, and moisture during transport.
- Secure all pesticide containers to prevent rolling and sliding.
- Avoid transporting fertilizer, seed, feed, drugs, clothing, and foodstuffs with pesticides.
- Transfer pesticide containers to an appropriate storage facility immediately upon reaching your destination.

# Management Practices for Pesticide Storage Facilities

Safety is the key element in storing pesticides. Proper storage will protect the environment and the people who live and work near the storage area. Proper storage of pesticides

- prolongs chemical shelf life;
- reduces risk to people and livestock;
- eliminates surface contamination;
- prevents ground water contamination.

It is best to build and/or designate a separate building specifically for storage of large quantities of pesticides. If a separate facility is not possible, a precise area within an existing building should be specified for pesticide storage. The following guidelines will help ensure safe and environmentally friendly storage of pesticide products.

## Site

- Pesticide storage facilities
  - must be located away from human and livestock habitat;
  - must not be constructed in areas that are known to flood;
  - should be built as separate structures dedicated for pesticide storage;
  - should be situated so that runoff from spills and leaks cannot contaminate surface water, drains, wells, etc.;
  - should be at least 100 feet from sensitive areas such as wellheads.
- Commercial dealers and applicators should consider these conditions when siting a storage facility:
  - prevailing wind
  - proximity of surrounding commercial and residential areas
  - potential fire hazard
  - availability of emergency response services



*Ideally, pesticides should be stored in a separate building.*



*Always post and lock pesticide storage areas.*

## Storage Area Exterior

- Secure the storage facility (separate building, room, cabinet) against theft, vandalism, and unauthorized access.
- Post the storage area with warning signs labeled “DANGER - PESTICIDES - KEEP OUT” on walls, doors, and windows. Signs should be legible at least 50 feet from the building.
- Store drums on sides to avoid accumulation of rainwater in top or bottom recessed areas.

## Storage Area Interior

- Pesticides should always be stored on the ground floor. Buildings used for pesticide storage should not contain office space unless pesticides can be completely isolated and good ventilation can be maintained.

- The interior of the storage area
  - should be well-lighted and dry;
  - should have a cement floor to facilitate cleanup of spills (maintain floor to prevent cracking);
  - should not contain floor drains or sump pumps (floor drains, if present, should be completely sealed);
  - should be equipped with exhaust fans to prevent vapor accumulation and heat buildup (vent fans so that no people, animals, or plants are exposed to the fumes);
  - should be insulated to help maintain an even room temperature (pesticides should never freeze or become excessively hot; specific temperature information generally is provided on the pesticide label; the range normally recommended for liquid pesticides is 40-100° F);
  - should contain metal shelves with lips for storing chemicals off the floor (wooden shelves are unacceptable because they can absorb spilled pesticides; large metal drums and nonmetallic containers should be kept on pallets);
  - should include an area for storing properly rinsed, empty containers awaiting disposal.
- Store liquid pesticides and highly toxic pesticides (those with “DANGER” on the label) on low shelves to minimize the potential for exposure if the containers are broken or begin to leak. Containers should not extend beyond the shelving.
- Separate pesticides by classification (herbicides, insecticides, fungicides, etc.) within the storage facility to prevent cross-contamination and decrease the likelihood of accidental misuse.
- Never keep seed, fertilizer, feed, drinking water, veterinary supplies, protective equipment, or foodstuffs in a pesticide storage area.

**Emergency Preparedness and Community Right-to-know**

Title III of the Superfund Amendments and Reauthorization Act (SARA), also called the Emergency Planning and Community Right-To-Know Act of 1986, requires that the storage of certain specified extremely hazardous substances be reported to local emergency planning commissions. While SARA, Title III, primarily affects pesticide manufacturers and commercial dealers, individuals storing large quantities of certain pesticides may also have to comply with the law. For further information, consult *Pesticides and Community Right-to-Know*, PPP-32.

