PENNSTATE

College of Agricultural Sciences Cooperative Extension

Agricultural and Biological Engineering

C18

Recycling Plastic Pesticide Containers

Don Gilbert, Environmental Specialist, Pennsylvania Department of Agriculture
Tracy E. Garthe, Research Technician

Many members of the agricultural community are responding with a new answer to an old question: What can farmers do with empty pesticide containers? The answer: Recycle them!

As landfills close down, stricter laws have made locating new landfills difficult, especially ones that accept chemically contaminated wastes. To help deal with this dilemma, other ways to handle these wastes are being explored, specifically recycling. This shift towards more environmentally sound waste management can be seen in the agricultural industry by its efforts to recycle used pesticide containers. With agriculture in the United States generating nearly 60 million pounds of plastic containers per year, recycling provides an opportunity for managing this waste and a raw material supply for new products.

Preparation of Used Containers

The first and most important step to prepare these containers for recycling is to remove all pesticide residue. Containers must be properly cleaned by the applicator after the contents are emptied, either by pressure rinsing with a special nozzle or by triple rinsing. The types of containers accepted are #2 HDPE, containing EPA-registered pesticide products, or pesticide-related products such as surfactants, adjuvants, crop oils, and foaming agents. Many of these containers are derived from agricultural, turf, forestry, vegetative management, and specialty pest control operations. Single-use bottles and drums up to 55 gallons are accepted. It should be noted that homeowner pest control or herbicide containers are not accepted in these programs.

Both rinsing procedures require that the container cap be removed, washed, and disposed of according to label directions. While, the pesticide is carefully emptied into the spray tank, the container should be rotated to make sure trapped product flows out (approximately 30 seconds). The container is allowed to drip for an additional 30 seconds. Immediately after the container has been drained, either rinsing procedure should begin.

Pressure Rinsing

1. The pressure rinse nozzle is placed on a water hose. With the nozzle turned off, the water supply is turned on to check for leaks.

2. The container is held upside down at the spray tank opening so that the rinsate can drain into the spray tank. The tip guard is removed from the pressure rinse nozzle, and the tip of the nozzle is forced through the container's lower side, closest to the handle.

3. The water system pressure should be at least 40 psi, and the container is rinsed for at least 30 seconds. The nozzle is turned inside the container to assure all sides, including the handle, are rinsed. Rinsing continues until water draining from the container is clear. The nozzle remains inside the container the entire time.

4. The pressure rinse nozzle is turned off and removed from the rinsed container. All rinse water is drained into the spray tank.

5. After the residue on the outside of the container is carefully rinsed off, the container is stored in a dry area until transported for recycling.

Triple Rinsing

1. The empty container is filled 1/4 full with clean water. Replace the lid and shake the container to rinse all inside surfaces, including the handle.

2. The rinse water is drained into the spray tank until the flow becomes a drip. This procedure is repeated two more times, shaking in different directions to assure all remaining pesticide residue is removed.

3. After the exterior residue of the container is carefully rinsed, the container is stored in a dry area until transported for recycling.

Rinsing Pesticide Containers: Points to Remember

When rinsing pesticide containers, several factors must be kept in mind to provide the optimal safety and effectiveness.

* All pesticide label instructions should be followed precisely, and required personal protective equipment should be worn while rinsing.

* Once residue has time to dry and become caked on, it can be very difficult to remove. The best time to rinse is during the mixing and loading, because this allows the applicator to add the rinse water to the spray tank as a carrier for the finished spray mix.

* Empty pesticide containers, except for those that are designated as returnable or refillable, should never be reused for any purpose. If returnable or refillable containers are available, they should be used instead of single-use containers.

* A back-flow prevention device should be used when filling spray tanks or rinsing pesticide containers.

* If no mixing and loading pad is used, the pesticide application equipment should be cleaned and loaded at the application site. When mixing in the field, the location should be varied.

The Recycling Process

The containers are stored until they can be transported to a site that accepts them for recycling. The portion of the label that is glued to the container is acceptable, but booklets and plastic sleeves should be removed ahead of time by the applicator.

At the recycling site, containers will be inspected to ensure they are properly rinsed. Any containers with visible pesticide residue are rejected and returned to the applicator. These containers are reduced to chips by a granulator. The granules are sold to a manufacturer as feedstock for new products such as pesticide containers, fence posts, sign posts, and drain tiles. All pesticide containers are recycled through the Agricultural Container Recycling Council (ACRC) program.

The Benefits of Proper Rinsing

☺ **Rinsing reduces soil and water contamination.**

☺ **Rinsing can save money.**

☺ **Rinsing reduces ecological and health risks.**

Trouble Spots

Many of the drawbacks of recycling pesticide containers are the result of negative public perception and poor product design. To increase the willingness of recyclers to accept pesticide containers, research and education into the effects of pesticide residue on the recycling process needs to be conducted. Also, manufacturers of pesticide containers need to begin to "design for recycling." Industry should consider how the product will be used *and* how it will be managed after it has served its purpose.

There are several trouble spots that must be considered when starting a pesticide container recycling program.

Pesticides and Other Chemical Agents: Minimal information is available concerning the effects of pesticide residue on the recycling process and end products. Although the recycling process will typically render residue harmless, negative public perception makes many recyclers reluctant to accept products that were exposed to pesticides. ACRC studies show that products made from properly triple- or pressure-rinsed containers are 99.9% free of pesticide residues. Nonetheless, these plastics are strictly maintained in a separate delivery stream from general household materials, and ACRC regularly inspects the operations and records of manufacturers to assure compliance.

Energy Use: Though the pesticide industry is currently recycling these containers, the large amount of reprocessing energy may limit applications to low-value end products. Before containers can be reprocessed, a lot of human energy is used to dispose of the container caps, inspect containers for pesticide residue, and remove the labels.

Container Cap: Pesticide container caps are not usually recycled because they often contain caked-on pesticide residue. Instead, caps need to be properly discarded.

Storing the Containers: Plastic has a high heat value and is easily combustible. Precautions should be taken at the farm and drop-off location to reduce fire hazards when large quantities are present.

Status of Recycling Programs

Helping with state efforts to recycle used pesticide containers are members of the agricultural chemical industry who have organized the ACRC. This group was formed to distribute educational materials, to help with program establishment, and to provide contractors for granulating and transporting containers from site to the recycler, and to research and approve end-use products.

Currently, 48 states have pesticide container recycling programs, and this number is expected to grow. In 2004, 7.9 million pounds of containers were collected through state programs.

To locate a nearby pesticide container recycling location, contact:

Pennsylvania Dept. of Agriculture
(717) 705-5858
www.agriculture.state.pa.us/agriculture/cwp/view.asp?a=3&q=127445

Agricultural Container Recycling Council
(877) 952-2272
www.acrecycle.org

PSU
Revised 9/05
http://www.abe.psu.edu

The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University prohibits discrimination and harassment against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, or veteran status. Discrimination or harassment against faculty, staff, or students will not be tolerated at The Pennsylvania State University. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Director, The Pennsylvania State University, 328 Boucke Building, University Park, PA 16802-5901, Tel 814-865-4700/V, 814-863-1150/TTY.