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Fact Sheet #7

Best Management Practices for Agricultural Chemical Handling, Mixing, and Storage

Storage and handling of pesticides and fertilizers in their concentrated form poses the highest potential risk to surface or ground water from agricultural chemicals. For this reason, it is essential that facilities for the storage and handling of these products be properly designed, sited, and managed. Colorado law (SB 90-126) requires operations handling large volumes of agricultural chemicals to comply with containment regulations. Operations who fall below the thresholds for mandatory containment should observe best management practices (BMPs) for handling these concentrated products.

The ideal facility provides:

- Separate storage areas for pesticide and fertilizer which are secured and keep the product out of the weather
- Secondary containment of the stored products
- A safe mixing and loading area away from water resources
- Worker protection features such as showers, first-aid, and spill clean up kits

The ideal management:

- Minimizes the amount of chemicals stored and handled
- Reduces rinsate, container, and product waste
- Maintains good records of all chemical use

Pesticide and Fertilizer Storage

Plan your storage facilities as a secured, single use area, separate from other activities and storage (feed, seed and fuel). Design the storage area to protect pesticides and fertilizers from possible theft, unauthorized use by untrained personnel, and temperature extremes. Federal law requires that concentrated pesticide be stored in a secured area. Therefore, outdoor storage containers should be located within a permanently fenced area. Be sure to post warning signs near each entrance to the storage facility.

In most cases, pesticide and fertilizer should be stored separately to minimize the possibility of cross contamination or hazardous waste in the case of fire or other disaster. Small operations can avoid the need

for multiple storage areas by constructing separate containment for pesticide and fertilizer within the same structure. Whenever possible, you should minimize storage of chemicals to avoid the associated risks. Purchasing only the amount of chemical needed, keeping tight inventory control, and using returnable container systems can help small operators minimize storage. However, even small operations need the insurance of a well designed and managed facility. The cost of these preventive measures is far less than the potential costs of a cleanup or lawsuit.

Secondary Containment

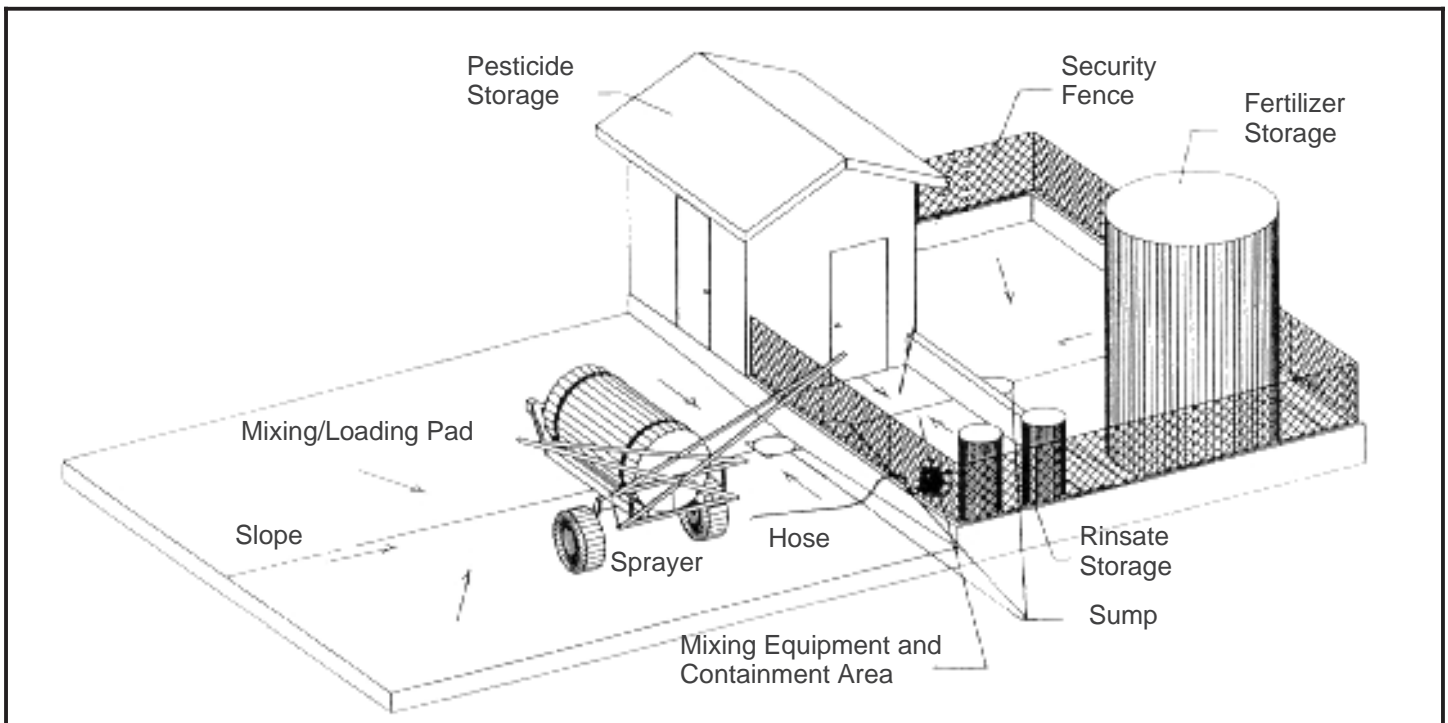
Secondary containment is essentially a back-up system built around primary pesticide and fertilizer storage to capture products that may escape due to leaks or spills. Secondary containment protects the environment from accidental leaks and spills of bulk liquid storage tanks by preventing spills from entering the soil and possibly surface or ground water. Separate containment should be provided for pesticide and fertilizer storage.

