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EC98-767 Farm*A*Syst Nebraska's System for Assessing Water Contamination Fact Sheet 4: Improving Pesticide Storage and Handling

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Farm A Syst

FACT SHEET 4

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

Improving Pesticide Storage and Handling

We'll look at five areas of pesticide management on your farm:

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

When handling pesticides, wear proper protective clothing and equipment at all times. See the pesticide label for details.

The pesticide label is a legal document recognized by courts of law. The producer assumes certain responsibilities upon purchase of the product. Read and follow the pesticide label. Read the pesticide label before a purchase, before mixing, before applying, and before storing or disposing of the excess pesticide or empty containers. Normally, a telephone number is provided on the label for further information or questions.

Personal protection is not addressed in Farm*A*Syst, because its focus is groundwater and drinking water protection. The *Contacts and References* section provides some safety information sources.

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 puncture or knock over a jug or rip open a bag or box. 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.

If a spill does occur, an impermeable (waterproof) floor, such as concrete, should virtually eliminate any seepage of chemicals into the ground. Putting a curb around the floor will prevent chemicals from spreading to other areas. Cleanup should be immediate because many pesticides will penetrate and be absorbed into concrete.

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 dilution or transfer of pesticides to spraying equipment or nurse tanks.

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 a few best management recommendations for safe pesticide storage:

1. Locate the facility downslope and at least 100 feet away from your well. Separation from the well 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. (See *Table 1* for water solubilities of commonly used pesticides in Nebraska.) *Understanding Pesticides and Water Quality in*



Table 1. Water Solubilities of Commonly used Pesticides in Nebraska.

Common Name	Trade Name	Water Solubility (mg/L)
Acifluorfen sodium salt (H)	Blazer	immobile
Alachlor (H)	Lasso	intermediate mobility
Aldicarb (I)	Temik	immobile
Atrazine (H)	Aatrex	very mobile
Benefin (H)	Balan	immobile
Bentazon sodium salt (H)	Basagran	very mobile
Bromoxynil butyrate ester (H)	Buctril	very mobile
Butylate (H)	Sutan+	very mobile
Carbaryl (I)	Sevin	mobile
Carbofuran (I)	Furadan	intermediate mobility
Chlorimuron ethyl (H)	Classic	low mobility
Chlorpyrifos (I)	Lorsban, Dursban	very mobile
Chlorsulfuron (H)	Glean	immobile
Clomazone (H)	Command	low mobility
Clopyralid (salt) (H)	Stinger	immobile
Cyanazine (H)	Bladex	intermediate mobility
Cycloate (H)	Ro-neet	mobile
Desmedipham (H)	Betanex	very mobile
Diazinon (I)	DZN, Diazinon	mobile
Dicamba salt (H)	Banvel	immobile
Diclofop-methyl (H)	Hoelon	very mobile
Diquat (salt) (H)	Diquat	immobile
2,4-D ester (H)	Weedone, etc.	mobile
2,4-D amine (H)	2,4-D amine	immobile
2,4-DB salt (H)	Butyrac	immobile
EPTC (H)	Eradicane	intermediate mobility
Ethofumesate (H)	NortonSC	mobile
Fenoxaprop-ethyl (H)	Bugle, (Opt II)	very mobile
Fluazifop-p-butyl (H)	Fusilade-2000	very mobile
Fomesafen (H)	Reflex	immobile
Glyphosate isopropylamine salt (H)	Roundup	immobile
Imazamethabenz-methyl (m-isomer) (H)	Assert	low mobility
Imazamethabenz-methyl (p-isomer) (H)	Assert	low mobility
Imazapyr acid (H)	Arsenal	immobile
Imazaquin salt (H)	Scepter	immobile
Imazethapyr (H)	Pursuit	immobile
Lactofen (H)	Cobra	very mobile
Linuron (H)	Lorox	mobile
Malathion (I)	Cygon	mobile
MCPA (salt) (H)	Rhomene	immobile
MCPA (ester) (H)	various	very mobile
MCPP (H)	2 + 2 (MCPPE+2,4-D)	immobile
Methyl parathion (I)	Mocap	mobile
Metolachlor (H)	Dual	intermediate mobility
Metribuzin (H)	Sencor, Lexone	low mobility
Metsulfuron-methyl (H)	Ally	immobile
Nicosulfuron (H)	Accent	mobile
Oxyfluorfen (H)	Goal	very mobile
Paraquat (H)	Gramoxone Extra	immobile
Pendimethalin (H)	Prowl	very mobile
Permethrin (I)	Ambush, Pounce	very mobile
Phorate (I)	Thimet	very mobile
Picloram (H)	Tordon	immobile
Primisulfuron (H)	Beacon	immobile
Propachlor (H)	Ramrod	low mobility
Pyrazon (H)	Pyramin	intermediate mobility
Quizalofop-ethyl (H)	Assure II	very mobile
Sethoxydim (H)	Poast Plus	immobile
Simazine (H)	Princep	very mobile
Tebuthiuron (H)	Spike	immobile
Terbufos (I)	Counter	very mobile
Thifensulfuron-methyl (H)	Pinnacle	immobile
Triclopyr ester (H)	Crossbow	very mobile
Trifluralin (H)	Treflan	very mobile

