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EC98-769 Farm*A*Syst Nebraska's System for Assessing Water Contamination Fact Sheet 5: Improving Fertilizer Storage and Handling

Robert Grisso

University of Nebraska at Lincoln

DeLynn Hay

University of Nebraska at Lincoln, dhay1@unl.edu

Paul J. Jasa

University of Nebraska at Lincoln, pjasa1@unl.edu

Richard K. Koelsch

University of Nebraska - Lincoln, rkoelsch1@unl.edu

Sharon Skipton

University of Nebraska-Lincoln, sskipton1@unl.edu

See next page for additional authors

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Authors

Robert Grisso, DeLynn Hay, Paul J. Jasa, Richard K. Koelsch, Sharon Skipton, and Wayne Woldt

Farm A Syst

FACT SHEET 5

Nebraska's Farm Assessment System for Assessing the Risk of Water Contamination

Improving Fertilizer Storage and Handling

1. Fertilizer storage practices

If stored safely in a secure location, fertilizers pose little danger to groundwater. Common sense suggests keeping fertilizer dry and out of the way of activities that might rip open a bag or allow rain to enter a bulk container.

In the event of such an accident, an impermeable (water-proof) floor, such as concrete, helps to prevent fertilizer seeping into the ground and leaching to groundwater. A curb built around liquid fertilizer storage areas will prevent contaminants from spreading to other areas.

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

A mixing/loading pad provides for secondary containment during the

transfer of liquid fertilizer to application equipment or nurse tanks. Store piles of dry bulk fertilizer on an impermeable surface under cover or in a building. Treat dry fertilizer impregnated with a pesticide as a pesticide. Store under cover or protected from rain and wind.

Building a new storage facility

While a new facility just for fertilizer storage may be expensive, it may be safer than trying to adapt areas meant for other purposes. Keep these simple principles in mind:

1. Locate the dry storage building or liquid secondary containment downslope and at least 100 feet away from the well. Separation from the well should be greater in areas of sand or fractured bedrock. *Worksheet 2, Site Evaluation*, can assist you in ranking your farm soils and geologic conditions according to their ability to keep contaminants out of groundwater.
2. In the event of a fire, contaminated surface water should drain to a confined area.
3. The mixing and loading area should be close to your storage facility, to minimize the distance chemicals are transported.
4. The building foundation or secondary containment floor should be well drained and located above the water table. The finished grade should be 3 inches below the floor of the storage area and sloped away from the building to provide surface drainage. The subsoil should have a low permeability.
5. Provide pallets to keep bags off the floor. Store dry products separate from liquids to prevent wetting from spills.
6. If you plan to store large bulk tanks or for any storage greater than the accumulated volume of 2,000 gallons, provide a



containment area large enough to confine 110 percent of the contents of the largest bulk container. The containment must allow for the displaced volume of any other storage tanks or plumbing, plus the volume of the expected precipitation from a 25 year, 24 hour storm if the area is not under a roof. Drain outlets are not allowed. Wastewater and spillage must be removed with a pump.

7. A locked storage cabinet or building provides security. Preventing unauthorized use of fertilizer reduces the chance of accidental spills or theft. Another good security precaution is locking valves. Provide signs or labels indicating that the cabinet or building is a fertilizer storage area. Labels on the outside of the building and on file at the fire department give firefighters important information about fertilizers during an emergency response for a fire or spill.
8. Provide adequate road access for deliveries and emergency equipment.
9. For information on factors to consider in the design of a storage facility, such as ventilation, water access, temperature control, and worker safety, contact your local University of

Nebraska Cooperative Extension office or the Nebraska Department of Environmental Quality at (402) 471-2186 for plans and recommendations.

Modifying an existing storage facility

You may find the above principles to be expensive and difficult to apply to your current storage but compared to the cost of a major accident or even a lawsuit, storage improvements are a bargain. Items 5-8 above are also important points to remember for existing storage.

The least expensive alternative you may have is to cut back on the amounts stored. If this option is not practical, consider how you can protect the fertilizers you keep on hand.