**Safety Tips for the Storage Area**

- Always store pesticides in their original containers with the original label attached. However, if a pesticide container is leaking, transfer the chemical to a sturdy new container that can be sealed. Attach the original label to the new container, or label the new container with specific information *immediately*.
- Purchase only the quantities of pesticides required for a single season to minimize the need for off-season storage.
- Keep the storage site neat and tidy. Pesticide handlers must be able to
  - see pesticide labels;
  - detect leakage or corrosion;
  - get to leaks or spills to clean them up.
- Store protective equipment and clothing in a nearby location that provides immediate access but is away from pesticides and their fumes, dusts, or possible spills.
- Provide an immediate supply of clean water, and have an eyewash dispenser immediately available for emergencies. Soap and a first aid kit are also necessary.
- Establish procedures to control, contain, and clean up spills. Familiarize everyone with the procedures.

- Provide tools (shovel, broom, dustpan) and absorbent materials (clay, sawdust, shredded paper) to clean up spills.
- Mark pesticide containers with the date of purchase and rotate inventory to ensure that the oldest material is used first.
- Keep
  - an accurate, up-to-date stored pesticide inventory;
  - a file of product labels available for reference;
  - a file of Material Safety Data Sheets;
  - a building floor plan showing the exact location of pesticides;
  - emergency phone numbers (police, fire, poison control center, Indiana Department of Environmental Management Emergency Response) at the storage area and in the office.
- Maintain an inventory of all safety kits and signs.
- Develop a fire emergency plan in consultation with the local emergency planning committee and fire, police, and sheriff's departments. Notify the appropriate officials of the types of pesticides and quantities stored.
- Know and follow local fire codes. Consult with local fire authorities regarding the best methods for fire protection: water, foam, dry chemical, halon, or carbon dioxide.

#### EDUCATION INFORMATION

##### **Purdue University Cooperative Extension Service**

Purdue Pesticide Programs, (765) 494-4566

Local Extension Agent, (888) 398-4636

#### REGULATORY INFORMATION

##### **State Regulatory Information, and Information on Pesticide Applicator Certification & Licensing**

Office of the Indiana State Chemist, (765) 494-1594

##### **Federal Regulatory Information**

U.S. Environmental Protection Agency, Region V,  
(312) 353-2000

#### EMERGENCY INFORMATION

**Hot Line:** Chemtrec, (800) 424-9300

**Accidental poisoning:** Indiana Poison Center,  
(800) 858-7378

**Spills:** Indiana Department of Environmental  
Management, (888) 233-7745

## Removing Pesticide Residues from Containers

Product labels direct applicators to triple rinse each empty pesticide container, pour the rinse solution (rinsate) into the spray tank mixture, and use the product according to the label. Triple rinsing—washing out each pesticide container three times—is a procedure that has weathered the storms of regulatory change for nearly 20 years. This method reduces the potential for environmental damage by converting pesticide containers from hazardous waste to solid waste. Also, triple rinsing ensures that all of the pesticide product is incorporated into the tank mixture so that applicators get their money's worth.

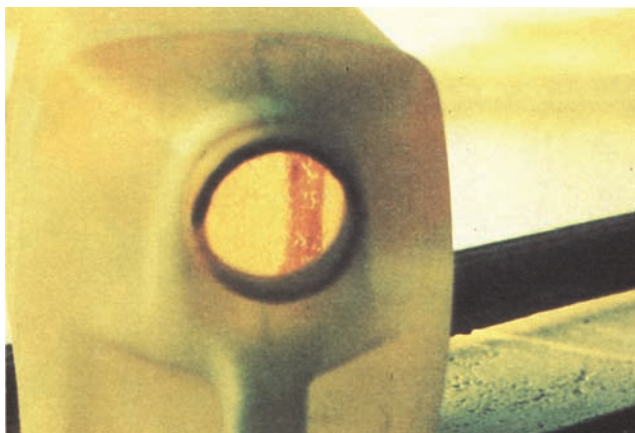
At a time when pesticide applicators are overwhelmed by scientific information, the benefits from simple techniques such as rinsing pesticide containers often are overlooked. Examine the consequences of *improper* management of pesticide containers:

- Drinking water can be contaminated if improperly rinsed containers are deposited in landfills.
- Local, state, and federal laws may be violated, causing legal problems for the applicator.
- Expensive material can be left in each unrinsed container.