(H) - Herbicide, (I) Insecticide)

From *Understanding Pesticides and Water Quality in Nebraska*, EC94-135.

Nebraska, EC94-135, and *Pesticides and Groundwater; an Applicator's Map and Guide to Prevent Groundwater Contamination* (for selected Nebraska counties) in the *Contacts and References* section provide more information on these topics. Also, *Worksheet 2, Site Evaluation*, assists you in ranking your farm soils and geologic conditions according to their ability to keep pesticides and other contaminants out of groundwater.

- In the event of a fire, contaminated surface water should drain to a confined area.
- The mixing and loading area should be close to your storage facility to minimize the distance chemicals are transported.
- The building foundation or secondary containment floor should be well-drained and high above the water table. The finished grade should be 3 inches below the floor and sloped to provide surface drainage away from the building. The subsoil should have a low permeability.
- Provide pallets to keep large drums or bags off the floor. Shelves for smaller containers should have a lip to keep the containers from sliding off. Steel shelves are easier to clean than wood if a spill occurs. Store dry products above liquids or in another area to prevent wetting from spills.

<p>6. If you plan to store large bulk tanks, provide a containment area large enough to confine 110 percent of the contents of the largest bulk container, plus the displaced volume of any other storage tanks and plumbing in the area and the volume of the precipitation from a 25 year, 24 hour storm if the area is not under a roof. <i>Design and Management of Storage Containment of Fertilizer and Pesticides</i> in the <i>Contacts and References</i> section provides 25 year, 24 hour storm information. A sump pump, not a drain outlet, must be used to remove water or spillage.</p> <p>7. A locked storage cabinet or building provides security. Preventing unauthorized use of pesticides reduces the chance of accidental exposure, spills, or theft. Locking valves on containers can add another measure of security. Provide signs or labels identifying the cabinet or building as a pesticide storage area. Labels on the outside of the building give firefighters information about pesticides during an emergency response for fire or a spill.</p> <p>8. Provide adequate road access for deliveries and emergency equipment.</p> <p>9. Keep pesticides separate to prevent cross-contamination. Herbicides, insecticides, and fungicides should be kept on separate shelves or areas.