

Best Management Practices For Pesticide And Fertilizer Storage And Handling

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Best Management Practices for Pesticide and Fertilizer Storage and Handling

Storage and handling of pesticides and fertilizers in their concentrated forms pose the highest potential risk to ground or surface water from agricultural chemicals. For this reason, it is essential that facilities for the storage and handling of these products be properly sited, designed, constructed, and operated. Colorado law (SB 90-126) now requires operations handling large volumes of bulk agricultural chemicals to comply with containment regulations. Operators who handle amounts of pesticides and fertilizers which fall below the thresholds for mandatory containment should observe Best Management Practices (BMPs) for handling these concentrated products.

Economic considerations, including liability and property transfer problems, as well as fire and environmental hazards should constitute a strong inducement for operators to evaluate current agricultural chemical practices and facilities. This publication contains suggestions for operators to consider for their enterprise. Consult with local authorities and professional engineers for specific zoning ordinances and technical advice prior to site selection and construction.

Agricultural chemical facilities include storage and the mixing and loading site. The size and function of these facilities will vary from small private land owners to large

commercial dealers. However, all operators need properly designed facilities which promote worker safety and environmental protection.

The ideal facility provides:

- separate storage areas for pesticides and fertilizers that are secured and keep the products out of the weather (storage buildings should be located at least 50 feet from other buildings);
- secondary containment of the stored products;
- a safe mixing and loading area away from water resources; and
- worker protection features such as showers, first aid, and spill clean-up kits.

Proper management of the containment facility is an important aspect of responsible pesticide use. Use of poor practices at these sites can lead to serious liability problems and a poor public image for agricultural applicators and dealers.

The ideal management practices:

- minimize the amount of agricultural chemicals stored and handled;
- reduce waste such as rinsate, containers, and partially used product;

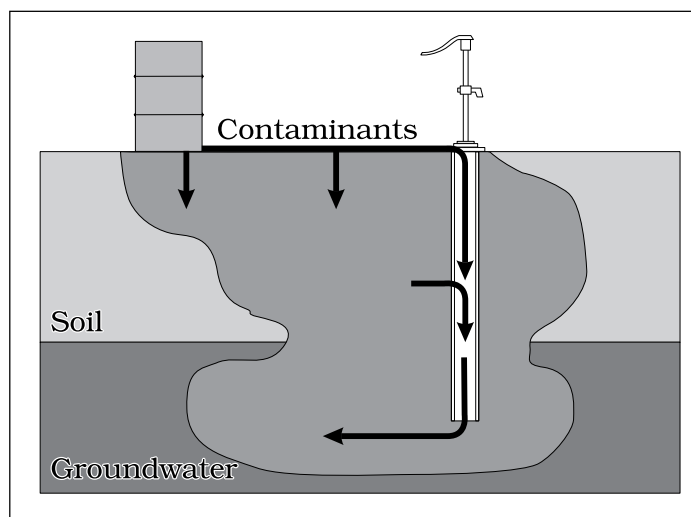


Figure 1. Concentrated products handled near water resources present the highest risk of drinking water contamination.

The BMP Approach

The Colorado Legislature passed the Agricultural Chemicals and Groundwater Protection Act (SB 90-126) to promote the adoption of Best Management Practices to protect groundwater. The Act calls for mandatory fertilizer and pesticide containment if certain thresholds are exceeded. Operators of these facilities can further reduce the potential for groundwater contamination by adopting BMPs for chemical containment and minimization. Those operators whose facilities are exempted from mandatory containment are also strongly encouraged to voluntarily adopt BMPs for agricultural chemical containment. BMPs are recommended methods, structures, or practices designed to prevent or reduce water pollution. Voluntary adoption of BMPs will help prevent contamination of water resources, improve public perception of the industry, and perhaps eliminate the need for further regulation and mandatory controls.

- maintain good records of all chemical use; and
- provide preparation and training to respond to emergencies.

Regulations

Several laws govern facilities for pesticide and fertilizer storage, mixing, and loading. These are predominantly federal laws under the jurisdiction of the Environmental Protection Agency (EPA) or state laws under either the Colorado Department of Agriculture (CDA) or the Colorado Department of Health (CDH). However, more stringent local ordinances have been adopted in some Colorado municipalities. The intent of most of these regulations is to develop standards that stimulate good storage and handling practices to protect the environment. The principles behind these regulations are BMPs designed

to protect water quality, and they are applicable to all pesticide and fertilizer facilities.

