

**NATURAL RESOURCES CONSERVATION SERVICE  
VIRGINIA CONSERVATION PRACTICE STANDARD**

**AGRICHEMICAL HANDLING FACILITY**

(No.)

**CODE 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.

**CONDITIONS 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.

**CRITERIA**

**General Criteria Applicable to All Purposes**

Plan, design, and construct agrichemical handling facilities to meet all federal, tribal, state

and local regulations and codes such as electrical codes, building codes, and fire prevention codes.

The minimum size of the agrichemical storage will be based on the agrichemical use of the farm needed for a single growing season averaged over the last 5 years.

The pad, hoses, pipes, valves, seals, connectors, filters, tanks, and related plumbing material must be compatible with the chemicals being handled and capable of withstanding the intended use.

Design rinse devices so that residual contents of agrichemical containers can be adequately rinsed directly from the container to the spray tank. Design the rinse system to operate from the nurse tank discharge pump or a separate pump that provides adequate pressure. Verify with the manufacturer of the facility that any pump to be used in pressure rinsing is compatible with the rinse device.

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

For facilities where liquid materials will be used, posts, pipes, hoses, discharge valves, or other devices may not pass through the floor, containment storage walls, or the sump.

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.

When the agrichemical handling facility is also used for agrichemical storage, provide sufficient space and designate a separate room or area.

### **Criteria for Permanent Facilities**

**Location.** Locate the agrichemical handling facility as follows:

1. Adjacent to or as near the chemical storage building as practical when chemical storage is not incorporated into the facility;
2. As far as practical from known risk zones such as sinkholes, coarse-textured soils, geologic fractures, high water tables, streams, ponds, lakes, wetlands, and water wells. Provide a minimum setback distance of 100 feet from such risk areas.
3. Isolated and located downwind from residences and other buildings used to store feed, seed, petroleum products, or livestock with a minimum distance as required by local regulations;
4. At sites that have not been used as stationary mixing/loading sites in the past.
5. Locate the bottom of the facility a minimum of two feet above the seasonal high water table.
6. Locate so that the floor is above the 100-year floodplain elevation. The 100-year floodplain elevation shall be identified by the Flood Insurance Rate Map (FIRM). If a FIRM is not available, locate the 100-year floodplain elevation by hydrologic analysis, or by historical reference to the flood of record. However, if site restrictions require location within a floodplain, protect from inundation and damage from the 25-year flood event, or larger if required by laws, rules, and regulations.

**Storage Capacity.** Chemical mixing/handling pads shall be roofed. Provide a minimum storage volume on the chemical-handling pad of 250 gallons or 1.25 times the volume of the largest storage or spray tank on the pad, whichever is greater.

For unroofed facilities, such as secondary containment areas for liquid storage tanks, provide storage on the pad as stated above or the volume of the 25-year, 24-hour storm, whichever is greater. Store or field-apply the full storage volume within the 72-hour period following the storm. Follow chemical label directions.

Prevent outside runoff water from entering the facility.

**Agrichemical Collection.** For each liquid agrichemical containment area, provide a collection area or sump with adequate dimensions for sediment removal and pump operation.

**Chemical Handling Pad.** Size the pad to accommodate the largest spraying equipment. Equipment access is allowed from more than one direction. Provide adequate space for maneuvering around equipment with a minimum of 2 feet for open facilities and 4 feet for enclosed facilities. When practical, base the minimum width of the mixing pad on the width of the spray equipment with the booms retracted.

Slope the pad to allow for drainage to a collection area or sump.

**Concrete Surfaces.** Protect the surfaces of concrete that are exposed to agrichemicals from penetration and contamination. For all concrete:

- Use an admixture for concrete meeting the requirements of ASTM C1240 (micro silica), ASTM C618 (fly ash), or ASTM C989 (ground blast furnace slag), or
- Seal with a chemically resistant non-vapor barrier forming coating, or
- Seal with a chemically resistant coating and take measures to protect against vapor formation under the concrete.

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

**Rinsate Tanks.** 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.

**Manufactured Components.** Manufactured tanks and components shall be structurally sound, capable of withstanding all anticipated loads, and constructed of suitable materials for their intended use. Tanks will be sized based on a single farm owner or operator agrichemical need.