Sound containers are your first defense against a spill or leak. Should a bag be accidentally ripped, fertilizers should be confined to the immediate area and promptly recovered. That means having a solid floor and, for liquid fertilizers, a curb. The size of the secondary containment space, if not under a roof, should follow the prerequisites listed in item 6 above.

Ideally, your fertilizer storage area should be separate from other activities. If the building must also serve as a machine shed or as housing for livestock, you may find it difficult to meet all the requirements for safe storage.

Stored fertilizers can pose a danger to fire fighters and to the environment. Reducing the fire risk in the storage area is the first step, but other things can be done.

- You can reduce the damages by anticipating such emergencies. If a fire should occur, consider where the water will go and where it might collect. In making the storage area secure, also make it accessible, allowing you to get fertilizers out in a hurry.
- If fertilizer containers are damaged, the stored nutrients may be carried away by water and spread over a large area.
- Label windows and doors to alert fire fighters to the presence of fertilizer stored in the structure.
- A curb around the floor can help confine contaminated water (see *Figure 1*).

2. Mixing and loading practices

Groundwater contamination can result from small quantities spilled regularly in the same place. Spills of dry fertilizer should be promptly and completely cleaned up and placed immediately into the application equipment. Cleaning up spills of liquid fertilizers can be more difficult.

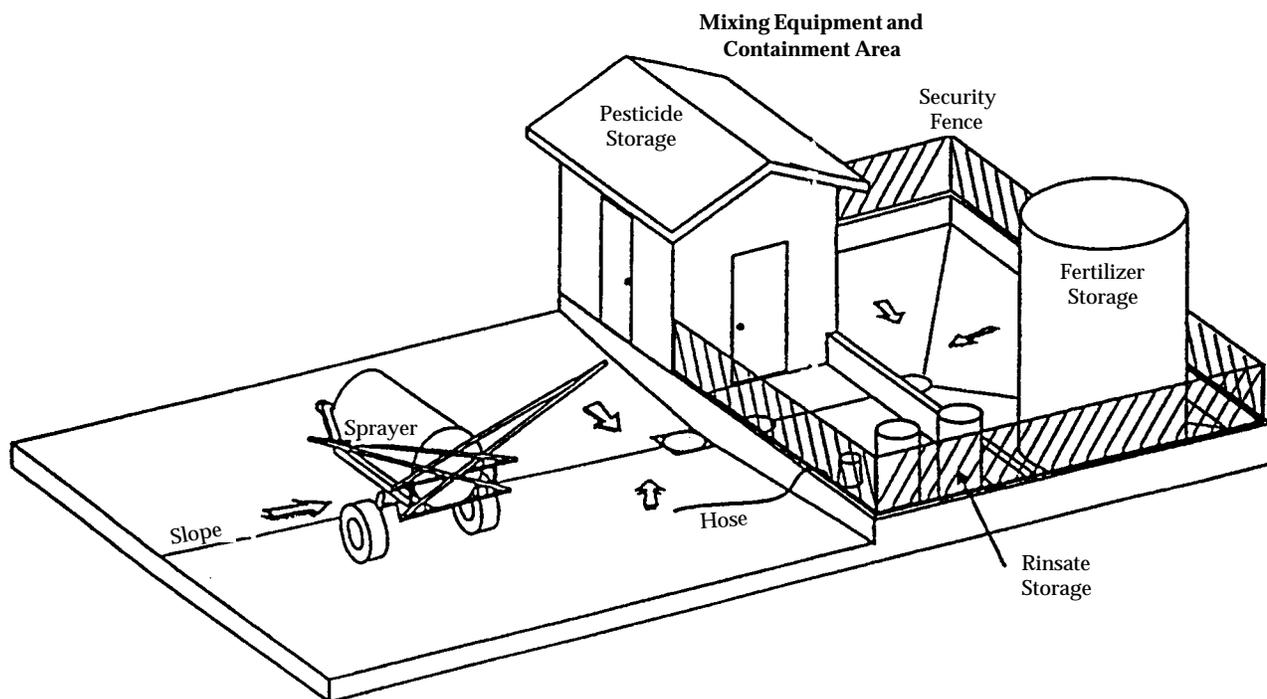


Figure 1. Design and management of storage containment of fertilizer and pesticides.