Triple rinsing is defined by a 1974 federal regulation as the “flushing of containers three times, each time using a volume of the normal diluent equal to approximately ten percent of the container’s capacity, and adding the rinse liquid to the spray mixture.” Pesticide labels on metal, plastic, and glass containers reflect this federal definition when directing applicators to triple rinse or the equivalent. The following instructions explain two commonly accepted residue removal techniques: triple rinsing and pressure rinsing.

## Triple Rinsing

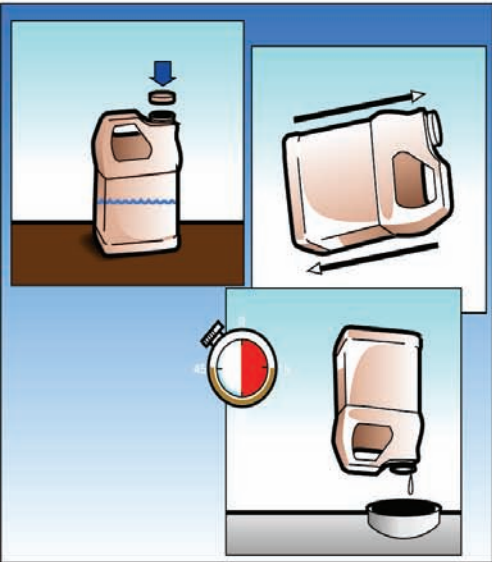
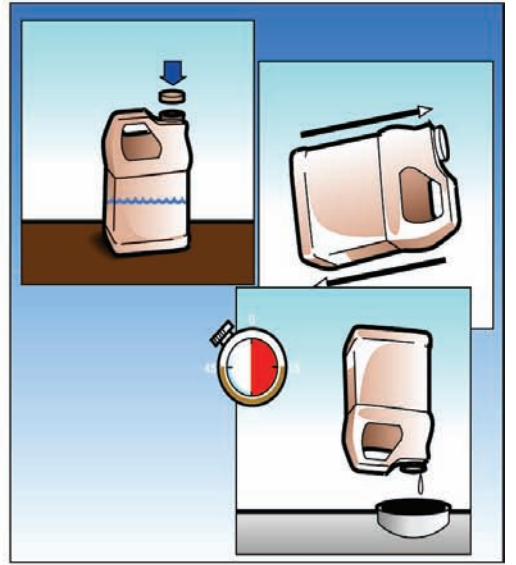
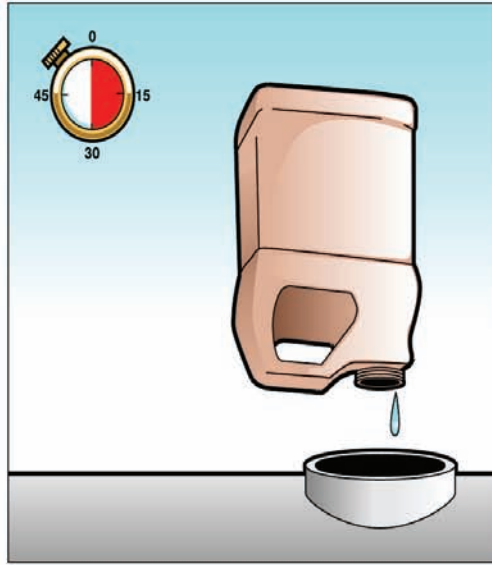
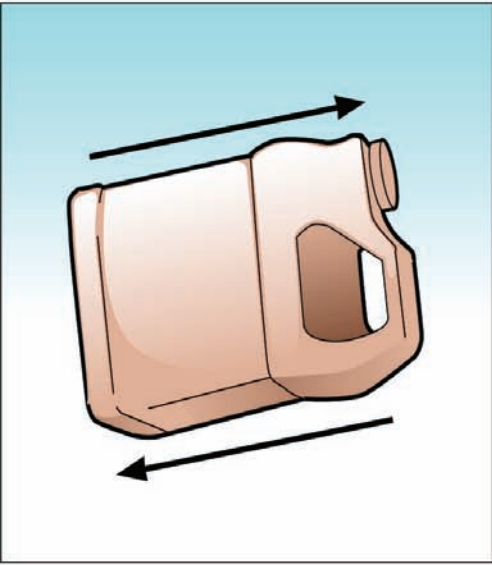
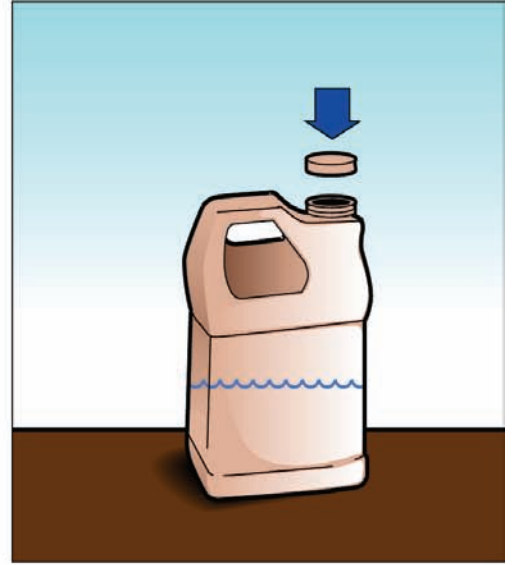
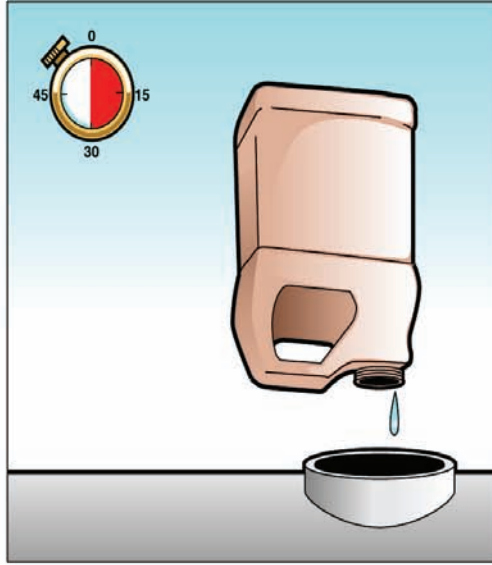
1. The same personal protective equipment worn while handling the pesticide concentrate during the mixing process should be worn while rinsing containers.
2. The procedure for rinsing containers should begin immediately after emptying the contents into the application equipment. Allowing the residue to dry in the empty containers for even a few hours will reduce the effectiveness of the procedure. If you can't rinse them immediately, leave the caps on the containers until you are prepared to do so. This will help prevent the pesticide from drying inside the containers.
3. Pour the pesticide into your spray solution and let the container drain for an additional 30-60 seconds. This step greatly enhances your ability to remove the residue during the triple rinsing process.
4. Add clean water (or other diluent specified on the label) equal to 10-25 percent of the container's volume and secure the cap.
5. Shake or roll the container so that the interior surfaces will be rinsed.
6. Pour the rinsate into the spray mix and allow the container to drain for an additional 30 seconds. This completes the first cycle.
7. Repeat the procedures outlined in steps 4-6. This completes the second cycle.
8. Again, repeat steps 4-6. If the rinsate still appears cloudy or milky, keep repeating until the water looks clear, indicating a thorough rinse. If the pesticide is an emulsifiable concentrate (EC) or a liquid flowable (LF), multiple rinses are always advisable.
9. Render all plastic and metal containers unusable by puncturing or crushing.
10. The final step is to dispose of the containers in a sanitary landfill or offer them for recycling.