**Flexible Membrane Liners.** All flexible membranes shall be certified by the manufacturer to be suitable for the intended use.

Design of the flexible membrane shall be in accordance with manufacturer recommendations. All flexible membrane installations shall meet the material and installation requirements of the plans and specifications provided for each installation and shall be certified by the installer.

Minimum Thickness for Membranes	
Type	Minimum Thickness
HDPE	40 mil thickness
LLDPE	40 mil thickness
PVC	30 mil thickness
RPR	45 mil thickness
EPDM	45 mil thickness

**Structural Design.** Address all items that will influence the performance of the structure, including loading assumptions, storage tanks, material properties, and construction quality. Indicate design assumptions and construction requirements on the plans.

When using a roof/building to cover the facility, use minimum snow and wind loads as specified in ASCE 7, *Minimum Design Loads for Buildings and Other Structures*.

Locate footings below the anticipated frost depth unless measures are designed to accommodate frost/freeze conditions.

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;
- Concrete - *Building Code Requirements for Structural Concrete, ACI 318*, American Concrete Institute;
- Masonry - *Building Code Requirements for Masonry Structures, ACI 530*, American Concrete Institute;
- Slabs – Use a five (5) inch minimum concrete slab thickness. Design slabs in accordance with American Concrete Institute's *Code Requirements for Environmental Engineering Concrete Structures, Appendix H: Slabs on Soil (ACI 350-06)* or Midwest Plan Service's *Designing Facilities for Pesticide and Fertilizer Containment, (MWPS-37)*.

**Water Supply.** Provide an adequate water supply for mixing agrichemicals, rinsing tanks and containers, and for emergency health and safety needs as appropriate for the facility. Install backflow prevention and anti-siphon devices. Provide all pipelines, hoses, and other hardware as needed.

**Safety.** Design shall include appropriate safety features to minimize the hazards of the facility. Provide warning signs, smoke alarms, emergency eyewash station, and other devices as appropriate, to ensure the safety of humans.

Provide adequate ventilation at all times for enclosed buildings using natural or mechanical means. Ventilate completely enclosed structures with an automatic louvered vent fan turned on by the light switch for the enclosure. In addition, equip such enclosures with a red exterior light also activated by the interior light switch.

Containment areas with walls over 3' high must provide a means for quick escape.

**Vegetation.** Stabilize disturbed areas, as necessary, to prevent erosion, in accordance with Virginia Conservation Practice Standard *Critical Area Planting (Code 342)*.

#### Criteria for Portable Facilities

The portable agrichemical handling facility is a manufactured portable device that can be easily

moved from field to field and will meet the needs of the user.

Construct the pad of durable material that is chemically resistant for the intended agrichemicals. The minimum containment capacity of the pad is 1.25 times the volume of the largest individual agrichemical container or tank that will be located on the pad. Include a sump or other provisions for easy recovery of spilled liquid.

### CONSIDERATIONS

For permanent facilities, the agrichemical handling facility may cause an increase in water use at the site from the mixing of agrichemicals and rinsing of agrichemical sprayers, containers and agrichemical-handling pad.

Consider installing an apron at the facility entrance to minimize sediment transport onto the pad.

Consider providing a mixing platform for filling agrichemical sprayers.

For portable handling facilities, consider using a top/bottom-loading valve with built-in check valve in the hose from the nurse tank to the spray tank. This will enable the operator to remain on the ground while filling the sprayer.

### PLANS AND SPECIFICATIONS

Prepare plans and specifications for constructing agrichemical mixing facilities in accordance with the criteria contained in this standard to achieve its intended use.

Portable agrichemical handling facilities are manufactured items. Review plans and specifications submitted by the manufacturer to ensure that the proposed facility meets the requirements of this standard.

Include the following statement on the front page of the construction drawings for the agrichemical handling facility:

*“Management of chemicals is the responsibility of the owner/operator and shall be in accordance with applicable Federal, State, and Local regulations.”*

Record all required information in an engineer field book, on a plan sheet or design

computation sheet, or in another appropriate location.