A liquid fertilizer mixing and loading pad

Containing liquid fertilizer spills and leaks requires an impermeable surface (such as concrete) for mixing and loading. A concrete pad should be large enough to accommodate your equipment and to contain leaks from bulk tanks, wash water, and spills from transferring fertilizers to the sprayer.

If possible, locate the pad adjacent to the storage area. At sites where runoff could reach the well, construct a diversion to direct runoff to another area, or make sure that water from the well is diverted away.

The dimensions of the pad depend on the equipment you use. The fertilizers and rinse water should have a confined

area, such as a sump, for settling before transfer to rinsate storage tanks. Having several separate rinsate storage tanks allows you to keep rinse water from different fertilizer chemical mixes separate. Separate tanks will allow rinsate to be used for mixing water on subsequent loads.

If a loadout facility is required to meet the secondary containment regulations, the loadout facility must meet these minimum requirements:

1. Constructed of concrete, asphalt, or other impermeable materials.
2. Constructed to withstand the weight of vehicles which will be on the loadout facility.
3. Sized to contain a minimum of 1,800 gallons or 1.5 times the largest container on the

- loadout facility, whichever quantity is smaller.
4. Sloped to a collection point or sump.

If you are considering constructing a mixing/loading pad, more detailed information is available from local University of Nebraska Cooperative Extension offices or the Nebraska Department of Environmental Quality.

Better management of your existing mixing and loading site

Liquid fertilizer spills and leaks are bound to occur from time to time. 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 fertilizers near your well. One way to do this is to use a nurse tank to transport water and fertilizer to the application site. Ideally, the mixing site should be moved from year to year within the field of application.
- Avoid mixing and loading on gravel driveways or other surfaces that allow spills to sink quickly through the soil. An impermeable clay surface is better than sand.
- Install an anti-backsiphon device on the well or hydrants. Never put the hose in the sprayer tank. Provide an air gap of 6 inches between the hose and the top of the sprayer tank.
- Provide continuous supervision of sprayer filling.
- Use a closed handling system in which the fertilizer is directly transferred from the storage container to the applicator equipment, such as by a hose, so that humans and the environment are never inadvertently exposed to the chemical.
- Use rinsate for mixing subsequent loads of similar materials.

3. Spill cleanup procedures

For dry spills, promptly sweep up and reuse the

fertilizer as it was intended. Dry spills are usually very easy to cleanup. Dry impregnated fertilizer is considered a pesticide and, if spilled, should be recovered and applied to the target crop as it was intended.

For liquid spills, recover as much of the spill as possible and reuse as it was intended. Some contaminated soil may have to be removed and field applied if possible.

As required by Title 126, Nebraska Administrative Code, report spills of any amount to streams or lakes. Report spills of more than 50 gallons on the soil or a mixing/loading pad. Smaller quantities of liquid or dry products should be reported if they could cause damage because of the nature of the specific compound or spill location. To report, call the Nebraska Department of Environmental Quality at (402) 471-2186. Remove the spilled material and contaminated soil no matter what the quantity, and dispose of according to the Department of Environmental Quality's recommendations.

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

4. Container disposal practices

Bulk deliveries of anhydrous ammonia, liquid fertilizers, and dry bulk fertilizers have reduced

the need to dispose of containers. Many farmers do, however, use bagged fertilizers. Follow label instructions for the disposal or burning of bags and the disposal of ash, or bundle the bags and dispose of them in an approved landfill.

Your drinking water is least likely to be contaminated by your disposal practices if you follow appropriate management procedures or dispose of wastes in any location that is **off the farm site**. However, proper offsite disposal practices are essential to avoid risking contamination that could affect the water supplies and health of others.

5. Other management factors

Reducing fertilizer 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 and keeping records of what you do have on hand. Buying only what you need makes long-term storage, greater than four months, unnecessary.