Colorado SB 90-126 and its associated rules and regulations require:

- Secondary containment of any storage facility that stores pesticides in bulk quantities (containers larger than 55 gallons liquid or 100 pounds dry). However, DOT 57 or MACA 75 approved mini-bulk containers up to 660 gallons are exempted.
- Mixing and loading pads where at least 500 gallons of liquid formulated product or at least 3,000 pounds of dry formulated product are handled annually. Pads are also required where 1,500 pounds of active ingredient of a combination of liquid and dry products is handled annually. Bulk pesticide storage facilities required to have secondary containment must also have a mixing and loading pad.
- Secondary containment for liquid fertilizer storage where any container or series of interconnected containers has a capacity of greater than 5,000 gallons, and for dry storage facilities with at least 55,000 pounds of bulk fertilizer.
- Mixing and loading pads for fertilizer storage facilities required to have secondary containment.
- Field mixing and loading of pesticides and fertilizers are exempt from these rules and regulations.

Other state and federal laws also regulate the handling of agricultural chemicals.

The Federal Insecticide, Fungicide, and Rodenticide Act is administered by EPA and establishes requirements that address storage, mixing and loading/unloading of pesticides. These requirements are stated as part of the pesticide label.

The Colorado Pesticide Act, administered by CDA, requires that pesticide storage, mixing, and disposal be performed as per requirements on the pesticide label.

The Colorado Pesticide Applicator's Act administered by CDA has general requirements for storage of pesticides by commercial applicators.

The Colorado Hazardous Waste Act and the federal **Resource Conservation Recovery Act** regulate hazardous wastes generated at agricultural chemical handling facilities.

Always check with state and local authorities for regulations governing each site. Federal regulations have jurisdiction in the absence of more stringent state or local regulations.

Do the SB 90-126 Storage and Containment Regulations Apply to You?

PESTICIDES		<u>YES</u>	<u>NO</u>
Secondary Containment:			
<ul style="list-style-type: none"> Do you store pesticides in containers larger than 55 gallons for liquid pesticides or 100 pounds for dry pesticides that are not DOT approved? 		<input type="checkbox"/>	<input type="checkbox"/>
Mixing and Loading Pads:			
<ul style="list-style-type: none"> Do you mix and load (at one site annually) more than: <ul style="list-style-type: none"> a) 500 gallons of concentrated liquid pesticide <li style="text-align: center;">or b) 3,000 pounds of dry concentrate <li style="text-align: center;">or c) 1,500 pounds of active ingredient of a combination of liquid and dry products? 		<input type="checkbox"/>	<input type="checkbox"/>
FERTILIZERS			
<ul style="list-style-type: none"> Do you store liquid fertilizer in a container or series of interconnected containers with a capacity of greater than 5,000 gallons? 		<input type="checkbox"/>	<input type="checkbox"/>
or			
<ul style="list-style-type: none"> Do you store bulk (containers larger than 100 pounds) dry fertilizer in quantities of 55,000 pounds or more? 		<input type="checkbox"/>	<input type="checkbox"/>
Field mixing and loading of pesticides and fertilizers is exempt from these containment regulations.			

If you answered **yes** to any of these questions, the storage and containment regulations promulgated under Colorado SB 90-126 may apply to your operation. Contact the Colorado Department of Agriculture for further clarification on these rules.

Site Selection

Human and environmental safety should always be considered before locating fertilizer or pesticide facilities. Determine the potential vulnerability of the groundwater at the site by comparing aquifer depth and the permeability of the overlying material. Surface water hazard generally is a function of distance, slope, and runoff at the site. Seek professional help if you are unsure how to meet local codes and evaluate environmental vulnerability.

Existing Sites

Evaluate the existing site to determine its suitability for pesticide and fertilizer storage and handling before building any new facilities. Baseline values for environmen-

tal contaminants on the construction site should be determined by testing soil, groundwater, and surface water. If these baseline values are not established and the site is later found to be contaminated, it will be difficult to determine if the contamination was a result of the old site or the new facilities.

An environmental assessment may be a valuable tool to consider when deciding where to locate a facility. The assessment will determine baseline information and the suitability of the site. It is intended to detect the presence of contamination, if any, and the level and extent of contamination. If any contamination is found, sample soil and groundwater to determine the full extent of the contamination.

New Sites

Choose a new site based on the same concerns as an existing site. Environmental assessment of new sites is also recommended prior to purchase to determine suitability of the site for your operation. Consider the new location in relation to water supplies, populated areas, traffic patterns, and potential future development.

Facility Site Plan

When considering the construction of a facility, sketch out a site plan and document:

1. Location of proposed chemical facilities in relation to surrounding property and traffic patterns
2. Soil type
3. Depth to groundwater
4. Depth and location of wells, both on the site and within 100 feet of the property
5. Distance and direction to surface water
6. Plan of construction
7. Proximity to 100-year flood plain
8. Drainage of water across the property during storms
9. Operational plan for containment areas showing the containment strategy, handling of recovered chemicals and rinse water, and handling of precipitation accumulation and waste.

