

Fact Sheet 2

Reducing the Risk of Groundwater Contamination by Improving Pesticide Storage & Handling

Five areas of pesticide management on your farmstead should be reviewed:

1) pesticide storage practices; 2) mixing and loading practices; 3) spill cleanup; 4) container disposal practices; and 5) other management practices.

When handling pesticides, wear proper protective clothing at all times. Personal protection is not addressed in Farm•A•Syst, because its focus is groundwater and drinking water protection. For more information on personal protection when handling pesticides, contact your county Extension office, Extension Agricultural Engineering, or the Pesticide Use Section, Kansas State Board of Agriculture (see Contacts and References).

1. Pesticide storage practices

If stored safely in a secure location, pesticides pose little danger to groundwater. Common sense suggests keeping them dry and out of the way of activities that might knock over a jug or rip open a bag. Short-term storage (during seasonal use) poses a lower risk than year-round storage, but **any** storage regardless of length of time stored poses a risk to groundwater.

The risk of contamination increases the closer the pesticide storage area is to your well. Pesticide storage areas should be downslope and at least 400 feet from your well to provide reasonable assurance well water will not be contaminated. Separation should be greater if the site has sandy soils or fractured bedrock near the land surface.

The risk of pesticide contamination of groundwater is influenced by properties of both the pesticide and the soil on which it is spilled or applied. Several publications in the Contacts and References section provide more information on these topics. Also, Worksheet 8, *Site Evaluation*, can assist you in ranking your farmstead soils and geologic conditions according to their ability to keep pesticides and other contaminants out of groundwater.

Managing your existing storage facility

Proper management of your existing pesticide storage facility will often allow you to protect your water supply without major expense. Even when needed changes require expensive modifications to your facilities, keep in mind that compared to the cost of a major accident or a lawsuit, storage improvements can be a bargain.

The cheapest alternative you may have is to cut back on the amounts and types of pesticides stored, if practical. Also consider how you can protect the pesticides you keep in storage.

*For glossary,
see page 2 of
Worksheet 2.*

- Pesticide storage areas should be locked or pesticides stored in a locked cabinet out of reach of children. A locked storage cabinet or building provides security, preventing unauthorized use of pesticides and reducing the chance of accidental spills or theft. Provide signs or labels identifying the cabinet or building as a pesticide storage area.

- Pesticides should always be stored in sound, properly labeled, original containers. Sound containers are your first defense against a spill or leak. If a container is accidentally ripped open or knocked off a shelf, the spill should be confined to the immediate area and cleaned up promptly.
- Steel shelves are easier to clean than wood if a spill occurs. Shelves for smaller containers should have a lip to keep the containers from sliding off.
- Store dry products above liquids to prevent wetting from spills. Provide pallets to keep large drums or bags off the floor.
- Keep pesticides separate to prevent cross-contamination. Herbicides, insecticides and fungicides should be kept on separate shelves or areas.
- If you plan to store large bulk tanks, provide a containment area large enough to confine 125 percent of the contents of the largest bulk container, plus the displaced volume of any other storage tanks in the area. Contact the Kansas State Board of Agriculture to obtain a copy of the bulk storage regulations.

Remodeling existing facilities that serve other uses may be less expensive than building a new facility, but remodeling can be complicated. When existing buildings must accommodate other activities, using them to store pesticides could compromise the safety of people and the environment. Storing pesticides in a separate facility reduces the risk associated with fire or accidental spills. **Never store pesticides inside a wellhouse or a facility containing an abandoned well.**

Fires in a storage area present a special hazard to people and the environment. You can reduce damages by anticipating emergencies. Label windows and doors to alert firefighters to the presence of pesticides and other products stored in the structure. A list of the pesticides and amounts stored should be kept in the house or away from the storage area and kept up-to-date. Also, consider where the surface runoff water will go and where it might collect, if a fire should occur. For example, a curb around a floor can help confine contaminated water. In making the storage area secure, also make it accessible, to allow getting pesticides out in a hurry.

