



# *Storing and Handling* **Pesticides** *to Protect Groundwater*

**Kristine A. Uhlman**, Extension Program Specialist—Water Resources

**Diane E. Boellstorff**, Corresponding Author; Assistant Professor and Extension Water Resources Specialist

**Mark L. McFarland**, Professor and State Soil Fertility Specialist

Texas A&M Department of Soil and Crop Sciences, The Texas A&M University System

If you store or use pesticides on your land and get your drinking water from a well, you need to follow basic practices to reduce the risk of pesticides contaminating your drinking water. Federal law mandates that pesticide users follow the instructions on the manufacturer's label to reduce contamination of the environment. Improper use or misapplication of a pesticide can be punishable by a fine or pesticide license revocation.

Depending on how toxic it is, a pesticide entering a water supply can affect the health of people or animals in two ways:

- **Acute illness** results from a short period of exposure, such as from a spill or back-siphonage accident.
- **Chronic illness** occurs after prolonged or repeated exposures to small amounts of some chemicals.

The underground water that supplies wells and springs is called groundwater. It is the source of drinking water for many Texans. Millions of gallons of groundwater may be located under the typical homesite, farm, or ranch. Groundwater aquifers can be polluted by leakage from fuel tanks, livestock pens, septic systems, and fertilizer and pesticide storage areas.

The management decisions you make on your property can significantly affect your drinking water and your family's health. They can also affect your potential legal liability and property value.

The following questions (Table 1) may help you identify potential risks associated with pesticide storage and handling. If you answer yes or don't know the answer to any question, you may have a high-risk situation on your property. Information on how to address each situation follows.

**Table 1.** Questions to help determine whether a water well is at risk of contamination by pesticides.

YES	NO	QUESTIONS
<input type="checkbox"/>	<input type="checkbox"/>	1. Do you store pesticides on your property?
<input type="checkbox"/>	<input type="checkbox"/>	2. Are chemicals stored in an unlocked area that is open to children, animals, or vandals?
<input type="checkbox"/>	<input type="checkbox"/>	3. Are the labels missing from your pesticide containers, or do the containers have holes or tears that allow chemicals to leak?
<input type="checkbox"/>	<input type="checkbox"/>	4. Does your pesticide storage area have a gravel or dirt floor?
<input type="checkbox"/>	<input type="checkbox"/>	5. Are your pesticide storage and mixing areas upslope or less than 150 feet downslope from your drinking water well?
<input type="checkbox"/>	<input type="checkbox"/>	6. Do you mix and load pesticides on a surface such as soil or gravel that allows spills to seep into the ground, or on a surface without a curb to catch spills?
<input type="checkbox"/>	<input type="checkbox"/>	7. Do you fill the sprayer tank directly from a water well?
<input type="checkbox"/>	<input type="checkbox"/>	8. Do you fill the sprayer tank with a hose that does not have a check valve, or put the hose in the tank below the liquid line during filling?
<input type="checkbox"/>	<input type="checkbox"/>	9. Do you wash out the sprayer tank and dump the rinse water less than 150 feet from a water well?
<input type="checkbox"/>	<input type="checkbox"/>	10. Do you ever dispose of partially filled pesticide containers on your property?

### **1. Do you store pesticides on your property?**

By using less pesticide, we can reduce waste. Don't buy more than you need; keep records of what is on hand; and use older products first. Other waste-reduction measures include:

- Buy the least amount of product needed to avoid having to store leftovers for long periods.
- Before using older chemicals that have been stored, check with your county Extension agent about possible updated risks, current restrictions on their use, and the availability of possibly safer or more effective alternative products.
- Follow the instructions on the label regarding who can use a product, how to use it, how long it will remain effective, what temperature range in storage will ensure product integrity, what to do after a spill or chemical exposure, what number to call in an emergency, and where, how, how much, and how often it may be used.

For information on how to use a specific pesticide, contact your county Extension agent, the Texas Department of Agriculture, or your pesticide sales representative.

### **2. Are chemicals stored in an unlocked area that is open to children, livestock, or vandals?**

Prevent unauthorized access to pesticides to reduce the risk of spills, theft, and accidental contact (for example, by children). The best protection is a locked storage cabinet or building intended only for pesticide storage and located away from other activities.

### **3. Are the labels missing from your pesticide containers, or do the containers have holes or tears that allow chemicals to leak?**

The first defense against spills or leaks is a sound container. Pesticide containers should have no holes, tears, or weak seams.

Proper labels on all pesticide containers are necessary to keep information at hand if an accident occurs. Labeling will also help you manage inventory and use older products first.

#### **4. Does your pesticide storage area have a gravel or dirt floor?**

A storage facility with a gravel or dirt floor will allow spilled pesticides to soak into the soil. Follow these guidelines to protect your well water:

- Store pesticides in a secure, properly constructed building.
- Locate the storage building at least 150 feet downslope of the wellhead.
- Never store chemicals in the well house.
- Make sure that the floor is made of impervious material such as concrete.
- Build a curb around the floor to trap spills and prevent them from spreading.
- To keep leaking chemicals from reaching the ground, install a secondary containment floor made of an easily cleaned material such as sealed cement or glazed ceramic tile around the storage building.
- Grade the soil so that the finished soil grade is 3 inches below the floor and sloped to drain away from the building.
- Choose a site where the subsoil is as impermeable as possible.
- Inside the storage facility, keep large drums or bags on pallets and off the floor.
- Use shelves with lips for smaller containers to keep them from sliding off.
- Use steel shelves, which are easier to clean than wood if a spill occurs.
- Store dry products above liquids to prevent wetting from spills.
- To prevent cross-contamination, keep different types of pesticides (herbicides, insecticides, and fungicides) on separate shelves or in separate areas.
- Check the pesticide product labels for expiration dates, and dispose of all out-of-date products properly.