Components of the Agricultural Chemical Facility

Fertilizer and pesticide facilities include: storage buildings and tanks; sites where products are unloaded, handled, and loaded into application equipment or transport equipment; and areas where equipment is cleaned and stored.

Properly designed facilities are important to promote storage, handling, and disposal practices that enhance worker safety and minimize the risk of contamination. An ideal facility incorporates safety features in all aspects of its design and provides:

- storage and handling facilities dedicated only to agricultural chemicals (this means the storage area is not part of any other building, such as the barn or equipment shed; a facility should be located at least 50 feet from any other building);
- secure storage of pesticides separate from fertilizers;
- secondary containment of minor spills resulting from normal mixing/loading operations;
- secondary containment of major, accidental spills or leaks (separate secondary containment for pesticides and fertilizers);
- facilities for collecting, storing and recycling excess tank mix and rinsate;

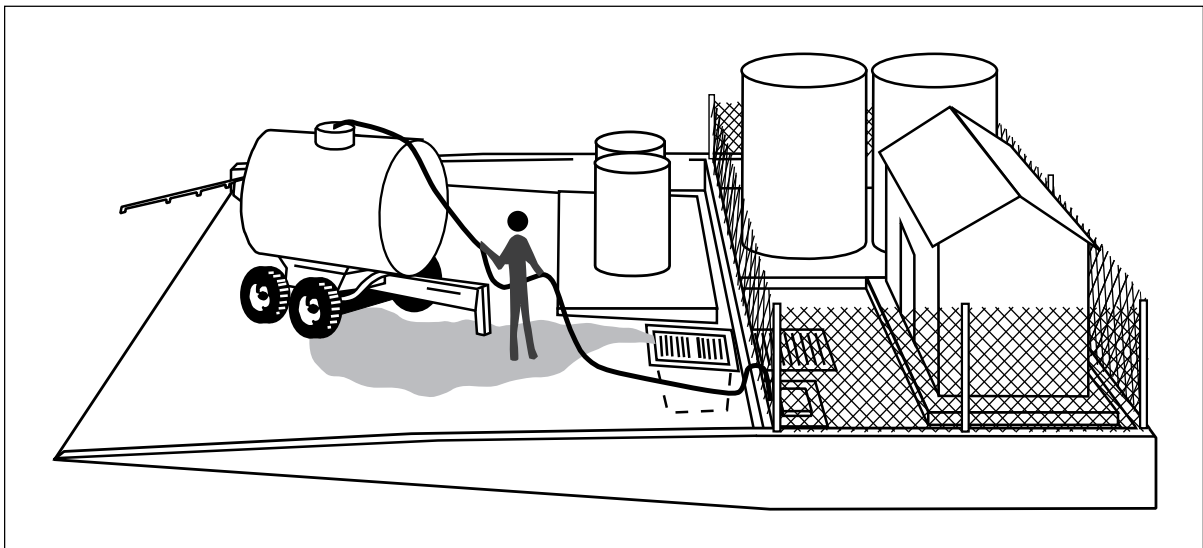


Figure 2. View of a combination mixing and storage facility for pesticide and fertilizer.

- a dry, secure area for storing empty containers and other waste prior to proper disposal;
- office facilities for effective management, recordkeeping, and communications;
- accessible storage for personal protection equipment and emergency supplies; and
- worker convenience facilities such as restrooms, showers, and laundry.

Proper facility design reduces the risk of contamination from normal handling practices and accidents by preventing the movement of pesticides and fertilizers to ground or surface water. The capital investment for such facilities can be high, but using standardized plans can reduce the design cost of these facilities. Predesigned plan sets are available through Colorado State University Cooperative Extension, Colorado Department of Agriculture, or the MidWest Plan Service. In some cases, a registered professional engineer may be able to design facilities that meet the requirements at a lower construction cost than predesigned plans.

The cost of containment facilities may discourage those operators who fall below the regulatory thresholds from developing the needed facilities. However, most operators should begin long-range planning for such facilities. In the interim, BMPs which reduce the hazards associated with handling concentrated products should be implemented. While good facilities are key to protecting workers and the environment, proper management and handling procedures will determine the success of your containment strategy.

Storage Facilities for Pesticide and Fertilizers

Storage areas usually include a storage building or warehouse, and many times include bulk storage tanks and a fenced yard as well. 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 pesticides 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, pesticides and fertilizers should be stored separately to minimize the possibility of cross contamination or creation of hazardous waste in the case of fire or other disaster. Small operations can avoid the need for multiple storage areas by constructing separate containments for pesticides and fertilizers 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.