Building a new storage facility

Building a new facility just for pesticide storage may be expensive, but generally it will be safer than trying to modify areas meant for other purposes. When building a new facility, keep in mind the principles of safe pesticide storage mentioned above. Remember that when building a new facility, you have the opportunity to provide the maximum amount of safety possible for your family and your drinking water supply.

Safe storage can minimize the risk of spills around your pesticide storage area. If a spill does occur, an impermeable (waterproof) floor, such as coated or sealed concrete, should virtually eliminate any seepage of pesticides into the ground. Putting a curb around the floor will prevent chemicals from spreading to other areas.

Secondary containment provides an impermeable floor and walls around the storage area, which will minimize the amount of pesticide seeping into the ground if a bulk liquid pesticide storage tank should leak.

A mixing/loading pad provides for secondary containment during the transfer of pesticides to spraying equipment or nurse tanks.

For information on other factors to consider in the design of a storage facility—such as ventilation, temperature control and worker safety—contact your county Extension office or Extension Agricultural Engineering for plans and recommendations.

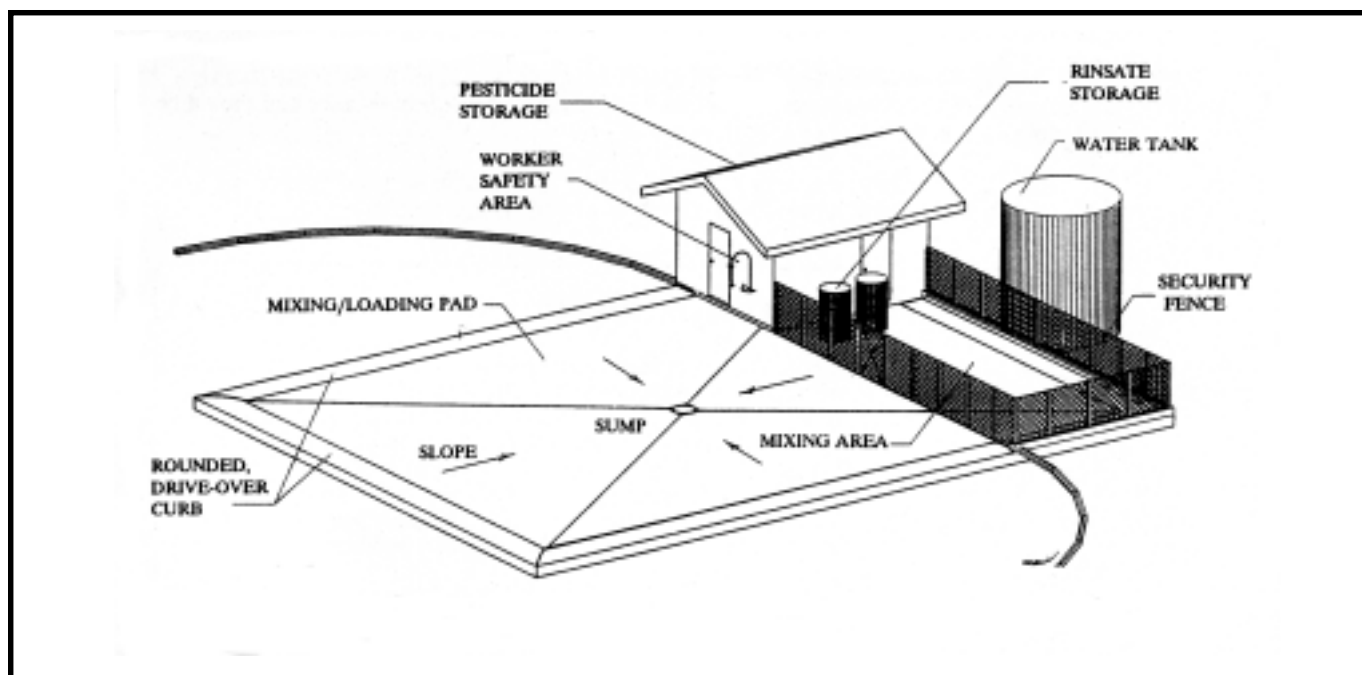


Figure 1: Small-scale drive-across pesticide/fertilizer facility. Source: *Designing Facilities for Pesticide and Fertilizer Containment*, MWPS-37, Midwest Plan Service, Ames, Iowa, 1991.

