

## PESTICIDE STORAGE

If you store pesticides for your operation, this storage must be properly constructed and maintained to prevent problems or an expensive cleanup in the event of an accident. **The best way to minimize storage problems is to minimize the amount you store.** Purchasing only small amounts that you can use quickly is the best approach for many turf management professionals. If you have to store pesticides, follow these guidelines:

- Design and build pesticide storage structures to keep pesticides secure and isolated from the surrounding environment.
- Store pesticides in a roofed concrete or metal structure with a lockable door.
- Keep pesticides in a separate facility, or at least in a locked area separate from areas used to store other materials, especially fertilizers, feed, and seed.
- Do not store pesticides near flammable materials, hot work (welding, grinding), or in shop areas.
- Do not allow smoking in pesticide storage areas.



Figure 25. Pesticide storage areas should be locked.

Store personal protective equipment (PPE) where it is easily accessible in an emergency, but not in the pesticide storage area (since that may make it unavailable during an emergency). Check the label and the

Material Safety Data Sheet (MSDS) to determine the required safety equipment for each chemical used in the operation. Keep a written pesticide inventory and the MSDS file for the chemicals on site. Do not store this information in the pesticide storage room itself. Remember that PPE is specified for normal application and handling activities. Regular PPE may not be protective in emergency situations, such as fires or reactions with other spilled chemicals.

Depending on the products stored and the quantity, you may need to register the facility with the Florida Department of Community Affairs and your local emergency response agency. Check with your pesticide dealer about community right-to-know laws for the materials that you purchase. An emergency response plan should be in place and familiar to personnel before an emergency occurs, such as a lightning strike, fire, or hurricane. Individuals conducting emergency pesticide cleanups should be properly trained under the requirements of the federal Occupational Safety and Health Administration (OSHA). For reporting chemical spills, see the section on spill reporting requirements later in this chapter.

Do not store large quantities of pesticides for long periods. Adopt the “first in–first out” principle, using the oldest products first to ensure that the product shelf life does not expire.

Store pesticides in their original containers. Do not put pesticides in containers that might cause children and others to mistake them for food or drink. Keep the containers securely closed and inspect them regularly for splits, tears, breaks, or leaks. All pesticide containers should be labeled. Arrange pesticide containers so that the labels are clearly visible, and make sure that the labels are legible. Refasten all loose labeling using non-water soluble glue or sturdy, transparent packaging tape. Do not refasten labels with rubber bands (which quickly rot and easily break) or nontransparent tapes such as duct tape or masking tape (which may obscure important product caution statements or label directions for product use). If a label is damaged, immediately request a replacement from the pesticide dealer or formulator. As a temporary supplement to disfigured or badly damaged labels, fasten a baggage tag to the container handle. On the tag write the product name, formulation, concentration of active ingredient(s), “signal word,” the statement “Keep Out of Reach of Children,” and the date of purchase. If there is any question about the contents of the container, set it aside for proper disposal.

Dry bags should be raised on pallets to ensure that they do not get wet. Do not store liquid materials above dry materials. Store flammable pesticides separately from nonflammable pesticides.

Segregate herbicides, insecticides, and fungicides to prevent cross-contamination and minimize the potential for misapplication. Cross-contaminated pesticides often cannot be applied in accordance with the labels of each of the products. This may make it necessary to dispose of the cross-contaminated materials as wastes and could require the services of a consultant and hazardous waste contractor.

Use shelving made of plastic or reinforced metal. Keep metal shelving painted (unless made of stainless steel) to avoid corrosion. If you use wood shelving, paint it with an enamel or waterproof paint to minimize any absorption of spilled pesticide materials. It is best to replace wood shelving with metal or plastic.

Construct floors of seamless metal or concrete sealed with a chemical-resistant paint. For concrete, use a water-cement ratio no higher than 0.45:1 by weight, and leave a rough finish to provide adhesion for the sealant. Equip the floor with a continuous curb to retain spilled materials. While a properly sealed sump may be included to help recover spilled materials, do not install a drain, as it can release spilled material into the environment. If you have a drain in a storage area, seal it as soon as possible to prevent uncontrolled releases. Provide sloped ramps at the entrance to allow handcarts to safely move material in and out of the storage area.