Fluid Fertilizers

Fluid fertilizer should not be stored in an underground or lined pit storage container. Underground tanks are strictly regulated by the EPA under RCRA and expose operators to unnecessary liability. For most operators, underground storage of any agricultural chemical is a risky choice.

Although it is not mandatory, valves on fertilizer storage containers should be locked or otherwise secured except when persons responsible for the facility security are present. Valves on rail cars, nurse tanks, and other mobile pesticide containers parked overnight at a storage facility also should be locked or secured.

Liquid Pesticides

Always store pesticide by container size and product in locked buildings with impermeable floors. Herbicides, fungicides, and insecticides should be separated to prevent cross contamination. Never store liquids below grade or in a basement. Small boxes and jugs should be kept on shelves, while drums and mini-bulks should be kept on floor pallets. Small volume returnables or mini-bulks in DOT approved containers will help small operations reduce the problems of storing unused product and minimize container disposal problems. Additionally, pesticides stored in these containers are exempted from requirements for secondary containment under SB 90-126.

Dry Pesticides and Fertilizers

Stored dry products pose little threat to groundwater as long as they are kept dry. Stored dry pesticide and fertilizer should be covered by a roof or tarpaulin which will keep precipitation off the product. Always keep dry products on pallets to reduce the possibility of water damage.

Pesticide and Fertilizer Storage Checklist

- Pesticide and fertilizer stored in separate containments.
- Storage facilities secured and placarded with appropriate warning signs.
- Dry products stored above liquid products, or in separate areas.
- Inventory of type and quantity of each chemical maintained.
(Provide your local fire department with a detailed diagram of all storage locations and facilities.)
- Storage area located a safe distance away from any wells or surface water. Runoff diverted from the storage area.
- Adequate lighting, ventilation, and fire extinguishers installed.
- Routine inspections of the storage area conducted to check for leaks and spills.
(Maintain a log book to document facility inspections and repairs.)

Secondary Containment for Pesticide and Fertilizers

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

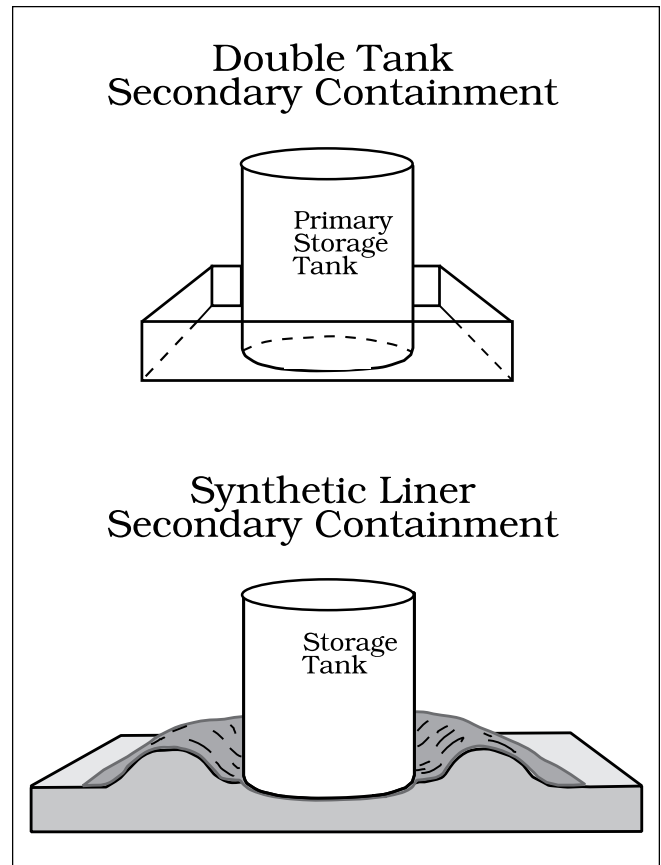


Figure 3. Several acceptable methods exist for secondary containment of storage units.

Several strategies can be used for secondary containment of pesticides and fertilizers. Fertilizer containment usually covers a larger area because of the size of the tanks used to store fluid fertilizers. Fertilizer can be contained in a dike constructed of concrete, a synthetic liner system, or a relatively impervious soil (bentonite, attapulgite, natural clay). Pesticides, rinsate, and wastewater may be contained in a concrete dike or synthetic liner system such as a plastic or fiberglass tub (Figure 3). Clay liners are not suitable for pesticide containment.