*Containers in which pesticides have been allowed to dry are difficult—if not impossible—to rinse properly.*



*Repeat the rinsing process until the rinsate looks clear. Note that the black tape behind these jars of rinsate becomes more clearly distinguishable as the pesticide residue diminishes with each rinse. (Photo courtesy of U.S. Environmental Protection Agency)*

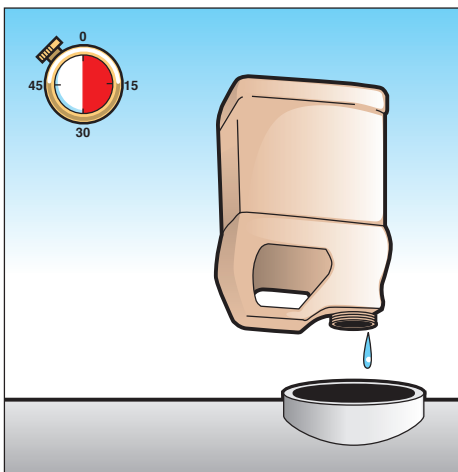


## Pressure Rinsing

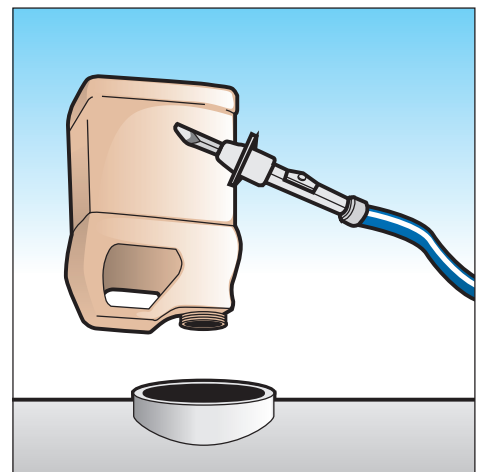
1. The same personal protective equipment worn while handling the pesticide concentrate during the mixing process should be worn while rinsing containers.
2. The pressure rinsing procedure should begin immediately after emptying the contents into the application equipment. If you can't rinse the containers immediately, leave the caps on until you are prepared to do so. This will help prevent the pesticide from drying inside the containers.
3. Pour the pesticide into the spray solution and drain the container for an additional 30-60 seconds.
4. Keep the container positioned over the spray tank as if pouring the concentrate. Puncture the bottom of the metal container or the side of the plastic container with the probe device (see manufacturer's suggestions for specific instructions and guidelines).
5. Allow water to flow into and through the empty pesticide container until the water is clear. Slowly rotate the probe back and forth. This procedure takes 30-60 seconds.
6. Plastic and metal containers are rendered unusable by pressure rinsing.
7. Dispose of the containers in a sanitary landfill or offer for recycling.



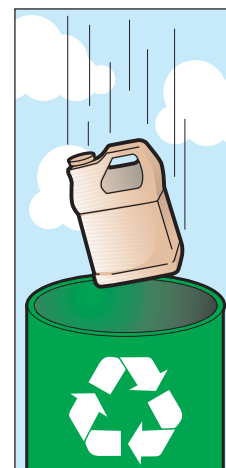
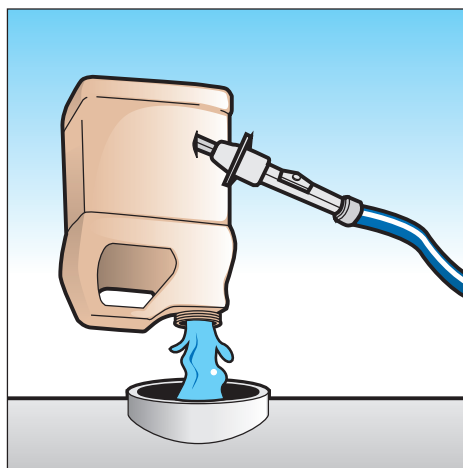
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## When Rinsing Is Not an Option

Triple and pressure rinsing pesticide containers are not viable options in certain situations. Thorough removal of pesticide products packaged in bags and aerosol spray cans may be accomplished by taking the following steps.

- *Multi-layered Bags*

1. Empty the contents of the bag into the tank.
2. Shake the bag to remove as much product as possible.
3. Cut the sides and folds to fully open the bag, and add any remaining pesticide to the tank.
4. Dispose of the cut and flattened bag in a sanitary landfill.

- *Aerosol Spray Cans*

1. Spray remaining contents on the proper site as directed by the label.
2. Deposit the empty container in a sanitary landfill.

## Pesticide Container Disposal

The pesticide user is responsible for seeing that pesticide waste such as unused chemicals and empty pesticide containers is disposed of properly. The pesticide label is the first source of disposal information and options, but it is important to recognize that the label may not always provide clear-cut advice and practical guidance. Furthermore, if the product is old, the label recommendations may be outdated and not legally appropriate. Disposal options greatly depend on container construction (metal, plastic, paper, glass) and the availability of facilities for disposing of or recycling the pesticide containers.

