Agrichemical Handling Facility (No.) 309

DEFINITION

A facility with an impervious surface to provide an environmentally safe area for the handling of on-farm agrichemicals.

PURPOSE

To provide a safe environment on farm and ranch operations for the storage, mixing, loading and cleanup of agrichemicals, retain incidental spillage, retain leakage, and to reduce pollution to surface water, groundwater, air, and/or soil.

CONDITION WHERE PRACTICE APPLIES

This practice applies where:

- The handling of agrichemicals creates significant potential for pollution of surface water, groundwater, air or soil and a facility is needed to properly manage and handle the chemical operation;
- An adequate water supply is available for filling application equipment tanks, rinsing application equipment and chemical containers as needed for the operation;
- Soils and topography are suitable for construction.

This standard does not apply to the handling or storage of fuels. This standard does not apply to commercial or multi-landowner agrichemical handling operations.

Agrichemical handling facilities may include both pesticide and fertilizer storage, mixing, and loading only when the requirements stated in Michigan Department of Agriculture (MDA) Regulation 642, On Farm Fertilizer Bulk Storage, are followed in addition to the criteria in this standard.

Agrichemical handling facilities utilizing an individual storage container with a capacity of 100,000 gallons or more shall follow the requirements for secondary containment provisions of commercial fertilizer bulk storage as stated in MDA Regulation 641, Commercial Fertilizer Bulk Storage.

CRITERIA

General Criteria for Permanent Facilities Applicable to All Purposes

Agrichemical handling facilities shall be planned designed and installed to meet all federal, state, local, and tribal laws and regulations.

The walls and floors designed for the agrichemical handling facility shall be constructed of any of the following materials and shall be designed to withstand a full hydrostatic head of any discharged liquid and weight load of material: earth, steel, reinforced concrete, precast concrete blocks, or solid masonry.

Capacity for storage of equipment, other than that directly related to the agrichemical handling facility operation, shall not be included in an agrichemical handling facility. Office space, other than for agrichemical handling facility record keeping, shall not be included in an agrichemical handling facility. Since the building is part of the agrichemical handling facility-these restrictions include the entire building in which the agrichemical handling facility is housed.

Treated seed may not be stored in an agrichemical handling facility.

The agrichemical handling facility and access areas will be designed for the intended material, equipment and vehicle loads.

Primary storage containers placed in an agrichemical handling facility shall be limited to those that are designed specifically for the liquid they are storing/containing and for above-ground operation.

Secondary containment areas not protected from rainfall shall provide for a complete separation

between bulk fertilizers and pesticides while maintaining their individual capacity.

Prevent outside runoff water from entering the facility for storms up to the 25-year, 24-hour event.

Restrict access to agrichemical storage by children, pets, livestock, wildlife, and unauthorized persons. Refer to pesticide labels and state regulations for controlled access requirements at agrichemical handling facilities with pesticide storage.

Year round storage facilities shall be heated, if required, to comply with agrichemical label requirements.

Primary containment piping shall be located above the ground and within the secondary containment. No posts, pipes, hoses, discharge valves, or other devices may pass through the floor, containment storage walls, or the sump.

Outlet drains are not permitted in the agrichemical collection, storage or handling areas.

For an Agrichemical Handling Facility located within a building where there is the potential for liquids to splash on the building walls and where the curbing in the facility is less than 6 inches high, provide features to direct splashed liquids from the walls to the containment area. This may be accomplished by extending the concrete to the walls, installing splash curtains, or installing other features constructed of durable materials. Avoid gaps between the edge of the containment floor and the building walls.

Provide rinsate tanks of adequate number and size as needed for the type of operation, allowing for separation of non-compatible chemicals. The material type shall be suitable for the type of chemical to be contained in the tank.

During the season when the agrichemical handling facility will be used, provide a means of storing or field applying spills according to the agrichemical label within 72 hours following the spill event.

For agrichemical handling facilities exposed to rainfall, if the pad is not power-washed after daily use during the growing season, provide a means of storing or field applying accumulated rainfall according to the agrichemical label within 72 hours following the rainfall event.

Provide an adequate water supply for mixing agrichemicals, rinsing tanks and containers, and for emergency health and safety needs as appropriate for the facility. Provide all pipelines, hoses, backflow prevention and other hardware as needed.

Stabilize disturbed areas, as necessary, to prevent erosion, in accordance with the NRCS Critical Area Planting practice standard (342).

Location: Stationary agrichemical handling facilities (secondary containment and/or mix/load) are not to be located on sites where stationary pesticide storage, mixing, and loading has previously occurred over an extended period of time.