Acceptable Containment Methods and Strategies

Pesticides:

1. Minimize volume and duration of pesticide stored on site
2. Double tanks for small volumes
3. Concrete, steel, fiberglass, or plastic floor and walls
4. Concrete curbed areas surrounding small volume container storage
5. Synthetic liners with concrete or composition walls
6. Approved portable synthetic containment units

Fertilizers:

1. Minimize volume and duration of fertilizer stored on site
2. Synthetic liners over a prepared earthen surface
3. Sealed asphalt floors around concrete pads for dry products
4. Earthen dikes of compacted clay or bentonite
5. Dust control boots for dry fertilizer conveyors

Containment Sizing and Design Considerations

Secondary containment facilities for bulk storage 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) require that the capacity of the containment be 110% of the volume of the largest bulk container when protected from precipitation or 125% of the largest container when unprotected from precipitation.

The wall and floor of a secondary containment should be impervious to liquids for the life of the structure. Secondary containment should support gravity loads of full tanks and should resist weather-related cracking and corrosion. The walls should resist static and hydraulic loads from the equilibrium liquid level. Walls adjacent to large tanks also need to resist dynamic hydraulic loads from liquids gushing from a ruptured tank.

Secondary containment should be sloped to a sump so spilled material or precipitation can be easily collected and removed. Tanks should be anchored to prevent flotation in the event the containment area is filled with fluid. Wall height of the containment area should be low enough so workers can easily see in and step over the wall. Flexible hoses at the pipe-to-tank connection will prevent potential plumbing rupture if a tank floats or shifts. In most cases, help from a professional engineer is needed to design a facility that meets all requirements and design considerations.

Synthetic Liners

Synthetic liners such as Hypalon, synthetic rubber, and others can be used to contain fertilizers and may be suitable for small operations that do not meet regulatory thresholds. Prior to installation, obtain written confirmation of compatibility and a written estimate of the life of the liner from the manufacturer. (This should be kept at the facility as a permanent record.) Synthetic liners should be installed per manufacturer's specifications and under the supervision of a qualified representative of the manufacturer. All seams should be tested, and repaired if necessary, in accordance with the manufacturer's recommendations.

Synthetic liners should have a minimum thickness of 30 mils, and be chemically compatible with the materials being stored within the structure. The synthetic liner should be protected by a 6-inch soil layer below the liner and a 12-inch gravel layer above the liner. Soil layers should be free of large rocks, angular stones, sticks or other materials which may puncture the liner.

Secondary Containment Checklist

- Adequate containment exists for stored chemicals.
- Containment area cleaned regularly and immediately after any spill or leak.
- Regular inspection of containment facility to ensure good repair.
- Stormwater collected promptly and disposed of, or used for make-up water.
- Sump pumps manually operated.
- All transfer pumps, pipes, hoses, and valves located above ground for easy inspection.
- Containment facility located a safe distance from any water body or supply well.

Mixing and Loading Facilities for Pesticide and Fertilizers

The site where pesticides and fertilizers are mixed and loaded prior to application is usually the most vulnerable area to contamination from spills and leaks. Unfortunately, it has been common procedure in the past to mix and load chemicals at a single, uncontained location with little thought given to ground or surface 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.

An operator can avoid site contamination problems by mixing and loading chemicals at the application site. Colorado SB 90-126 exempts operators from pad requirements 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 surface 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.

Producers might also consider using commercial pesticide and fertilizer applicators to avoid the problems associated with storing and handling chemicals.

Operators who have no other option than to mix and load chemicals at a fixed location need permanent pads to control chemical spillage. Colorado SB 90-126 defines who is legally required to have approved mixing and loading pads. However, all operators who handle chemicals should consider these pads a BMP.

A number of factors must be considered before constructing mixing and loading facilities. Proper site selection, well setbacks, local zoning restrictions, worker safety, traffic patterns, security, future business needs, as well as state and local regulations must all be considered in the design. Since most pads must be constructed of concrete in order to bear equipment loads, it is strongly suggested that a registered professional engineer assist in the design.

