

**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 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.

NRCS, NHCP
February, 2008

CRITERIA

General Criteria Applies to All Purposes

Plan, design and construct agrichemical handling facilities to meet all federal, tribal, state and local regulations. ***The owner/operator shall be responsible for securing all required permits and approvals and for performing all planned work in accordance with such laws and regulations. NRCS employees are not to assume responsibility for procuring permits, rights, or approvals, or for enforcing laws and regulations. NRCS may provide the landowner or operator with technical information used for obtaining the required permits, rights or approvals to construct, operate, and maintain the practice.***

Refer to the WV legislative rulings WV Dept of Agriculture and WV Dept. of Agriculture-Regulatory Environmental Affairs Division, WV DEP-Division of Water and Waste Management - Groundwater Program and WV DEP for further clarification (see References at end of practice). Fertilizer that is stored, shall apply for a "Application for Fertilizer Storage Facility Permit" from the WV Dept. of Agriculture.

The 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

NRCS, WV
June, 2009

Conservation practice standards are reviewed periodically, and updated as needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service ***WV State Office or visit the electronic Field Office Technical Guide (e-FOTG) located on our web site.***
Note: Bold italics is information added or changes made to the National Conservation Standard by WV.

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 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.

Bulk storage of 60 gallons or greater shall be in a enclosed area and have a secondary containment structure designed, 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, provide sufficient space and designate a separate **storage** room or area.

Criteria for Permanent Facilities

Location. Locate the agrichemical handling facility as follows:

- Adjacent to or as near the chemical storage building as practical when chemical storage is not incorporated into the facility, ***It is preferable to have a separate building for chemical storage;***
- As far as practical from streams, ponds, lakes, wetlands, sinkholes, and water wells, with a minimum setback distance of 100 feet ***radius;***
- 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 used as stationary mixing/loading sites 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 the seasonal high water table.
- Locate above the 100-year floodplain elevation. 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. 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 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 or field applying, according to chemical label directions, the full storage volume within the 72-hour period following the storm. ***Approval is required from the SCE for all unroofed facilities.***

Prevent outside runoff water from entering the facility.

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.

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 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.

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, 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 collection area or sump.

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

Concrete Surfaces. To protect the surfaces of concrete, that are exposed to agrichemicals, from penetration and contamination all concrete must have an admixture for concrete meeting the requirements of ASTM C1240 (micro silica), ASTM C618 (fly ash), **WV Construction Specification 732a. Concrete and Concrete Sealants for Agrichemical Handling Facilities**, or ASTM C989 (ground blast furnace slag), be sealed with a chemically resistant non-vapor barrier forming coating, or take 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 recommendations.

Agrichemical Collection. Provide a collection area or sump with adequate dimensions for sediment removal, **safety devices** and pump operation. ***The minimum dimensions of the reinforced concrete box sump (4000 PSI concrete) 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.

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 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 Reinforced 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. Base the required area of reinforcing steel on the subgrade drag theory in accordance with American Concrete Institute, ACI 360, *Design of Slabs-on-Grade*. When heavy loads are to be resisted and/or where a non-uniform foundation cannot be avoided, use an appropriate design such as ASAE EP514 “Design of Concrete Structures for Secondary Containment of Liquid Pesticides and Fertilizers”, and procedure incorporating a subgrade resistance parameter(s) such as ACI 360.

The State of WV requires the concrete (4,000 PSI) mixing pad to 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**, to **the facility and hose used for filling**, 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, hoses **with anti-siphoning and backflow prevention devices and a method to protect**

pipelines from freezing or winterize and other hardware as needed.

Safety. Design shall include appropriate safety features to minimize the hazards of the facility. Provide warning signs, emergency eyewash station, **drop shower (recommended)** 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, to prevent erosion, in accordance with the conservation practice standard for 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.

Pad. The pad shall 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.

Rinsing Devices. 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.

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 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. The loading platform may be used to facilitate filling of the spray equipment. ***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 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.

Minimum Components to be included in the Agrichemical Handling Facility are:

1. Chemical mixing and loading sealed concrete pad with curbs, 100% contained.
2. Chemical identification and quantities documented.
3. A collection sump, pump and safety devices.
4. Adequate water supply for mixing chemicals, rinsing tanks and containers and for emergency health and safety needs.
5. Tanks for storage of rinsate.
6. Water supply pump, pipeline, hoses, anti-siphoning devices and other hardware necessary for water control.
7. Additional documentation and criteria necessary for pad overflow protection and rinsing if not covered by a roof.

8. Operation, Maintenance and Safety Plan.

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.

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. Material Safety Data Sheets may be included 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 incident. Provide a list of safety equipment, contact names, and phone numbers. Contact the National Response Center or DEP Elkview Emergency Response Unit.

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 Agricultural Engineers, ASAE EP514, *Design of Concrete Structures for Secondary Containment of Liquid Pesticides and Fertilizers*, St. Joseph, MI.

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*.

NRCS, NHCP
February, 2008

ASAE Paper No 891613, American Society of Agricultural Engineers, Winter Meeting, New Orleans, LA.

USDA, Natural Resources Conservation Service, *Critical Area Planting*, Code 342, Conservation Practice Standards.

WV Department of Agriculture Series 6C Title 61 Legislative rule, General Groundwater Protection Rules for Fertilizer and Manures

WV DEP-Division of Water and Waste Management - Groundwater Program
<http://www.wvdep.org/item.cfm?ssid=11&ssid=165>

WV Dept. of Agriculture
<http://www.wvagriculture.org/images/Regulatory/Forms-Regs-Info/AppForFertilizerStorageFacilityPermit.pdf>

WV Dept. of Agriculture-Regulatory Environmental Affairs Division;
http://www.wvagriculture.org/Division_Webpages/READ-regulatory.htm

Emergency Contact Information refer to WV Division of Homeland Security and Emergency Management;
http://www.wvdhsem.gov/co_emergency_contact.htm

USDA, Natural Resources Conservation Service, Conservation Practice Standards, Section IV EFOTG:
http://efotg.nrcs.usda.gov/efotg_locator.aspx?map=WV

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

International Association of Geosynthetics
iagi@ifai.com

NRCS Soil Data Mart Information, Engineering Properties, Water Features, Flood Duration, Hydrologic Soil Group, Risk of Corrosion –concrete, Water Table Depth, Physical Soil Properties etc.:
<http://soildatamart.nrcs.usda.gov/>

NRCS, WV
June, 2009

**OSU Extension Fact sheet AEX-522-93, The
Ohio State University:**
<http://ohioline.osu.edu/aex-fact/0522.html>