Locate the agrichemical handling facility above the 100-year flood elevation.

The lowest component shall be at least 2 feet above the seasonal high water table.

Locate the mix-load pad or operational pad adjacent to or as near the agrichemical storage facility as practical when chemical storage is not incorporated into the facility.

Tile drainage tubing that underlies the facility must be removed or broken in a manner to eliminate the risk of agrichemicals from entering the drainage system.

Agrichemical handling facility locations must meet the following minimum separation distances:

Wells (private)[1/]	**150 ft**
Wells (public Type I and IIa)[2/]	**2000 ft**
Wells (public Type IIb and III)[2/]	**150 ft**
Surface waters	**200 ft**
Fuel storage tank < 1100 gal	**40 ft**
Fuel storage tank > 1100 gal	**5 ft**

[1/] As defined by Part 127, 1978 PA 368, Michigan Public Health Code.

[2/] As defined by 1976 PA 399, Michigan Safe Drinking Water Act.

Coatings and Liners: Coatings and liners shall be designed to withstand hydrostatic head and anticipated traffic loads. The coating or liner shall be flexible enough to bridge joints and provide watertightness.

An impervious coating or flexible membrane liner material, which will prevent deterioration of the concrete and absorption of pesticide, will be applied on all concrete surfaces, including mixing/loading areas and storage areas exposed to pesticides.

To protect the surfaces of concrete that are exposed to pesticides, from penetration and contamination all concrete must have one of the following:

- *An admixture for concrete meeting:*
  - *ASTM C1240 (micro silica)*
  - *ASTM C618 (fly ash)*
  - *ASTM C989 (ground blast furnace slag)*
- *Sealed with a chemically resistant non-vapor barrier forming coating* <u>*or*</u>
- *Measures to prevent vapor formation under the concrete sealed with a chemically resistant coating.*

Coatings must be compatible with the agrichemicals used at the facility and installed in accordance with the manufacturer's specifications.

ASTM C1240, ASTM C618, and ASTM C989 shall not be used during cold weather concrete installations.

Coating materials must be designed to remain flexible after curing, aging, cold weather, sunlight, and exposure to anticipated agrichemicals, loads and traffic. Coatings shall be epoxy, polyurea, *and methyl methacrylate polymer* or vinyl ester.

Exposed surfaces of fertilizer containment will be designed to resist penetration and absorption of fertilizer and fertilizer contaminated waters. An impervious coating or liner is required for secondary containment facilities constructed out of earth, concrete blocks or similar materials. For cast in place reinforced concrete walls and floors, an impervious coating or liner is not required for either liquid or dry fertilizers.

All coatings or liners shall be compatible with the materials being stored within the secondary containment area.

Minimum Thickness for Flexible Membrane Liners	
Type	**Minimum Thickness**
HDPE	40 mil thickness
LLDPE	40 mil thickness
PVC	30 mil thickness
RPE	45 mil thickness
EPDM	45 mil thickness

RPE = Reinforced Polypropylene

Flexible membrane liners shall be installed under the supervision of a qualified representative of the manufacturer and all field constructed seams shall be tested and repaired in accordance with the manufacturer's recommendations.

Foundation Preparation: In order to provide for slab friction and drainage, concrete agrichemical handling facilities will be provided with a foundation of at least 4 inches of compacted sand on native mineral soil or compacted sub-base. The sand will have no more than 12 percent passing the No. 200 sieve (74 microns) and be free from clay lumps.

Flexible membrane liners will be placed on relatively smooth ground that is free of stumps, roots, rocks, sticks, or other items that could puncture the liner or interfere with the operation. Surface preparation will be provided as required by the manufacturer.

Structural Requirements: Concrete will be structurally designed for: 1) the wheel loads of the existing or anticipated loaded equipment; 2) the loads imposed by storage tanks and other equipment; and 3) temperature and shrinkage. If the containment is to serve as part of a foundation or support for a building or roof, consider the total load in the structural design of the concrete.

Design raft (mat) foundations to accommodate frost/freeze conditions. Locate roof/building footings below the anticipated frost depth unless measures are designed to accommodate frost/freeze conditions. When vertical frost footings are used, there must be a smooth transition from the footing to the floor along the interface with the subgrade to reduce the stress from drying shrinkage and expansion and contraction from temperature changes of the concrete.

If the facility is to have a roof, snow and wind loads shall be as specified in the 2003 Michigan Building Code.