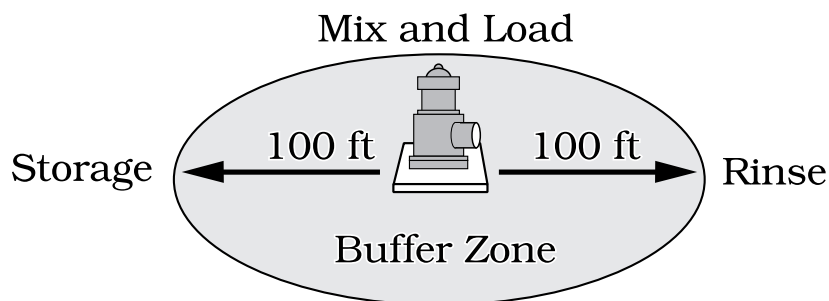
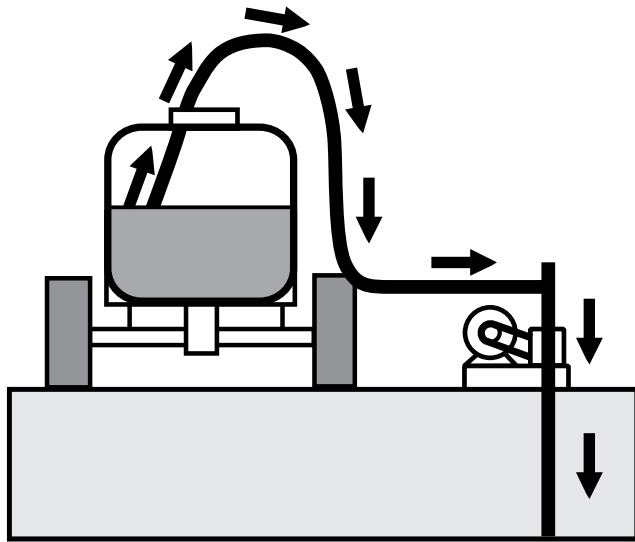
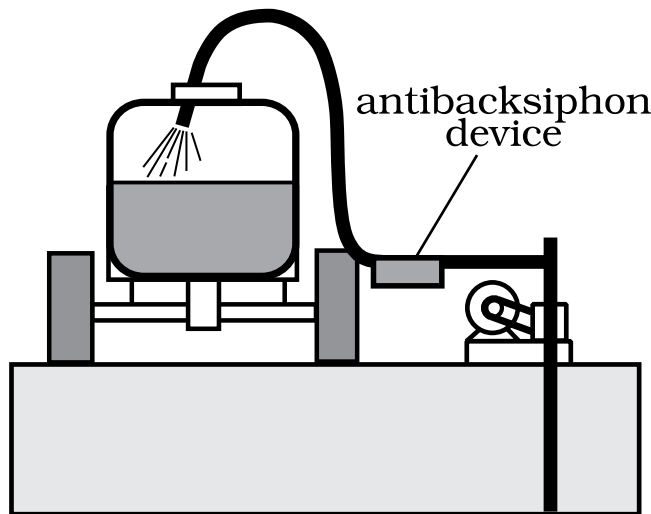


Figure 4. Maintain a buffer zone a safe distance from any surface water or well.



Avoid backsiphoning into water source



Keep fill hose above water level

Figure 5. To avoid backsiphoning, always create an air break between the fill hose and water level and install approved backflow prevention devices.

While reinforced concrete is the preferred material for constructing mixing and loading pads, other options exist. Transportable concrete modules, sealed asphalt, steel, and plastics are potentially acceptable. Several manufacturers are now marketing flexible or inflatable walled synthetic, drive-over pads that can be transported. These may work well for operations at temporary or field mixing sites.

In general, pads should be designed to cover the smallest area possible, but be large enough to contain equipment and a volume of 110% of the largest tank handled indoors or 125% of the largest tank handled in an outdoor facility. The loading pad volume requirements may be achieved with a curbed containment area and a shallow sump. Minimizing pad size and roofing the structure are important considerations for reducing stormwater volume. Roofs constructed over open air secondary containment and mixing pads relieve the operator from the continued problems associated with stormwater removal. Pads should be constructed with a nondraining, shallow sump to facilitate cleanup of spills, rinsate, wastewater, and stormwater. The pad and the sump should be kept clean with an operator-controlled pump. It is a good idea to keep the sump covered when not in use to minimize dust and debris accumulation.

Water supply tanks should be located outside of the containment area. If piped water is used to supply mix and wash water, it is essential that backflow prevention devices or an air gap be implemented to prevent contamination (Figure 5).

Mixing and Loading Checklist

- Mixing, loading, and equipment cleanup conducted at the application site whenever possible.
- Direct chemical injection systems installed on spray equipment to avoid mixing problems.
- Mixing area located a safe distance from any potential environmental hazards.
- Pads constructed and managed in accordance with federal, state, and local regulations and guidelines.
- Rinsate stored in properly labeled containers.
- Pad and sump cleaned daily or after each use.

Management of Containment Facilities

The life of pesticide and fertilizer storage, containment, and mixing 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. Preventive 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. Clean up fertilizer or pesticide spills promptly to prolong the life of concrete. Keep the sump, pipes, tanks, and fittings clean and free of corrosion. Keep metal fixtures painted and apply a protective surface coating over high-wear concrete and joints. Seal concrete cracks as part of a regular maintenance program. 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.