Acceptable Containment Methods and Strategies

- Minimize volume and duration of pesticide stored on site
- Double tanks for small volumes
- Concrete floor and walls
- Concrete curbed areas surrounding small volume storage
- Steel floors and walls
- Fiberglass or plastic walls and floors
- Synthetic liners over concrete or composition walls
- Approved portable synthetic containment units

Containment Sizing and Design

Secondary containment facilities should be large enough to hold the entire capacity of the largest storage tank, plus allow freeboard for any other items that may displace storage volume. Rules and regulations pertaining to Colorado law (SB 90-126)



Combination mixing and storage area for pesticide and fertilizer handling.

Source: Designing Facilities for Pesticide and Fertilizer Containment, (MWPS-37)
 MidWest Plan Service, Agricultural Engineering, Iowa State University, Ames, IA.
 1991

require that the capacity of the containment be 110% of the volume of the largest container when protected from precipitation, or 125% of the largest container when unprotected from precipitation.

Mixing and Loading Facilities

The site where pesticides and fertilizers are mixed and loaded prior to application is usually the most vulnerable area to contamination from spills. Unfortunately, it has been common procedure in the past to mix and load chemicals at a single, unprotected location with little thought given to surface or ground water proximity. Business operators may be liable for cleanup of these sites, even after selling the property, if mishandling of agricultural chemicals results in environmental contamination.

One method for avoiding site contamination problems is to mix and load chemicals at the application site. Colorado SB 90-126 exempts operators from utilizing a permanent concrete pad if they mix and load at the application site. Take a nurse tank to the field for mix and wash water and be sure to stay a safe distance from any wells or surface water. A minimum setback of 100 feet, depending on slope and soil characteristics, should be observed to protect water quality. Avoid mixing at the same spot in the field each time you spray and take precautions to prevent spills of any chemical, especially herbicide, during field mixing. The use of direct injection sprayers is becoming commercially feasible, and should be considered by all operators. Direct injection from mini-bulk or small two-way containers allows operators to greatly minimize chemical contact, spills, and waste.

Facilities Maintenance

The life of pesticide and fertilizer storage, containment, and mixing and loading facilities can be substantially extended with regular maintenance. Inspect the facility thoroughly on a seasonal basis to stay ahead of maintenance requirements of the facility. Preventative maintenance can minimize factors that cause deterioration and prevent small problems from becoming large ones.

Good housekeeping procedures are also important to prolonging the life of the facility. Cleaning up fertilizer or pesticide spills promptly will prolong the life of the structure. Keeping the sump, pipes, tanks, and fittings clean and free of corrosion is also important to extending facility life. Keep metal fixtures painted and apply a protective surface coating over high wear concrete and joints. Concrete cracking is a fact of life that must be dealt with as a necessary part of routine maintenance. Cracks which are active are warning signs and should not just be covered up. Determine the cause of the cracks and take the appropriate steps to correct the situation.

Waste Management

Dealers, commercial applicators, and farmers who handle agricultural chemicals must contend with the proper disposal of rinsate, empty containers, and other waste.

To minimize waste at the agricultural chemical handling site:

- Purchase only the amount of chemical needed for each season
- Return unused chemicals to avoid over-winter storage
- Mix only the precise amount of chemical needed for the immediate job
- Calibrate your sprayer properly so that your application rate is correct
- Use rinsate as make-up water for the next spray batch. Be sure rinsate water is compatible with chemical
- Use mini-bulk and two-way containers to eliminate container waste
- Mix chemicals and clean equipment at the application site to reduce rinsate water
- Recycle empty pesticide containers whenever possible
- Utilize direct injection spray systems and mini-bulk containers to reduce pesticide waste
- Roof mixing pads and secondary containment to reduce stormwater handling accumulation

Recordkeeping

Recordkeeping is an important aspect of managing an agricultural chemical facility. Good records document problems and help managers improve their operations. A written record of all inspections and maintenance should be made on the day of the inspection or maintenance and should be kept at the facility. Inspection and maintenance records should contain the name of the person making the inspection or maintenance, the date, conditions noted, and any maintenance performed. The operator should inventory, measure, and record the liquid level in each storage container at least once a month.

Emergency and Discharge Response Plan

The operator of a fertilizer or pesticide storage facility should prepare a written emergency and discharge response plan for the storage facility. The operator should keep the plan current at all times and keep employees trained in its operation. A copy of the plan should be kept at a prominent location at the storage facility and, if applicable, at the nearest local office from which the storage facility is administered. The plan should be made available for employee use and for inspection. Operators of storage facilities should provide a copy of the plan and a current chemical inventory to the local fire department.

The plan should include:

- The identity and telephone numbers of the persons or agencies who are to be contacted in the event of a discharge, including persons responsible for the stored chemical.
- The procedures and equipment to be used in controlling and recovering or otherwise responding to an emergency or discharge.
- For each chemical stored at the facility, a complete copy of the storage container labeling.
- The identification and location of every fixed storage container located at the facility.

Proper handling of concentrated pesticides and fertilizers reduces the potential risk to surface or ground water. It is much easier and more cost effective to prevent contamination than to clean it up after it happens

For more in-depth information or specific inquiries about BMPs or containment facilities, contact CSU Cooperative Extension or the Colorado Department of Agriculture. They have publications, programs, and specialists that can help you prevent water pollution.

Related materials that are available include:

SB 90-126 Rules and Regulations - Pesticides and Fertilizers. Colorado Dept of Agriculture. 1994

Designing Facilities for Pesticide and Fertilizer Containment. MidWest Plan Service #37. 1991

Plans and Specifications for Mixing/Loading Pad and Pesticide Storage Building. David W. Kammel and Ronald T. Noyes. In: Pesticide and Fertilizer Containment Symposium 2. Conference Proceedings. MidWest Plan Service. 1994