Use of specification NRCS-MI-158 Reinforced Concrete Construction is required for slab and structural reinforced concrete. Reinforced concrete slabs and walls shall have a minimum thickness of 6-inches.

Reinforced concrete will comply with the guidance in the current ACI-318, except for soil-supported slabs.

For soil-supported slabs 50 feet or less in length, the minimum steel reinforcement provided when the liner is dependent upon uncracked concrete is 0.18 percent of the concrete area. For slabs with a length or width over 50 feet the steel ratio in the direction of that length or width that is greater than 50 feet shall be increased to 0.18 percent times the length divided by 50 feet.

Where reinforced concrete construction is required and also requires contraction or expansion joints or other conditions where steel is not continuous through a joint, a waterstop is required.

When a flexible membrane liner is used over the concrete walls and/or floor, the slab may be plain (non-reinforced) concrete in accordance with Construction Specification MI-159, Plain Concrete.

Fabricated structures shall be designed according to the criteria in the following references as appropriate:

Timber - National Design Specifications for Wood Construction, American Forest and Paper Association;

Steel – Manual of Steel Construction, AISC, American Institute of Steel Construction;

Masonry - Building Code Requirements for Masonry Structures, ACI 530, American Concrete Institute;

Appurtenances: Sumps will be designed as shallow and small as practical while allowing sufficient size for cleaning. Construct sumps of corrosion and leak resistant material. If the sump will create a hazard to traffic, cover the sump opening with a corrosion resistant grating capable of supporting anticipated loads. A manually activated pump shall remove accumulated liquids. Underground outlets shall not be used.

Sumps or low point shall be located within the containment area.

Design appurtenances to prevent damage from freezing and thawing.

Use hoses, pipes, valves, connectors, filters, tanks, and related plumbing material compatible with the agrichemicals being handled. Suction hoses shall be designed for vacuum operation.

Backflow prevention devices shall be provided on pipes supplying non-contaminated water. Design transfer piping to prevent backflow between the pump and the storage tank(s). Air gaps are acceptable backflow prevention measures. Check valves are not acceptable backflow prevention measures.

Additional Criteria for Mix-Load Pads for Pesticides

The pad width shall be at least 2 feet wider than the widest piece of equipment (booms retracted) and the pad length at least 2 feet longer than the maximum length of the application equipment. Only the additional room necessary to accommodate entrance and exit ramps, worker access, tanks, pumps, power washers, hoses, temporary placement of agrichemical containers, storage of sprayers, and other necessary equipment shall be provided.

Ramps, rounded curbing, or other methods will be designed to provide a smooth transition for entrances and exits.

The floor of the facility shall slope to a watertight catch basin or sump.

Minimally sized sumps, shallow depressions, or cleanup channels must be provided to collect spills, rinsate, sediment, etc. in each containment area.

The mix load area shall provide the capacity to hold at least 750 gallons or the volume of the largest application equipment tank, whichever is less.

Additional Criteria for Permanent Pesticide Storage

When more than 60 gallons of Class I, II, or III flammable or combustible liquids or a single storage container larger than 5 gallons of Class I, II, or III flammable or combustible liquids are stored in an

agrichemical handling facility, National Fire Protection Association (NFPA) 30, Flammable and Combustible Liquids Code, Chapter 4, shall be followed. Storage cabinets or other remedies must be installed.

Storage will be provided that will contain 110 percent of the largest container stored in the area.

Ventilate all enclosed areas while occupied. This may be accomplished by the use of door openings, removable walls or a forced air ventilation system.

The floor shall be graded to a low corner to collect concentrated liquids.

Additional Criteria for Secondary Containment of Bulk Liquid Fertilizers

Primary storage containers of bulk fertilizer shall be located within a walled or diked containment area.

Primary storage containers shall be anchored, elevated, or secured by some other means as necessary to prevent flotation or instability.

Primary storage containers and appurtenances shall be constructed of materials that are resistant to corrosion, puncture, or cracking.

Primary storage containers shall be labeled as fertilizer in order to identify the contents within. The storage container labeling shall be in a prominent location with lettering that is a minimum of 4 inches in height.

Primary storage containers and appurtenances shall be secured to provide reasonable protection from wildlife, vandalism, and unauthorized access at all times. The container and appurtenances may be secured using fencing, lighting or locks.

All storage containers shall have the capability to have the liquid level within the storage container measured readily and safely.

All storage containers shall be equipped with a shutoff valve that is located on the storage container or at a distance from the storage container dictated by standard engineering practice.