Pesticide/Fertilizer Storage and Handling Facility Maintenance Checklist

Routinely inspect and maintain the following:

- Storage tanks (corrosion, mechanical damage, leaks)
- Tank valves and fittings
- Tank supports and anchors
- Containment area drainage
- Emergency and safety equipment
- Concrete joints and sealants
- Concrete floor and wall surfaces
- Sumps and sump pumps
- Protective coatings and paint
- Electrical systems and controls
- Sight gauges

Recordkeeping

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 records should contain the name of the person making the inspection, the date of each inspection, 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.

Waste Management

Pesticide and fertilizer that collects or is spilled on containment pads must either be land applied at proper rates or must be disposed of as a waste. Due to the costs associated with handling hazardous wastes, efforts should be made to minimize the amount of soil, water, or debris accumulating on the pad, and all chemical spills or rinsate must be recovered immediately. In most cases, spilled chemicals can be land applied or used in the next spray batch.

The mixing and loading pad may be used solely to contain incidental spills that occur during chemical handling, or it may be used for routine cleaning of equipment in addition to spill containment. Rinsates collected during equipment washing place an additional management demand on operators of these facilities. Sumps should be pumped dry after each cleaning operation to maintain pad capacity and avoid cross contamination. Rinsate may be applied to fields as fertilizer or pesticide according to label. However, a more cost-effective method is to store rinsate in dedicated tanks for use as make-up water in the next spray batch. It is important to avoid incompatible spray mixtures or mixtures of pesticides labeled for different crops. Rinsate tanks should be clearly marked with the type of material they contain and operators must exercise a high level of management to avoid cross contamination.

Accumulated sediment containing pesticide residues should be removed from the sump before cross contamination with other pesticide occurs. This sludge can be used as a pesticide on a labeled crop or it can be disposed of as waste. For most agricultural pesticides, the contaminated sludge can be mixed with dry fertilizer and applied to cropland in compliance with label conditions. If the pesticide or pesticides in the sludge are unknown, the material cannot be legally applied as a pesticide and must be handled as waste. For this reason, it is important to clean the pad and sump whenever pesticides are changed.

Incidental spills and leaks can be managed in one of two ways. Small spills may be cleaned off the pad using a dry absorbent material such as cat litter and stored in a clean drum for subsequent application or disposal. Larger spills may be washed down with sufficient water to flush the material into the sump. The water in the sump should be pumped out before the end of the work day.

A dealer, commercial applicator, or farmer who handles pesticides or fertilizers also must contend with the proper disposal of empty containers and other waste. The most effective waste management practices reduce the total amount of waste that must be handled.

To minimize waste at the agricultural chemical handling site:

- purchase only the amount of chemical needed for each season;
- return unused chemicals to your dealer in a timely manner 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 chemically compatible with the pesticide or fertilizer mixed, and that all label restrictions are observed;
- 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; and
- roof mixing pads and secondary containment to reduce stormwater handling problems.

Worker Safety

Knowledge of safety procedures is essential for all workers where pesticides and fertilizers are stored and used. Operators using pesticides and fertilizers should provide safety training and equipment. Pesticide labels specify the appropriate protective equipment and clothing to wear. The USEPA Worker Protection Standards (40 CFR 170) may apply to your operation and should be followed to protect employees from pesticide hazards.

Safety equipment such as emergency showers, eye flush fountains, up-to-date first aid kits, complete spill cleanup kits and current MSDS for the appropriate products should be available near the work area to allow easy access. Be sure to locate all personal protection equipment in a clearly accessible area partitioned from the stored products.

Implementation of safety training programs for new employees, and regular reviews of safety procedures for all employees, are recommended. Inform all workers of the types of materials they handle, how to handle them safely, and the potential health risks involved. A list of emergency numbers should be available at all times, and an emergency response plan should be developed to deal with any incident that may take place.

Emergency 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. 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:

1. 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.
2. The procedures and equipment to be used in controlling and recovering or otherwise responding to an emergency or discharge.
3. For each bulk chemical stored at the facility, a complete copy of the storage container labeling.
4. The identification and location of every fixed storage container located at the facility.

Persons employed at the storage facility should be trained in discharge response procedures outlined in the emergency and discharge response plan. New employees should receive training and should not participate in emergency responses until such training is completed.

Important Phone Numbers

Colorado Department of Agriculture
Pesticide Section (303) 239-4140
Fertilizer Section (303) 477-0081
State of Colorado Office of
Emergency Management (303) 273-1622
Colorado State University Cooperative
Extension (303) 491-6281
EPA Region VIII Pesticide Office (303) 293-1745
EPA National Response Center (800) 424-8802
CHEMTREC Emergency Hotline (800) 424-9300
Poison Control Center (800) 332-3073
Local police, fire, or sheriff 911 (usually)

For more information about fertilizer and pesticide handling, or specific inquiries about BMPs, contact Colorado State University Cooperative Extension. They have publications, programs, and specialists available to help you answer questions about water quality.