</p>	<p>10. For information on other factors to consider in the design of a storage or secondary containment 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 (402-471-2186) for plans, recommendations, and regulations.</p> <p>Modifying an existing storage facility</p> <p>Even if you decide to improve your current storage building, applying the above principles can be expensive. Compared to the cost of a major accident or a lawsuit, however, storage improvements are a bargain. (Items 5-10 above are also important points to remember for existing storage.)</p> <p>The least expensive alternative may be to cut back on the amounts and types of pesticides stored and purchase only the quantities you will be using in the immediate future. If that's not practical, consider how you can protect the pesticides you keep in storage. Sound containers are your first defense against a spill or leak. Keep a pesticide spill kit handy for immediate use as needed.</p> <p>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. The building should have a solid floor and, for liquid pesticides, a curb.</p>	<p>The secondary containment space should be large enough to hold 110 percent of the contents of the largest full container, plus the displaced volume of any other storage tanks in the area.</p> <p>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 also store pesticides could compromise the safety of people and the environment. Storing chemicals 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.</p> <p>You can reduce damages by anticipating emergencies. Fires in a storage area present a special hazard to people and the environment. If containers are damaged, the stored chemicals could be carried away by water and spread over a large area.</p> <p>Windows and doors can be labeled to alert firefighters to the presence of pesticides and other products stored in the structure. It's a good idea to keep a separate list of the chemicals and amounts stored. Keep a copy of the list in the house or away from the storage area. The list should include MSDS or pesticide labels.</p> <p>If a fire should occur, consider where the surface runoff water will go and where it might collect. For example, a curb around a floor can help confine contaminated water.</p>
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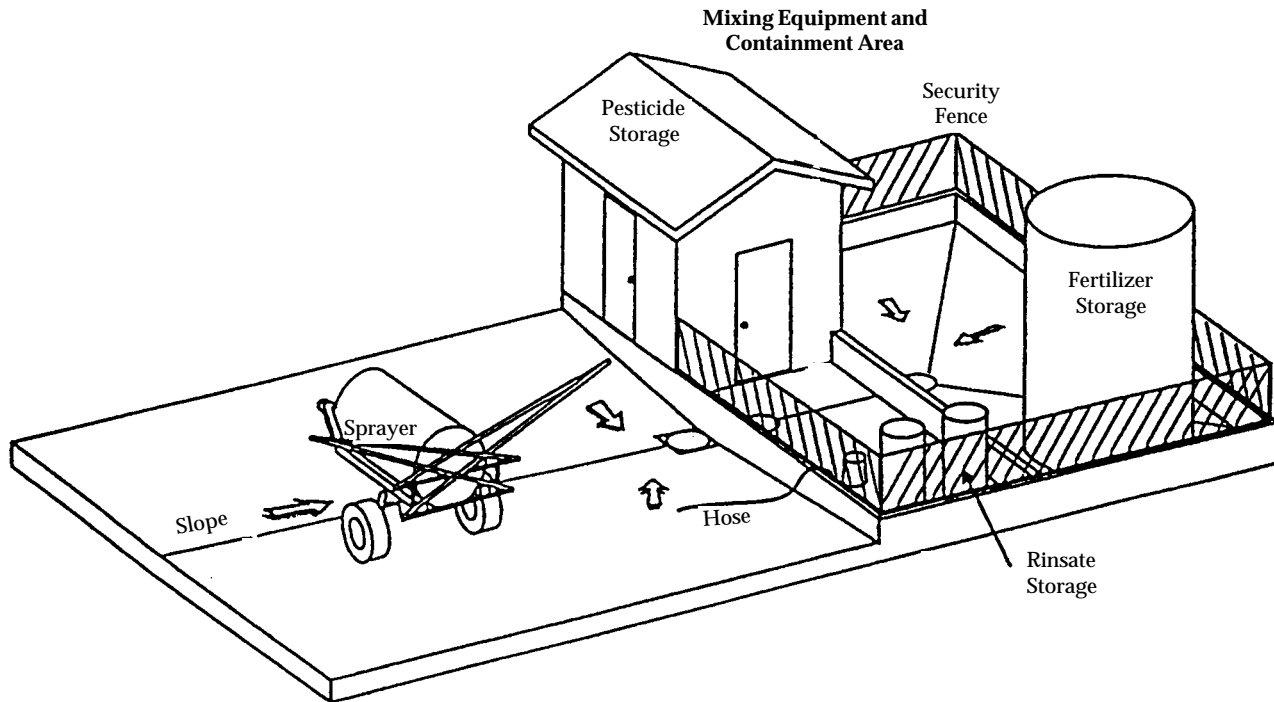


Figure 1. Design and management of storage containment of fertilizer and pesticides.

In making the storage area secure, also make it accessible, to allow getting chemicals out in a hurry.

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. By mixing and loading on an impermeable surface, such as concrete, you can contain and reuse most spilled pesticides.