For multiple valves that are located on a single line, the valve closest to its storage container shall be securable.

Walls or dikes shall not be more than 4 feet in height above interior grade unless provision is made for safe access and exiting.

For earth embankment dikes, the minimum sum of the inside and outside slopes of the settled embankment shall not be less than five horizontal to one vertical with neither slope steeper than 2:1. Slopes shall be designed to be stable in all cases.

The minimum top width for an earthen embankment is 4 feet.

Secondary containment areas protected from rainfall shall contain a minimum of 110 percent of the volume of the largest storage container within the containment area, plus the displacement volume that is occupied by all other tanks within and below the height of the wall or dike.

Secondary containment areas not protected from rainfall shall contain a minimum of 110 percent of the volume of the largest storage container within the diked area, plus the volume that is occupied by all other tanks within and below the height of the dike, plus the volume of a 6-inch rainfall.

The floor shall be graded to a low corner or sump to collect concentrated liquids.

Allow 2 feet minimum distance for inspection and maintenance between storage containers and, between storage containers and the secondary containment wall.

Additional Criteria for Operational Area for Bulk Liquid Fertilizer Storage

Operational areas shall be utilized for transferring, loading, unloading, and mixing fertilizers at farm storage facilities.

The operational area containment shall provide the capacity to hold at least 750 gallons or the volume of the largest application equipment tank, whichever is less.

The operational area shall have a minimum width of 10 feet and a minimum length of 20 feet and shall be sized with booms retracted.

Loading and unloading operations shall be supervised at all times by an attendant who is familiar and/or

trained in the procedures that are used for the control and recovery of discharges.

Any fill or unloading point of the mobile container shall be positioned over the containment area during loading or unloading or assure retention of any discharge.

A portable operational area meeting the capacity and dimension criteria in this section and constructed of durable material compatible with the liquid fertilizer being stored within the secondary containment area will satisfy the requirements of an operational area.

Additional Criteria for Bulk Dry Fertilizer

A storage facility shall store non-fluid fertilizers in a sound structure that has a cover or roof, sidewalls, and a base sufficient to prevent contact with precipitation and surface waters. If the dry fertilizer is stored outdoors, the storage facility shall place the dry fertilizer on a ground cover that is sufficiently impermeable to prevent seepage or runoff and shall completely cover the dry fertilizer with a tarpaulin or other suitable covering to prevent contact with precipitation and surface water.

A storage facility shall allow that all loading, unloading, mixing, and handling of dry fertilizer is on an impermeable surface of a size and design that will contain the fertilizer and allow for the collection of spilled material to be recycled and applied at agronomic rates.

CONSIDERATIONS

Consider the potential effects of installation and operation of agrichemical handling facilities on the cultural, archeological, historic, and economic resources.

Consider the prevailing winds during the season when the agrichemical handling facility will be used. As much as practical, locate agrichemical handling facilities downwind and downhill from sensitive areas such as waters of the state, wetlands, sensitive upland areas, houses, play areas, gardens, and livestock feedlots.

Consider including measures to reduce the accumulation of sediment transported by wind, vehicles, or other means.

For roofed agrichemical handling facilities, consider providing measures to prevent blown-in precipitation.

Consider installing an apron at the facility entrance to minimize sediment transport onto into the facility, mix/load pad or operational area.

Consider siting the facility to meet the following guidelines:

Farm buildings	50 ft.
Residential/business building	200 ft.
Public roads	50 ft.
Pressurized water lines (Domestic/livestock use)	25ft.
Property lines	25 ft.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use.

Support data documentation requirements are as follows:

- Inventory and evaluation records
  - Assistance notes or special report
- Survey notes, where applicable
  - Design survey
  - Construction layout survey
  - Construction check survey
- Design records
  - Physical data, functional requirements and site constraints, where applicable
  - Soils/subsurface investigation report, where applicable
- Design and quantity calculations
- Construction drawings/specifications with:
  - Location map
  - Designed by" and "Checked by" names or initials
  - Approval signature
  - Job class designation
  - Initials from preconstruction conference
  - As-built notes
- Construction inspection records
  - Assistance notes or separate inspection records
  - Construction approval signature

- Record of any variances approved, where applicable
- Record of approvals of in-field changes affecting function and/or job class, where applicable.

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan shall be developed for this practice. The O&M plan shall be consistent with the purposes of the practice, its intended life, safety requirements, and the criteria for the design.

REFERENCES

Michigan State University Extension Bulletin E-2335 "On-Farm Pesticide Storage and Handling"