When designing the facility, keep in mind that temperature extremes during storage may reduce safety and affect pesticide efficacy. Provide automatic exhaust fans and an emergency wash area. The emergency wash area should be outside the storage building. Local fire and electrical codes may require explosion-proof lighting and fans. The light/fan switches should be outside the building, and both switches should be turned on before people enter and should remain on until after they have left the building.

The BMPs discussed in the next section often address the ideal situation of newly constructed, permanent facilities. However, you are encouraged to apply these principles and ideas to existing facilities.

Plans and specifications for pesticide storage buildings are available from several sources, including the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), the Midwest Plan Service, and the IFAS Publications Office. These organizations' publications also contain recommended management practices for pesticide storage facilities.

Note that cancelled, suspended, or unusable pesticides must be disposed of properly. Storage for long periods can lead to leaking containers or other costly problems. The Florida Department of Environmental Protection and the Florida Department of Agriculture and Consumer

Services (FDACS) operate a program for the free disposal of these materials (Operation Cleansweep, ph. 877-851-5285 toll-free, or 386-418-5525). For more information, go to [www.dep.state.fl.us/waste/categories/cleansweep-pesticides](http://www.dep.state.fl.us/waste/categories/cleansweep-pesticides). If this program is not available, a licensed waste disposal contractor should do the disposal.

A good storage facility should have the following features:

- A secure area where unauthorized persons are restricted from entering.
- Proper labeling on exterior doors, such as signs that say "NO SMOKING" and "WARNING: PESTICIDE STORAGE." No-smoking regulations need to be enforced.
- No opportunity for water to enter.
- Temperature control to avoid excessive cold or heat.

#### BMPs FOR PESTICIDE STORAGE AND DISPOSAL

The following BMPs should be used for storing and disposing of pesticides:

- Maintain and follow labels on all pesticide containers.
- Store pesticides only in their original containers or make sure the new containers are properly labeled.
- Store similar pesticides together; for example, store herbicides with herbicides, and insecticides with insecticides.
- Store dry pesticides above liquids.
- Keep containers closed tightly.
- Inspect inventory frequently and watch for damaged containers.
- Store separately any pesticides that may be flammable.
- Limit the amount of inventory, and purchase only the amounts needed.
- Triple-rinse, puncture, and crush empty containers. Clean all visible chemical from the container, including the container cap and cap threads. Follow the label directions for container disposal.
- Apply unused chemical mixtures or rinsate to a legal target at or below the label rate, or save it to use as make-up water for later applications of compatible materials.
- For cancelled, suspended, or unusable pesticides, contact the FDACS Bureau of Compliance Monitoring at (850) 488-3314 or go to <http://www.flaes.org/complimonitoring/index.html> for guidance.

- Nonporous floors.
- Not located close to a body of water, sinkhole, or wellhead.
- Adequate lighting and ventilation.
- The ability to contain runoff from spills.
- A source of clean water with prevention of backflow of chemicals into the water supply.
- Freedom from combustible materials or debris.
- Storage shelves and cabinets of nonporous material that will not absorb pesticides.
- Shelves or other means of keeping chemicals off wet floors.
- Materials and equipment to contain and clean up pesticide spills.
- Clean, readily available personal protective equipment and emergency telephone numbers or other means of securing assistance in an emergency.
- Appropriate fire extinguishers.

### MIXING AND LOADING ACTIVITIES

In most cases, the mixing and loading of pesticides into application equipment should be done adjacent to the application site. If chemicals are routinely mixed and loaded at a shop or storage site, spilled material can accumulate and expensive cleanup procedures may be required.

Use extreme caution when handling concentrated chemicals. Spills could result in an expensive hazardous waste cleanup. It is important to understand how mixing and loading operations can pollute vulnerable ground water and surface water supplies if conducted improperly and at the wrong site. Locate operations well away from ground water wells and areas where runoff may carry spilled pesticides into surface waterbodies. Areas around public water supply wells should receive special consideration and may be designated as wellhead protection areas. Before mixing or loading pesticides in such areas, consult with state and local government officials to determine if special restrictions apply.

To prevent problems when mixing chemicals on-site, use a mixing tray or portable pad to avoid spillage that could be transported to non-targeted areas. Should a chemical spill onto the mixing tray, the material should then be rinsed into the applicator equipment and used according to the product label.