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 separate 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. Make sure that any water from the pad moves away from the well. 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 local University of Nebraska Cooperative Extension office, the University of Nebraska Biological Systems Engineering, or the Nebraska Department of Environmental Quality at (402) 471-2186.

Better management on your existing mixing and loading site

You can not totally eliminate all spills and leaks, but

you can minimize contamination if one does occur, even if you do not have an impermeable mixing and loading pad, by following these 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 each year within the field of application.
- Avoid mixing and loading on gravel driveways or other surfaces that allow spills to percolate quickly through the soil. A clay surface is better than sand.
- 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 6 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 storage container to applicator equipment (through a hose, for example). Humans and the environment are not inadvertently exposed to the pesticide.

- Use rinsate for mixing or diluting subsequent loads. Spray the rinsate load on the labeled site according to label directions.

3. Spill cleanup procedures

For dry spills, promptly sweep up and reuse 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 and reuse as it was intended. It may be necessary to remove and field apply some contaminated soil.

A Material Safety Data Sheet (MSDS) that accompanies the pesticide should also have other cleanup recommendations.

Title 126, Nebraska Department of Environment Quality, requires that spills of any amount to streams or lakes be reported. On the soil or on a mixing and loading pad, report concentrate spills greater than 1 quart and dilute solutions greater than 5 gallons. Report spills of smaller quantities if they may cause damage because of the specific compound or spill location.

To report spills, call the Nebraska Department of Environmental Quality at (402) 471-2186. After working hours, calls are referred to the Nebraska State Patrol.

Remove the spilled material and contaminated soil no matter what the quantity, and dispose of according to recommendations you receive when the spill is reported.

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

4. Container disposal practices

Unwashed 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 containers immediately after use, because residue can be difficult to remove after it dries. Pour rinse water into the spray tank and apply to the labeled site. Puncture cleaned containers and store them in a covered barrel until you can take them to a permitted landfill or recycling pick-up site.
- Recycle properly rinsed plastic and metal containers whenever possible.
- 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. Even a small amount of residue can harm livestock.

Your drinking water is least likely to be contaminated 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. (For more detailed information about proper disposal of pesticide containers, refer to *Worksheet* and *Fact Sheet 7, Hazardous Materials and Waste Management*. *Fact Sheet 7* also discusses the risks of burning these containers.)

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 needed to apply, keeping records of what you have on hand, and using older products first.

- Buying only what is needed makes long-term storage unnecessary. In addition, you avoid cold weather storage problems, which can make some pesticides useless.
- Recordkeeping may seem like a task unrelated to groundwater contamination, but knowing what was 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. Records are required for Restricted Use Pesticides. Details are available from the Nebraska Department of Agriculture (402) 471-2394. Along with field records, 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.

- 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 local University of Nebraska Cooperative Extension Educator about possible restrictions on their use. (*Worksheet* and *Fact Sheet 7, Hazardous Materials and Waste Management* provide information on how to safely and legally dispose of unwanted and banned pesticides.)

CONTACTS AND REFERENCES

Who to call about...

General pesticide information:

National Pesticide Telecommunication Network, (800) 858-PEST, 8:30 - 6:30 M-F. Provides information on recognizing and treating pesticide poisoning; pesticide products, cleanup, and disposal; contacts for animal poison centers; certification and training programs; and pesticide laws.

Nebraska Department of Agriculture, Plant Industry, P.O. Box 94756, Lincoln, NE 68509-4756, (402) 471-2341. Laws and Regulations concerning Restricted Use Pesticides.

Plans and recommendations for pesticide mixing and loading pads:

Nebraska Department of Environmental Quality, (402) 471-4255.

Health effects of pesticides in water:

National Pesticide Telecommunications Network, (800) 858-7378 for medical and consumer information on pesticides.

The Poison Center, Children's Hospital, Omaha, NE (800) 955-9119.

Nebraska Health and Human Services System, P.O. 95007, Lincoln, NE 68509-5007, (402) 471-2541.

With specific questions, contact your local University of Nebraska Cooperative Extension Educator, health department, or Natural Resources Conservation Service staff.

Drinking water quality and treatment and Health Advisories:

EPA Safe Drinking Water Hotline, (800) 426-4791, 8:30-5:00 EST M-F.

