NATURAL RESOURCES CONSERVATION SERVICE
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 an environmentally-safe facility to:

- Store, mix, load, and clean-up agrichemicals;
- Retain incidental spillage or leakage; and
- Reduce pollution to surface water, ground water, air, and/or soil.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where:

- The handling of agrichemicals creates significant potential for pollution of surface water, ground water, air and/, or soil, and a facility is needed to properly manage and handle the chemical;
- 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.

Base the size of the agrichemical storage on the maximum agrichemical use on the farm for a single growing season from any of the last 5 years.

Ensure the materials in the pad, hoses, pipes, valves, seals, connectors, filters, tanks, and related plumbing are compatible with the agrichemicals being handled and capable of withstanding the intended use.

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

Posts, pipes, hoses, discharge valves, or other features that may leak liquid chemicals will not pass through the floor, containment storage walls, or the sump.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service State Office or visit the Field Office Technical Guide. ***Note: Bold italics is information added or changes made to the National Conservation Standard by WV.***

Where the agrichemical handling facility is separate from the mixing/loading area and a hose is used to load the application equipment, provide containment on the mixing/loading area equal to that in the handling facility.

When a combined volume of 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, follow National Fire Protection Association (NFPA) 30, Flammable and Combustible Liquids Code, Chapter 4. Storage cabinets or other remedies must be installed.

Bulk storage of 60 gallons or greater shall be in an enclosed area and have a secondary containment structure designed and constructed to contain discharges and prevent runoff or leaching of pesticides. All above ground tanks shall have secondary containment. The secondary containment area (walls and pad) must be impervious and constructed to hold 110% of the volume of the largest storage tank(s).

When the agrichemical handling facility is also used for agrichemical storage, store the agrichemicals in a room or area separated from the mixing and handling area.

Criteria for Permanent Facilities

Location. Locate the agrichemical handling facility as follows:

- Adjacent to or as near as practical to the existing agrichemical storage building;
- As far as practical from streams, ponds, lakes, wetlands, sinkholes, and water wells, with a minimum setback distance of 100 feet;
- Isolated and located downwind from residences, ***gardens, recreation areas, ponds,*** and other buildings used to store feed, seed, petroleum products, or livestock with a minimum distance as required by local regulations;
- At sites that have not been previously used for stationary pesticide storage and/or mixing/loading sites that may have been contaminated in the past.
- ***When siting the building, consider soil and land characteristics to prevent contamination by surface runoff.***

Locate the bottom of the facility a minimum of two feet above any seasonal high water table.

Artificially lowering the water table would be acceptable under the following conditions:

- The artificial drainage system is at least 20 feet from any portion of the agrichemical handling facility including mix/load and transfer pads.
- The drawdown is analyzed using the ellipse equation or equivalent to illustrate the modified seasonal high water table.
- The artificial drainage system discharges to an observable sump with a shut off valve on the outlet pipe that may be closed in the event of an agrichemical spill in or around the agrichemical handling facility
- The design is approved by the State Conservation Engineer.

Locate above the 100-year floodplain elevation. However, if site restrictions require location within a floodplain, design to protect the facility from inundation and damage from the 25-year flood event, or larger if required by laws, rules, and regulations.

Agrichemical Handling Pad. Size the pad to accommodate the largest spraying equipment. Equipment access is allowed from more than one direction. Provide adequate space on pad for maneuvering around equipment. Use a minimum of 2 feet ***per side*** for open facilities and 4 feet ***per side*** 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 water-tight collection area or sump.

Design Storage Capacity. Provide a minimum storage volume on the agrichemical 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, provide storage on the pad as stated above or the volume of the 25-year, 24-hour storm, whichever is greater.

Provide a means of storing the accumulated rainfall or spilled agrichemical or field applying the collected volume according to the agrichemical label within 72-hours following the rain or spill event. ***Approval is required from the State Conservation Engineer for all unroofed facilities.***

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

Agrichemical Collection. Provide a collection area or sump with adequate dimensions for sediment removal***, safety devices,*** and pump operation. Use a manually activated pump to remove accumulated liquids.