Related source material:

SB 90-126 Rules and Regulations - Pesticides, Colorado Department of Agriculture, 1994.

SB 90-126 Rules and Regulations - Fertilizers, Colorado Department of Agriculture, 1994.

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

Pesticide and Fertilizer Containment Symposium 2, Conference Proceedings, MidWest Plan Service, Ames, Iowa, 1994.

Best Management Practices for Pesticide and Fertilizer Storage and Handling

Guidance Principle: Construct facilities for pesticide and fertilizer storage, mixing, and loading to protect groundwater from contamination due to spills or leaks.

Determine whether compliance with SB 90-126 rules regarding agricultural chemical storage and containment is required due to volume of product used. Select BMPs that achieve the above guidance principle and are feasible for your operation.

Consider:

- current chemical storage and mixing practices
- potential hazard of the mixing or storage site
- overall costs and benefits of BMPs

General BMPs

- 7.1 Follow all label directions for storing and mixing of agricultural chemicals and for disposing of empty containers.
- 7.2 Keep accurate fertilizer and pesticide use records. Maintain a log book to document storage facility inspection and maintenance.

Site Selection BMPs

- 7.3 Assess the storage site and the loading areas to determine appropriateness of the site in terms of human safety and ground and surface water vulnerability.

Chemical Storage BMPs

- 7.4 Store all agricultural chemicals in a locked, well marked building with impermeable floors, located a safe distance from any water source (minimum of 100 feet from water and 50 feet from any other building suggested).
- 7.5 Store pesticides in their original containers with labels intact, visible, and legible.
- 7.6 Store products by type and size. Keep fertilizers and pesticides in separate containments. Store small volume containers on metal shelving with a retainer lip at the front of each shelf.

Secondary Containment for Liquids BMPs

- 7.7 Equip pesticide and fertilizer storage facilities with secondary containment dikes designed to contain liquid spills or leaks. Recover any spill in the storage area immediately and reuse or dispose of appropriately.
- 7.8 Separate containment of pesticides and fertilizers.
- 7.9 Construct secondary containment systems out of chemical-resistant, impermeable material. Do not use exposed earthen berms for secondary containment of pesticides.

Mixing and Loading BMPs

- 7.10 Mix and load at the application site (in the field) whenever possible.
- 7.11 Construct impermeable mixing/loading pads at permanent pesticide loading sites. Design pads to handle traffic loads of the largest vehicle, plus the spray load. Consider roofing or enclosing the pad to reduce stormwater accumulation.
- 7.12 Site permanent and field mixing areas a minimum of 100 feet, or the necessary safe distance, from any water source or well.
- 7.13 Install backflow prevention devices on supply lines or be sure an air gap is established when using hoses connected to a water supply. Using nurse tanks for water supplies ensures protection from backflow.
- 7.14 Recover any spill at the mixing site immediately and reuse. Do not let spilled chemical soak into the soil. Keep granular absorbent material available at the mixing site to clean up small spills.
- 7.15 Clean loading pads and sumps after daily use. Do not allow accumulation of fertilizers or pesticides in the sump. Keep the sump covered when not in use to keep out trash, dirt, and debris.

Waste Management BMPs

- 7.16 Mix only the amount of pesticide that will be used for the current job.
- 7.17 Use products by age so that older product gets used first. If containers are deteriorating, use the product as soon as possible or contact your ag chemical dealer.
- 7.18 Purchase the correct amount of product needed and return unopened containers for credit. Whenever available, use mini-bulks or small-volume refillable containers to avoid container waste.
- 7.19 Recover rinsates and washwater from the mixing pad for reuse as make-up water or apply to the field as a dilute solution in accordance with the label directions.
- 7.20 Clean spray tanks and spray equipment at the application site. Take care to rinse equipment in areas where water will not run off toward wells or surface water.
- 7.21 Triple rinse or pressure rinse one-way pesticide containers immediately after emptying. Rinse container caps and the outside of containers to remove pesticide residues. Puncture containers prior to disposal.
- 7.22 Recycle empty pesticide containers whenever possible. Do not burn or dispose of containers on-farm.

Worker Safety BMPs

- 7.23 Provide worker safety features such as gloves, showers, protective clothing, fire extinguishers, and spill clean-up kits. Keep Material Safety Data Sheets available at the mixing station.
- 7.24 Train all employees in proper pesticide handling and safety procedures. Employees should have a clear understanding of your operation's emergency response plan in case of any spill or fire. Emergency response plans should include records of products stored and provisions for notification of the proper local authorities.