For your own safety, always use all personal protective equipment required by the label.

### PESTICIDE EQUIPMENT CALIBRATION AND LOADING

Keep application equipment properly calibrated and in good repair. Correct measurement keeps you in compliance with the label; reduces the risks to applicators, workers, and the environment; and saves you money.



Figure 26. Calibrate spreaders frequently.

**Calibrate using clean water and do not calibrate equipment near wells, sinkholes, or surface waterbodies.**

Measure pesticides and diluents accurately to avoid improper dosing, the preparation of excess or insufficient mixture, or the preparation of a tankload of mixture at the wrong strength.

The proper application of pesticides helps to reduce costs and increase profits. Improper application can result in wasted chemicals, marginal pest control, excessive carry-over, or damage to turf or landscape ornamentals. As a result, inaccurate application is usually very expensive.

Be aware of the proper application methods, chemical effects on equipment, equipment calibration, and correct cleaning methods. **Sprayers should be calibrated when new or when nozzles are replaced** and recalibrated after a few hours of use, as new nozzles may wear and the rate of flow may increase rapidly. For example, wettable powders may erode nozzle tips, causing an increase in application rates after spraying as few as 50 acres. Recalibrate equipment periodically to compensate for wear in pumps, nozzles, and metering systems.

The amount of chemical solution applied per unit of surface area depends on the forward speed, system

pressure, size of nozzle, and spacing of nozzles on the boom. A change in any one of these will change the rate of application. Consult the operator's manual for detailed information on a particular sprayer. Backpack sprayers and hand sprayers also can and should be calibrated, and applicators should be "calibrated" to determine how much chemical is being applied during a broadcast application while walking across a lawn.

Calibration should be performed by measuring the amount of pesticide applied to a small area (for example, 1,000 square feet) and calculating how much would be applied to a large area. For equipment with more than one nozzle, be sure to check the flow rates of all nozzles on the sprayer so they are similar. Equipment suppliers and pesticide suppliers often supply calibration equipment or assistance at low or no cost. If you calculate the return on investment for time spent calibrating equipment, you will see that even a small improvement in calibration accuracy can save a significant amount of money spent on pesticide that was wasted because it was over applied.

#### BMPs FOR LOADING AND CALIBRATING PESTICIDE EQUIPMENT

- Mix the pesticide and load the spreader or sprayer carefully to avoid spills.
- Mix and load pesticides on an impervious mix/load pad with provisions for collecting and reusing spilled or waste material.
- Use excess pesticide mixtures on a site that is specified on the label.
- Consider closed systems for loading and mixing.
- Triple-rinse containers, pour the rinsate into the spray tank, and use the excess according to the product label.
- Calibrate your spreader or sprayers.

Florida law requires an air gap or back-siphoning device between the water supply and the application equipment to prevent backflow into the water supply. **Never submerge the end of a water supply hose in a tank.** This can lead to the costly contamination of a water supply.

#### PESTICIDE APPLICATION EQUIPMENT WASH WATER

Wash water from pesticide application equipment must be managed properly, since it could contain pesticide residues. Ensuring that no pesticide spills occur on the vehicle by mixing all pesticides over mixing trays eliminates potential pesticide hazards. Sweep any granular products that have spilled onto the vehicle or non-targeted areas into labeled bags for later use.

Wash the vehicle in a designated wash area. The water hose should have an on/off valve and a water-reducing nozzle. Use the least amount of water possible to wash the equipment adequately. Motorized spray equipment can be rinsed of pesticides residues over turf areas at the job site where the rinsate will be used according to the product label. These practices prevent unwanted pesticide residues from being washed onto non-targeted areas. **Avoid conducting such washing in the vicinity of wells or surface waterbodies.**

For most turf application equipment, the inside of the application tank should be rinsed. This is done by filling it with water and then applying the rinse water in the same manner and at the same site as the original pesticide. For larger equipment that is loaded at a central facility, the inside of the application equipment should be washed on the mix/load pad. This rinsate may be applied as a pesticide (preferred) or stored for use as make-up water for the next compatible application. Otherwise it must be treated as a (potentially hazardous) waste. After washing the equipment and before an incompatible product is handled, the sump should be cleaned of any liquid and sediment.