2. Mixing and loading practices

Groundwater contamination can result even from small spills in the mixing and loading area. Small quantities spilled regularly in the same place can go unnoticed, but the chemicals can build up in the soil and eventually reach groundwater. Mixing and loading on an impermeable surface, such as coated or sealed concrete, will allow containment of most spilled pesticides.

Better management of your existing mixing and loading site

Even if you don't have an impermeable mixing and loading pad, you can minimize contamination by following some basic guidelines:

- Avoid mixing and loading pesticides near your well. One way to do this is to use a nurse tank to transport water to the mixing and loading site. Ideally, the mixing site should be moved within the field of application.
- Avoid mixing and loading on gravel driveways or other surfaces that allow spills to sink quickly through the soil. A clay surface is better than sand or gravel.
- Install a backsiphon prevention device on the well or hydrants to prevent reverse flow of liquids into the water supply. Never put the hose in the sprayer tank. Provide an air gap of six inches between the hose and the top of the sprayer tank.
- Always supervise sprayer filling. For restricted-use pesticides, a trained and certified applicator must supervise operations.
- Consider a closed handling system, which transfers the pesticide directly from the original container to applicator equipment (through an attached or connected hose, for example). Humans and the environment are not inadvertently exposed to the pesticide with this system.
- Use rinsate for mixing subsequent loads. Spray the rinsate according to label directions.

A mixing and loading pad

Containing pesticide spills and leaks requires an impermeable (waterproof) surface for mixing and loading. The pad should be large enough to contain leaks from bulk tanks, wash water from cleaning equipment, and spills from transferring chemicals to the sprayer or spreader (see Figure 1).

The size of the pad depends also on the equipment you use. It should provide space around the parked equipment for washing and rinsing. Having several rinsate (rinse water) storage tanks allows you to keep rinsate from different chemicals separate. That way, it can be used as mixing water on subsequent loads.

Locate the pad next to the storage area. At sites where runoff water could reach the well, construct a diversion so runoff is directed to another area.

If you are considering constructing a mixing and loading pad, contact your county Extension office or Extension Agricultural Engineering for more detailed information. Call (913) 532-5813.

3. Spill cleanup procedures

For dry spills, promptly sweep up and use the pesticide as it was intended. Dry spills are usually very easy to clean up.

For liquid spills, recover as much of the spill as possible using soil, sawdust or other absorbent material, and place it in a sealable container. The spilled pesticide should be either used as intended or properly disposed. Contact your local health department for disposal procedures.

Kansas law requires reporting spills which may cause environmental damage. To report, and to receive advice and assistance, contact your county Emergency Preparedness Coordinator or other emergency response authority. The KDHE Bureau of Environmental Remediation at (913) 296-1679, or the State Board of Agriculture at (913) 296-2142, can also provide assistance and should be contacted in the event of a spill. Any major spill events should be reported to the Kansas Division of Emergency Preparedness at (913) 296-3176.

Have an emergency response plan for your site. Know where runoff water will go, how to handle your particular pesticides, and whom to call for help.

4. Container disposal practices

Unrinsed and improperly stored containers can lead to groundwater contamination by allowing chemical residues to leak onto the ground. Some basic guidelines can help avoid similar problems:

- As often as possible, use returnable containers and minibulks and take them back to the dealer.
- Pressure-rinse or triple-rinse plastic and metal containers **immediately** after use, since residue can be difficult to remove after it dries. Pour rinse water into the spray tank. Puncture containers and store them in a locked storage area until you can take them to a permitted landfill or recycling center.
- Shake out bags, bind or wrap them to minimize dust, and take them to a permitted landfill.
- Do not bury or burn pesticide containers or bags on the farm.