Keeping records 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.

CONTACTS AND REFERENCES

Who to call about...

Plans and recommendations for fertilizer mixing and loading pads:

Nebraska Department of Environmental Quality, (402) 471-2186.

Fertilizer spills:

Nebraska Department of Environmental Quality, (402) 471-2186.

Nebraska State Patrol, (800) 525-5555.

Proper disposal of soil contaminated by a fertilizer spill:

Nebraska Department of Environmental Quality, (402) 471-2186.

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 and nitrates in groundwater:

Well Water, Nitrates and the "Blue Baby" Syndrome Methemoglobinemia, 1991. NebFact NF91-49. Health risk of nitrate in drinking water. (1)

Consequence of Nitrate in Groundwater, 1986. 7 pages. *Solutions* magazine, July/August 1986.

Health effects:

The product label. Read your product labels carefully for specific information on fertilizer health effects.

Nitrates and Groundwater. Freshwater Foundation. (5)

Fertilizer handling and management:

Fertilizer Management for Alfalfa, NebGuide G73-2. (1)

Fertilizer Suggestions for Corn, NebGuide G74-174. (1)

Fertilizer Suggestions for Soybeans, NebGuide G87-859 (1)

Fertilizer Know How, Extension Circular EC 73-197. (1)

Soil Test Program, CP-10 Computer program to evaluate the soil needs. (1)

Chemicals in Your Community: A Guide to the Emergency Planning and Right To Know Act. 1988. U.S. Environmental Protection Agency. Pages 26-27 contain information on implications of this law for farmers. (4)

Fertilizer storage:

Fertilizer and Pesticide Containment Facilities Handbook, MWPS-37. Midwest Plan Service, Ames, IA. (3)

Fertilizer and Pesticide Containment Guidelines 1994, NebGuide G94-1185. (1)

Design and Management of Storage Containment of Fertilizer and Pesticides, 1995. Extension Circular EC-95-744. (1)

Publications available from...

1. Your local University of Nebraska Cooperative Extension office or directly from IANR Communications and Information Technology, University of Nebraska-Lincoln, 105 Ag Communications Building, P.O. Box 830918, Lincoln, NE 68583-0918, (402) 472-9712. (There may be charges for the publications, postage, and sales tax.)

2. Your district water supply specialist or the Natural Resource District.

3. Midwest Plan Service publications are available through your local extension office or Agricultural Engineering Plan Service, University of Nebraska-Lincoln, 219A LW Chase Hall, P.O. Box 830727, Lincoln, NE 68583-0727, (402) 472-1646.

4. U.S. Environmental Protection Agency (EPA), Office of Pesticide Programs (TS-766C), 401 M Street S.W., Washington, DC 20460.

5. Freshwater Foundation at Spring Hill Center, 725 County Road 6, Wayzata, MN 55391, (612) 449-0092.

6. Nebraska Department of Environmental Quality, P.O. Box 98922, Lincoln, NE 68509, (402) 471-2186.

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Nebraska Farm*A*Syst team members included: Robert Grisso, Extension Engineer, Ag Machinery; DeLynn Hay, Extension Specialist, Water Resources and Irrigation; Paul Jasa, Extension Engineer;

Richard Koelsch, Livestock Bioenvironmental Engineer; Sharon Skipton, Extension Educator; and Wayne Woldt, Extension Bioenvironmental Engineer.

This unit was modified by Robert Grisso.

Editorial assistance was provided by Bob Midland, Nick Partsch and Sharon Skipton.

Technical reviews provided by: Larry Schulze, University of Nebraska Extension Pesticide Coordinator; Gary Buttermore, Nebraska Department of Environmental Quality; Bob Klein, University of Nebraska Extension Cropping Systems Specialist; Gary L. Zoubek, University of Nebraska Extension

Educator; Gerald R. Bodman, Biological Systems Engineering; Rob Thompson, Pickrell Cooperative, Pickrell, NE; Dave Clabaugh, Lower Big Blue Natural Resources District.

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