#### PESTICIDE SPILL MANAGEMENT

**Clean up spills as soon as possible.** Unmanaged spills may quickly move into surface waters and injure plants and animals. It is essential to be prepared for major or minor spills. The sooner you can contain, absorb, and dispose of a spill, the less chance there is that it will cause harm. Always use the appropriate personal protective equipment as indicated on the MSDS and the label for a chemical. In addition, follow the following four steps:

- **CONTROL** actively spilling or leaking materials by setting the container upright, plugging leak(s), or shutting the valve.
- **CONTAIN** the spilled material using barriers and absorbent material. For small spills, use kitty litter, vermiculite, shredded newspaper, absorbent pillows, clean sand, or pads. Use dikes to direct large spills away from ditches, storm drains, ponds, sinkholes, or woods. You can also use products such as "Soak Up" to absorb spilled materials. These types of products allow the absorbed material to be diluted into the spray mixture and applied as usable pesticide.
- **COLLECT** spilled material, absorbents, and leaking containers and place them in a secure, properly labeled container. Some contaminated materials could require disposal as hazardous waste.
- **STORE** the containers of spilled material until they can be applied as a pesticide or appropriately disposed of.

Small liquid spills may be cleaned up by using an absorbent such as cat litter, diluting it with soil, and then applying the absorbent to the target site as a pesticide in accordance with the label instructions.

### SPILL REPORTING REQUIREMENTS

Comply with all applicable federal, state, and local regulations regarding spill response training for employees, spill reporting requirements, spill containment, and cleanup. **Keep spill cleanup equipment available when handling pesticides or their containers.**

If a spill occurs for a pesticide covered by certain state and federal laws, you may need to report any accidental-

release if the spill quantity exceeds the “reportable quantity” of active ingredient specified in the law. See **Appendix A** for important telephone numbers for reporting pesticide spills. Very few of the pesticides routinely used in turf management are covered under these requirements. A complete list of pesticides and reportable quantities is available at <http://www.floridadisaster.org/cps/SERC/htc1.htm>.

**Table 10** provides reportable quantities for some common pesticides, but it is your responsibility to determine if a pesticide you use has a reportable quantity. The list in the table should not be used as a substitute for a review of the official Section 304 list provided at the website above.

Table 10: Reportable quantities for certain pesticides

Chemical Name	Brand Name	CAS Number	EHS RQ	CERCLA RQ
Atrazine	AAtrex	1912249	N/A	N/A
Fenoxycarb	Logic	74490-01-8	N/A	N/A
Hydramethylnon	Maxforce	67485-29-4	N/A	N/A
Malathion	Cythion	121-75-5	N/A	100
Methiocarb	Mesurool	2032-65-7	10	10
Simazine	Princep	122-34-9	N/A	N/A
Trifluralin	Treflan	1582098	N/A	10

(For a complete list call (850) 413-9970, or go to <http://www.floridadisaster.org/cps/SERC/htc1.htm>. Reportable quantities are given in pounds of active ingredient.

Public Law 96-510 and Public Law 92-5000 (CERCLA) require immediate notification of the appropriate U.S. governmental agency when oil or hazardous substances are discharged. The law states, “Any such person who fails to notify immediately such agency of such discharge shall, upon conviction, be fined not more than \$10,000 or imprisoned for not more than one year, or both.”

Under Chapters 376 and 403, Florida Statutes:

- Any owner or operator of a facility who has knowledge of any release of a hazardous substance from a facility in a quantity equal to or exceeding the reportable quantity (see the MSDS sheet) in a 24-hour period shall immediately notify the State Warning Point.
- The owner or operator having a discharge of petroleum products exceeding 25 gallons on a pervious surface (or any amount in a waterbody) must report such discharge to the Florida Department of Environmental Protection or the State Warning Point.

The penalty is not in reporting a spill; it is in failing to report a spill.

#### REPORT THE FOLLOWING INFORMATION

- Name, address, and telephone number of person reporting.
- Name, address, and telephone number of person responsible for the discharge or release, if known.
- Date and time of the discharge or release.
- Type or name of the substance discharged or released.
- Estimated amount of the discharge or release.
- Location or address of the discharge or release.
- Source and cause of the discharge or release.
- Size and characteristics of the area affected by the discharge or release.
- Containment and cleanup actions taken to date.
- Other persons or agencies contacted.