Your drinking water is least likely to be contaminated if you follow appropriate management procedures and dispose of properly rinsed pesticide containers in any location that is off the farm site. However, proper offsite disposal practices, such as an approved sanitary landfill, are essential to avoid risking contamination that could affect the water supplies and health of others.

(For more information about proper disposal of pesticide containers, refer to Worksheet and Fact Sheet 5, *Farm & Home Waste Management*.)

Atrazine in Well Water: A Case Example

Careless disposal of atrazine containers might have contaminated the water supply of a dairy farm. The atrazine concentration in the farm's well water was above the state groundwater standard. A box of empty 2.5 gallon liquid atrazine containers was found discarded beneath the drip line of a farm building. Concentrate residues were visible on the outside of the containers. Surface runoff from the livestock lot flowed past the containers, discharging near the well field. Such disposal incidents greatly increase the likelihood of groundwater contamination.

5. Other management practices

Reducing pesticide waste makes financial as well as environmental sense, but it means more than just reducing spills. It also means not buying more than you need to apply, keeping records of what you have on hand, and using older products first.

- Buying only what you need makes long-term storage unnecessary. In addition, you avoid cold weather problems, which can make some pesticides useless.
- Recordkeeping may seem like a task unrelated to groundwater contamination, but knowing what you've used in the past and what you have on hand allows you to make better purchasing decisions. Keep records of past field application rates and their effectiveness. Along with field records, you can add information such as the manufacturer's name and address, chemical types and handling precautions. This information can be important if you must respond quickly to an accident.

Any application of a restricted-use pesticide falls under the Federal Pesticide Recordkeeping Requirements and records must be kept by law. Contact your county Extension agent if you need further information on these requirements.

- Using older products first keeps your inventory current and effective. Before using chemicals that have been stored for a few years, though, check with your county Extension agent about possible restrictions on their use. (Worksheet and Fact Sheet 5, *Farm & Home Waste Management*, provide information on how to safely and legally dispose of unused pesticides.)

CONTACTS AND REFERENCES

Who to call about...

General pesticide information

National Pesticide Telecommunication Network, 1 (800) 858-PEST (-7378). Provides 24-hour information (365 days a year) on recognizing and treating pesticide poisoning, pesticide products, pesticide cleanup and disposal, enforcement contacts, pesticide certification and training, and pesticide laws.

Health effects of pesticides in drinking water

Kansas Department of Health and Environment, Topeka, Kansas, (913) 296-5500. With specific questions, contact your local health department or county Extension agent.

Drinking water quality and treatment and Health Advisories

EPA Safe Drinking Water Hotline, Monday through Friday, 7:30 a.m. to 4 p.m. Central Standard Time. Call 1(800) 426-4791.

Health and safety information on chemicals

Chemical Referral Center, sponsored by the Chemical Manufacturers Association. Call 1 (800) 262-8200. The Center does not answer questions but does serve as a central contact point in non-emergency situations.

Pesticide storage, handling, disposal, safety and recordkeeping

Your county Extension office, Extension Agricultural Engineering, (913) 532-5813, or the Pesticide Use Section, Kansas State Board of Agriculture, (913) 296-2142.

Pesticide spills and proper disposal of soil contaminated by a pesticide spill

Your local Emergency Preparedness Coordinator should be contacted in the event of a spill. The Kansas Department of Health and Environment, (913) 296-1679, the Kansas State Board of Agriculture, (913) 296-2142, and the U.S. Environmental Protection Agency, (913) 551-7020 can also provide assistance.

What to read about...

Publications are available from sources listed at the end of the reference section. (Refer to number in parentheses after each publication.)