- *Availability of Suitable Landfills*

Properly rinsed pesticide containers generally can be deposited in landfills that accept common household trash. However, sites that accept household refuse generally are prohibited from accepting waste classified as hazardous by the federal Resource Conservation and Recovery Act. Since pesticide containers that are not properly rinsed fall into this category, pesticide applicators frequently have difficulty disposing of unrinsed or improperly rinsed containers.

- *Disposal on Private Land*

Federal laws generally do not prevent the burning or burying of containers on private property, but some state laws prohibit these disposal methods. In Indiana, open burning of pesticide containers is strictly prohibited; and farmers can no longer bury empty pesticide containers on their property unless they have a permit to do so issued by the Indiana Department of Environmental Management.

- *Metal Container Reconditioning*

Properly rinsed, metal containers have economic value as a source of scrap metal.



- *Plastic Container Recycling*

Recycling is a relatively new disposal option that is gaining in popularity. Indiana conducted two pilot recycling programs for plastic pesticide containers during the summer of 1992. Twenty thousand rinsed pesticide containers were reclaimed and diverted from landfill burial. To qualify for recycling, containers must be

- clean inside and out;
- free of unrecyclable plastic caps;
- free of all paper labels and plastic sleeves.

Plastics can be recycled into a number of products. For instance, some plastic containers are labeled “This jug contains plastic resins from pesticide containers recycled by farmers and others who care about our environment.” The plastic recovered from pesticide containers also might be used as fuel for cement kilns or to make flower pots, plastic fence posts, drainage tiles, guard rails, pallets, roadside sign posts, or sewage lines. Contact your county agricultural extension agent to find out if any recycling programs are available in your area.



- *High Temperature Incineration*

Properly designed and approved incinerators make possible the complete disposal of plastic containers.

- *Disposal Not Required*

Many novel pesticide packages do not require rinsing by the applicator. Closed system, returnable containers and water-soluble bags are exciting new approaches that will end the need for rinsing and disposing of pesticide containers.

## **Disposal of Excess Pesticides**

Ideally, the need for disposal of excess pesticides can be eliminated by planning the job and buying only the amount of product that is needed. If that is not feasible and the excess chemical cannot be stored safely, follow these disposal guidelines.

Small quantities of unused pesticides purchased for home use from drugstores, garden centers, hardware stores, etc., generally may be discarded in the household trash. However, the containers must be wrapped in newspaper and boxed before being placed in the garbage. Review pesticide labels for complete instructions.

Commercial applicators and farmers who may accumulate excess pesticides or diluents are limited to three options: continue to store them; remove them to a landfill specifically designated for pesticide disposal by the state or the Environmental Protection Agency; or, ideally, use them according to label directions for subsequent applications. Tox-away days are becoming a more popular disposal tool. Contact your county extension agent or the Office of the Indiana State Chemist to determine if any such programs are scheduled locally.

## Points to Remember

- Read and follow all label instructions. This includes directions for use, precautionary statements (hazards to humans, domestic animals, and endangered species), environmental hazards, rates of application, number of applications, reentry intervals, harvest restrictions, storage and disposal, and any specific warnings and/or precautions for safe handling of the pesticide.
- Wear appropriate protective clothing and equipment when working with pesticides.
- Rinse containers immediately after emptying because some pesticide residues will dry quickly and become difficult to remove. If the container cannot be rinsed immediately, replace the cap until it can be rinsed.
- Never reuse pesticide containers (rinsed *or* unrinsed).
- Contact the manufacturer, dealer, or business where pesticides were purchased to see if they will take back rinsed pesticide containers or unused concentrates.
- Never allow empty pesticide containers to accumulate where unauthorized people have access to them. Such containers may be dangerous to children, pets, livestock, and wildlife, as well as adults who might convert them to other uses.
- In the event of a pesticide spill, remove all persons from possible chemical exposure; control the spill; contain it by diking and absorbing liquid pesticides with dry material such as sawdust, kitty litter, or shredded paper; and report the spill.
- Post emergency telephone numbers in a prominent location.
- The proper transportation and storage of pesticides and the proper rinsing and disposal of empty pesticide containers demonstrate that applicators are competent professionals who are concerned about the environment.

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