Health and safety information on chemicals:

Chemical Referral Center, sponsored by the Chemical Manufacturers Association, (800) 262-8200. The Center can refer you to the correct manufacturer of a pesticide.

Pesticide spills:

Pesticide Accident Hotline (CHEMTREC). Help in managing spills, leaks, or fires, (800) 424-9300.

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

To report spills or releases, Nebraska State Patrol, (800) 525-5555.

Proper disposal of soil contaminated by a pesticide 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 pesticides in groundwater:

Pesticides in Groundwater: How They Get There; What Happens To Them; How To Keep Them Out. NebGuide G3213. (1)

Understanding Pesticides and Water Quality in Nebraska. Extension Circular EC 94-135. (1)

Pesticides and Groundwater: An Applicator's Map and Guide to Prevent Groundwater Contamination (for selected Nebraska counties). Land Use Map. (8)

Health effects:

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

Material Safety Data Sheets. MSDS information should be available with each pesticide purchased.

Pesticide Safety Telephone Hotline Card. EC-2501. Billfold card with pesticide hotline numbers. (1)

Pesticides: Surface Runoff, Leaching and Exposure Concerns. 1990. University of Minnesota Bulletin AGBU-3911. (3)

Pesticides and Groundwater: A Health Concern for the Midwest. 1986. Freshwater Foundation. (4)

Pesticides: Health Effects in Drinking Water. 1985. Cornell Cooperative Extension. (6)

Health Advisory Summaries. 1989. U.S. Environmental Protection Agency, Washington, D.C. Specifies maximum acceptable levels of pesticide concentrations in drinking water and describes health effects that might be caused by particular pesticides in drinking water. (2)

Pesticide handling and management:

Federally Registered Restricted Use Pesticides. July, 1994. Extension Circular EC-2500. (1)

Use and Care of Clothing Worn for Pesticide Application: A Five-State Survey Report. 1989. RP318. (1)

Fertilizer and Pesticide Containment Facilities Handbook. 1991. MWPS-37. (7)

Nutrient and Pesticide Best Management Practices for Wisconsin Farms. 1989. UW-Extension and DATCP. WDATCP Technical Bulletin ARM-1. (1)

A Consumer's Guide To Safer Pesticide Use. 1987. Free 25-page special reprint from the EPA Journal. (2)

Pesticides: A Community Action Guide. 1985. Concern, Inc., Washington, DC. (6)

Chemicals in Your Community: A Guide to Emergency Planning and Right To Know Act. 1988. Contains information on implications of this law for farmers. (2)

Citizen's Guide to Pesticides. 1989. Free 24-page publication contains information on handling, storage, and disposal of pesticides, reducing exposure to pesticides, and what to do in a pesticide emergency. Also provides addresses and phone numbers for EPA regional pesticide offices and state pesticide agency contacts. (2)

<p><i>Fertilizer and Pesticide Containment Guidelines.</i> NebGuide G1185. (1)</p> <p><i>Design and Management of Storage Containment of Fertilizer and Pesticides.</i> Extension Circular EC95-744. (1)</p> <p>Publications available from...</p> <p>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 publications, postage, and sales tax.</p>	<p>2. U.S. Environmental Protection Agency (EPA), Office of Pesticide Programs (TS-766C), 401 M Street S.W., Washington, DC 20460.</p> <p>3. Minnesota Extension Service Distribution Center, 3 Coffey Hall, 1420 Eckles Avenue, St. Paul, MN 55108-1030, (612) 625-8173.</p> <p>4. Freshwater Foundation at Spring Hill Center, 725 County Road 6, Wayzata, MN 55391, (612) 449-0092.</p> <p>5. Cornell Resource Center, 7 Business and Technology Park, Cornell University, Ithaca, NY 14850, (607) 255-2080.</p>	<p>6. Concern, Inc., 1794 Columbia Road N.W., Washington, DC 20009, (202) 328-8160.</p> <p>7. 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.</p> <p>8. Conservation and Survey Division, University of Nebraska-Lincoln, 113 Nebraska Hall, P.O. Box 880517, Lincoln, NE 68588-0517, (402) 472-7523.</p>
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