### DESIGN DATA

1. Completed Environmental Evaluation (Form VA-EE-1) and subsequent requirements.
2. On-site soils investigation data.
3. Survey and plot data: profile, cross-sections, topography, as needed.
4. Design computations, including purpose of practice and references used.
  - a. Documentation of 100-year floodplain elevation.
  - b. Volume of 25-yr, 24-hour storm for unroofed structures.
  - c. Design volume of containment area(s).
5. Plan view of site with existing and planned features, including dimensions, distances, etc.
6. Standard Cover Sheet (VA-SO-100A).
7. Materials and quantities needed. Identify borrow material and/or spoil area, as needed.
8. Vegetation and/or ground cover requirements.
9. Identification of needed Erosion & Sediment Control measures.
10. Supplemental practices required.
11. Virginia Conservation Practice Specifications (700 Series).
12. Operation and Maintenance Plan.

### CHECK DATA

1. As-built survey.
2. As-built plans including dimensions, types and quantities of materials installed, and variations from design. Include justification for variations.
3. Locations of appurtenant practices.
4. Adequacy of vegetation and/or ground cover.
5. Complete as-built section of Cover Sheet.

### OPERATION AND MAINTENANCE

An operation and maintenance (O&M) plan shall be developed that is consistent with the purpose of the practice, the intended design life, safety requirements, design criteria, and all local, state, and federal laws and regulations.

incident. Provide a list of safety equipment, contact names, and phone numbers.

The O&M Plan is to address the following:

- Brief description of the facility. Define parameters used to size and design the facility such as storage tank and equipment sizes.
- The facility shall not be used for purposes other than the storing, mixing, loading, cleaning, and maintenance of materials and equipment used for agrichemical application.
- An inventory of agrichemicals to be stored or handled at the facility. Include Material Safety Data Sheets in the plan.
- The proposed method of handling and disposing of rinsate, washwater, and spills.
- A process for handling accumulated rainfall.
- A process for handling accumulated sediment.
- A strategy for cleaning surfaces between different agrichemical mixing operations.
- An inspection plan of structural components such as the condition of concrete, curbing, sump, access roads, building structure, etc. Note the timing of inspections, conditions that would cause concern, and required actions as appropriate.
- Any weekly, monthly, or annual maintenance that may be necessary for the proper functioning of the system components including, but not limited to, concrete surfaces, sumps, pumps, hoses, pipelines, building materials, electrical equipment, and other materials and equipment.
- A schedule of any required written inspection and maintenance reports.
- Proper winterization of the facility.
- Required safety signage.
- An Emergency Response Plan with safety procedures in the event of an accidental spill, exposure, fire, or other hazardous

## REFERENCES

- American Concrete Institute, *ACI codes*, Detroit, MI.
- American Forest and Paper Association, *National Design Specifications for Wood Construction*, Washington, DC.
- American Institute of Steel Construction, *AISC, Manual of Steel Construction*, Chicago, IL.
- American Society of Civil Engineers, ASCE 7, *Minimum Design Loads for Buildings and Other Structures*, Reston, VA.
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- Doane's Agricultural Report. *Chemical Containment Facilities*. Vol. 53, No 36-5.
- Midwest Plan Service, 1995. *Designing Facilities for Pesticide and Fertilizer Containment MWPS-37*, Ames, IA.
- Kammel, D. W., 1988. *Protective Treatment for Concrete*. Agricultural Engineering Department, University of Wisconsin.
- Noyes, R. I., 1989. *Modular Farm Sized Concrete Agricultural Chemical Handling Pads*. Oklahoma State University, Agricultural Engineering Department.
- Noyes, R. T., and D. W. Kammel, 1989. *A Modular Containment, Mixing/Loading Pad*. ASAE Paper No 891613, American Society of Agricultural Engineers, Winter Meeting, New Orleans, LA.
- USDA-Natural Resources Conservation Service. Virginia Conservation Practice Standards [On-line]. Available at <http://www.nrcs.usda.gov/technical/eFOTG>.
- USDA-Natural Resources Conservation Service. Virginia 700 Series Construction Specifications. [On-line]. Available at <http://www.nrcs.usda.gov/technical/eFOTG>.

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