Groundwater contamination, protection and testing

Pesticides in Drinking Water. MF-961. (1)
Groundwater and Well Contamination. MF-932. (1)
Managing the Farmstead to Minimize Groundwater and Well Contamination. MF-948. (1)
Nitrates and Groundwater. MF-857. (1)
Safe Domestic Wells. MF-970. (1)
Ensuring Safe Drinking Water. MF-952. (1)
Suggested Water Tests for Private Systems. MF-871. (1)

Taking a Water Sample. MF-963. (1)
Testing to Help Ensure Safety of Drinking Water. MF-951. (1)
Commercial Laboratories Certified for Water Quality Tests. MF-872. (1)
Understanding Your Water Test Report. MF-912. (1)

Health effects

The product label. Read your product labels carefully for specific information on pesticide health effects.
Pesticides and Groundwater: A Health Concern for the Midwest. 1986. (5)
Freshwater Foundation. A brief, easy-to-understand overview of health concerns related to pesticides and groundwater.
Pesticides: Health Effects in Drinking Water. 1985. (6)
Cornell Cooperative Extension.
Health Advisory Summaries. 1989. U.S. Environmental Protection Agency, Washington, D.C. (2)
Prepared for nearly 60 substances with potential to reach drinking water, each two-page Health Advisory Summary describes a pesticide, its brand names, its potential health effects, suggested action steps, and where to go for more information.

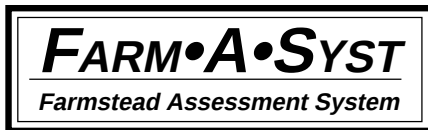
Pesticide storage, handling, disposal and safety

Private Pesticide Applicator Manual. MF-531. (1)
Extensive overview of all aspects of pesticide use.
Designing Facilities for Pesticide and Fertilizer Containment. 1991. MWPS-37. (4)
Pesticide Storage Facility. AF-169. (1)
Guide to Pesticide Storage. AF-76. (1)
Pesticides and Groundwater: A Guide for the Pesticide User. 1989. NREAS-34. (4)
A Consumer's Guide To Safer Pesticide Use. 1987. (3)
Free 25-page special reprint from the EPA Journal.
Chemicals in Your Community: A Guide to Emergency Planning and Right To Know Act. 1988. (3)
Contains information on implications of this law for farmers.
Disposing of Crop Protection Chemical Containers. 1990. (7)
ACRE Fact Sheets #5 and #12. Fact Sheet #5 provides an eight-point check list of procedures to follow for safe disposal of chemical containers. Fact Sheet #12 discusses pressure-rinsed and triple-rinsed containers and rinsed container disposal.
Constructing an Inexpensive Chemical Rinse Pad. 1990. (7)
ACRE Fact Sheet #14. Discusses capturing wastewater, storage of chemicals, site selection, and the design of a simple rinse pad.
Restricted Use Pesticides in Kansas. MF-710. (1)
Household Pesticides. MF-772. (1)
Pesticide Safety. Tabloid. MF-986. (1)

Publications available from...

1. Your county Extension office or directly from Extension Distribution Center, Umberger Hall, Kansas State University, Manhattan, Kansas 66506 (913) 532-5830. There may be charges for publications, postage and sales tax.
2. For information on how to obtain the full Health Advisories or the Health Advisory Summaries, call the EPA's toll free Safe Drinking Water Hotline, 1(800) 426-4791, 7:30 a.m. to 5 p.m. Central Standard Time.

3. U.S. Environmental Protection Agency, Office of Pesticide Programs (TS-766C), 401 M Street S.W., Washington, D.C. 20460.
4. Your county Extension office or Extension Agricultural Engineering, 237 Seaton Hall, Kansas State University, Manhattan, Kansas 66506, (913) 532-5813. There may be charges for publications, postage and sales tax.
5. Freshwater Foundation at Spring Hill Center, 725 County Road 6, Wayzata, Minnesota 55391, (612) 449-0092.
6. Cornell Resource Center, 7 Business and Technology Park, Cornell University, Ithaca, New York 14850, (607) 255-2080.
7. Alliance for a Clean Rural Environment (ACRE), P.O. Box 413708, Kansas City, Missouri 64141, 1(800) 545-5410.



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