The minimum dimensions of the reinforced concrete box sump shall be three (3) feet wide by three (3) feet long by two (2) feet deep, covered by a metal or appropriate chemical resistant grate. The minimum concrete thickness shall be eight (8) inches, reinforced with #4 steel reinforcement bars spaced no greater than 12 inches on center in both directions.

The sump pump shall be a chemical resistant submersible pump or an above ground centrifugal or piston pump which creates minimum turbulence within the sump. The pump may be operated electrically or manually. A filter shall be installed between the sump pump and sprayer or rinsate tanks.

All electrical components shall be water and explosion proof when attached to a submersible pump and shall be installed by a certified electrician, meeting local and national electric codes.

Equipment Wash Bay. An equipment wash bay may be included as part of the agrichemical handing facility. If included, separate the wash bay from any dry agrichemical storage area. A sump common to the mixing/handling area and the wash bay could be utilized.

Rinsate Tanks. Provide rinsate tanks of adequate number and size as needed for the type of operation, allowing for separation of non-compatible agrichemicals.

Label tanks with type of chemicals, target crops and date of expiration. A separate tank shall be provided for each target crop. Herbicides shall be kept in separate tanks and separated from other compounds.

Manufactured Components. Manufactured tanks and components will be structurally sound, capable of withstanding all anticipated loads, and constructed of suitable materials for their intended use. Base the tank sizes on the farm owner or operator agrichemical needs.

Liquid Tight. Design the agrichemical handling pad and other areas needing to be liquid tight with either a flexible membrane liner or according to the structural design section for liquid tight concrete.

Flexible Membrane Liners. All flexible membrane installations will meet the material and installation requirements of the plans and specifications provided for each installation

Flexible membrane liners will 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.

Minimum Thickness for Membranes	
Type	**Minimum Thickness**
HDPE	40 mil thickness
LLDPE	40 mil thickness
PVC	30 mil thickness
FPP-R	45 mil thickness
EPDM	45 mil thickness

Concrete Exposed to Agrichemicals. Concrete exposed to agrichemicals will meet the requirements of NEH Part 642 Construction Specification 31 – Concrete for Major Structures. Use Class 5000 concrete with a water to cementitious materials ratio (w/cm) less than or equal to 0.40.

Use Type II or V Portland cement meeting the requirements of ASTM C150. Use concrete containing a supplementary cementitious material such as fly ash or natural pozzolan meeting the requirements of ASTM C618, silica fume meeting the requirements of ASTM C1240, ground blast furnace slag meeting the requirements of ASTM C989, or blended supplementary cementitious materials meeting the requirements of ASTM C1697. Use concrete that is air entrained and continuously cured for a period of seven days.

Any portion of the concrete that could potentially be subjected to continual exposure to caustic chemicals or the abrasive effects of prolonged spray, such as might occur from a leaking pressurized vessel, shall be sealed with a chemically resistant coating. Use a non-vapor barrier coating unless measures are successfully implemented to prevent vapor formation. Coatings must be resistant to the agrichemicals that will be handled at the facility and be installed in accordance with manufacturer recommendations.

Structural Design. For the 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 the current edition of 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.

Permanent structures will 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;
- Concrete non-liquid tight – *Building Code Requirements for Reinforced Concrete, ACI 318,* American Concrete Institute, for concrete structures; *Guide for the Design and Construction of Concrete Parking Lots, ACI 330R,* American Concrete Institute, for slabs-on-ground subject to distributed stationary loads, light vehicular traffic, or infrequent use by heavy trucks or agricultural equipment; *Guide to Design of Slabs-on-Ground, ACI 360R,* American Concrete Institute, for slabs-on-ground subject to regular or frequent heavy truck or heavy agricultural equipment traffic.

- Concrete liquid tight – *Structural Engineering,* NRCS National Engineering Manual (NEM) Part 536, for concrete structures; *Requirements for Environmental Concrete Structures, Slabs-on-Soil, ACI 350 Appendix H,* for concrete slabs.

The concrete (5,000 PSI) mixing pad shall be a minimum of six (6) inches thick, reinforced with #4 steel reinforcement bars spaced no greater than 12 inch on center in both directions. Concrete curbs, a minimum 5" high, are reinforced with # 4 steel reinforcement bars spaced 10" on center. Pads with spans exceeding 30 feet shall have expansion joints and waterstops at a maximum spacing of 30 feet in either direction.