Take precautions to be ready in case fire breaks out in the storage facility:

- Label windows and doors to alert firefighters to the presence of pesticides.
- Keep a list of the stored chemicals and amounts in a separate location.
- Know where the runoff water would go and where it might collect if a fire breaks out.

#### **5. Are your pesticide storage and mixing areas upslope or less than 150 feet downslope from your drinking water well?**

The pesticide storage facility should be downslope and at least 150 feet away from your water well. To minimize the distance that chemicals are transported, locate the mixing and loading area close to the storage facility.

The mixing/loading area should be more than 10 feet downslope or 100 feet upslope of the well. If runoff from your mixing/loading area threatens your well, build a diversion to direct the water to a safe area.

#### **6. Do you mix and load pesticides on a surface such as soil or gravel that allows spills to seep into the ground, or on a surface without a curb to catch spills?**

When transferring pesticides to spraying equipment or mobile tanks, protect against spills by using a waterproof mixing or loading pad. Although small amounts spilled regularly in the same place can go unnoticed, the chemicals can build up in the soil and eventually leach to the water table.

To reduce the potential for release, line any engineered structures that include a sump to collect spilled liquid or drainage water. Do not pour the rinse water (rinsate) down a dry well.

Minimize the risk of contamination by following these basic guidelines:

- Mix pesticides at least 150 feet downslope of a wellhead.
- Do not mix pesticides on a gravel driveway or other surface that will allow spills to move quickly through the soil.
- If you are using a restricted-use or limited-use pesticide, a trained and licensed applicator must supervise the mixing and application.
- Consider using a closed handling system, which is a system designed by the manufacturer to prevent the pesticide from contacting people or the environment. The system will transfer the pesticide directly from a storage container to the application equipment.

The label is the authoritative source of information on best practices for mixing, loading, and storing a product.

### **7. Do you fill the sprayer tank directly from a water well?**

Avoid filling a sprayer tank directly from your water well. Instead, use a mobile tank to transport the water to the mixing and loading site. Or, fill the sprayer tank from a faucet away from the well to reduce the risk of contaminating your water supply.

### **8. Do you fill a sprayer tank with a hose that does not have a check valve, or put the hose in the tank below the liquid line during filling?**

Backflow is the reverse flow of a liquid caused by the sudden creation of a vacuum, much like sucking water through a straw. If a well pump shuts off while you are filling a pesticide sprayer, and the end of the hose is submerged in the pesticide mixture, backflow can siphon the mixture backward through the hose and into your well.

Install anti-backflow devices on all faucets. If you use a faucet without a backflow prevention device, maintain at least a 6-inch air gap between the end of the hose and the top of the sprayer tank.

### **9. Do you wash out the sprayer tank or dump the rinse water less than 150 feet from a water well?**

Rinse the sprayer in the field, where there is little risk of contaminating your well with rinsate. When possible, use the rinsate to mix the next load. Spray the last rinsate load on the appropriate crop.

### **10. Do you ever dispose of partially filled pesticide containers on your property?**

Significant amounts of pesticide can leak into the soil from a partially filled container. Follow these guidelines to reduce the chances of accidentally releasing pesticides into the environment:

- Buy products in returnable containers, and return them to the dealer whenever possible.

- Dispose of non-returnable containers at a permitted landfill.
- Because pesticide residue can be difficult to remove from application equipment, pressure-rinse or triple-rinse containers immediately after use. This rinse water can be reused in mixing subsequent loads.
- Do not bury or burn pesticide bags or containers.
- Participate in the Environmental Protection Agency's banned pesticide buy-back program. For information on whether the program is available in your area, contact the local county Extension agent.

The product label explains how to dispose of containers and excess chemicals properly.

Publications on best management practices for specific crops, pests, and pesticides are posted on the AgriLife Extension Service Bookstore at <http://agrilifebookstore.org/>.

#### **For more information**

*Assessing Your Pesticide Storage and Handling.* By E. E. Burgess. 1997. University of Tennessee, Knoxville, SP484 E, 12 pp.

Texas Department of Agriculture: <http://www.texas-agriculture.gov/RegulatoryPrograms/Pesticides>

Texas Department of Licensing and Regulation: <http://www.license.state.tx.us/index.htm>

Texas Groundwater Protection Committee: <http://www.tgpc.state.tx.us/index.php>

Texas Well Owner Network: <http://twon.tamu.edu>

TEX-A-SYST: *Reducing the Risk of Ground Water Contamination by Improving Pesticide Storage and Handling.* By B. L. Harris, D. W. Hoffman, and F. J. Mazac Jr. 1997. Texas A&M AgriLife Extension Service publication E-527, 12 pp.

## Acknowledgment

Support for this publication is provided through Clean Water Act§319(h) Nonpoint Source funding from the Texas State Soil and Water Conservation Board and the U.S. Environmental Protection Agency under Agreement No. 13-08.



## Texas A&M AgriLife Extension Service

*AgriLifeExtension.tamu.edu*

More Extension publications can be found at *AgriLifeBookstore.org*

Educational programs of the Texas A&M AgriLife Extension Service are open to all people without regard to race, color, sex, religion, national origin, age, disability, genetic information, or veteran status.

---

The Texas A&M University System, U.S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating.

Produced by Texas A&M AgriLife Communications