Above ground chemical storage tanks in West Virginia are regulated by 47CSR58 Groundwater Protection Rule. Section 4.8.a. requires all above ground storage tanks have secondary containment that is appropriate considering the potential to contaminate groundwater.

Water Supply. Provide an adequate water supply (***5 GPM or greater)*** for mixing agrichemicals, rinsing tanks and containers, and for emergency health and safety needs as appropriate for the facility. ***The hose bib should be a minimum of 2.0 feet from the floor. The hose shall be mounted or stored above ground and the hose end shall not be in contact with the floor prior to rinsing.*** Provide all pipelines and hoses with ***anti-siphoning,*** backflow prevention, ***pipeline freeze protection (winterizing),*** and other hardware, as needed.

Safety. Include appropriate safety features to minimize the hazards of the facility. Provide warning signs, emergency eyewash station, deluge shower, spill response kits, fire extinguishers 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.

Vegetation. Stabilize disturbed areas, as necessary, using the criteria listed under "Establishment of Vegetation" in the conservation practice standard Critical Area Planting (342) and/or the state planting guide.to prevent erosion. Vegetation used to stabilize areas adjacent to the facility must be resistant to herbicide drift and accidental runoff.

Criteria for Portable Facilities

A 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.

Pad. The pad will be constructed 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 rinsing devices so that residual contents of agrichemical containers can be adequately rinsed. The rinse system could 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. Dispose of clean, empty agrichemical containers in accordance with local and State requirements.

Consider providing a roof over permanent facilities.

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

Consider providing a mixing platform for filling agrichemical sprayers. ***When used, the portable platform shall be a minimum of 30 inches high with a minimum work area of three (3) feet by four (4) feet.***

For ventilation of enclosed buildings, consider applying the conservation practice standard for *Air Filtration and Scrubbing*, Code 371, to reduce emitted air pollutants.

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

Plans and specifications shall describe the requirements for applying this practice. At a minimum, include the following:

1. A plan view of facility layout.
2. Pertinent elevations of the facility.
3. Location of water features.
4. Location of electrical lines, gas lines, and requirements for burial and quality of materials.
5. Structural details of all components.
6. Electrical details of all components.
7. Plumbing details of all components.
8. Locations and details of safety features.
9. Where a roof structure is used to protect the facility, include design data and building dimensions.
10. Ingress/egress to the facility
11. Vegetative requirements.
12. Quantities.
13. Drainage/grading plan if needed.
14. Soil and foundation findings, interpretations, and reports.
15. Temporary erosion control measures during construction.

Review plans and specifications of portable agrichemical handling facilities. Ensure that the information submitted by the manufacturer on the proposed facility meets the requirements of this standard.

OPERATION AND MAINTENANCE

Develop an operation and maintenance (O&M) plan 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.

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 will 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. Material Safety Data Sheets must be available on site.
- 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 incident. Provide a list of safety equipment, contact names, and phone numbers.

Use the most current version of WV 309 Agrichemical Handling Facility Operation and Maintenance Plan.

REFERENCES

40 CFR Part 165, Subpart E – Standards for Pesticide Containment Structures, 165.80 through 165.97

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.

Daum, D. R., and D. J. Meyer. *Pesticide Storage Building.* Pennsylvania State University, Agricultural Engineering Department.

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.

WV Department of Environmental Protection-Division of Water and Waste Management - WV Groundwater Protection Regulations Report a Spill or Accidental Discharge WV Above Ground Storage Act

WV Department of Agriculture
Application for Fertilizer Storage Facility Permit

Midwest Plan Service, MWPS-37, Designing Facilities for Pesticide and Fertilizer Containment, Revised First Edition, 1995, Ames Iowa

NRCS Web Soil Survey (Engineering Properties, Water Features, Flood Duration, Hydrologic Soil Group, Risk of Corrosion –concrete, Water Table Depth, Physical Soil Properties etc.): Web Soil Survey

OSU Extension Fact sheet AEX-522-93, The Ohio State University:
On-Farm Agrichemical Mixing/Loading Pad