

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

SHORT TERM STORAGE OF ANIMAL WASTE AND BY-PRODUCTS

CODE 318
(FT.³)

DEFINITION

Temporary, non-structural measures used to store solid or semi-solid, organic agricultural waste or manure (stackable livestock and poultry manure, bedding, litter, spilled feed, or soil mixed with manure) on a short-term basis between collection and utilization.

PURPOSE

Apply this practice to achieve one or more of the following purposes:

- Temporarily stockpile or store manure in an environmentally safe manner for improved nutrient utilization and conservation.
- Provide the agricultural operation management greater flexibility in nutrient utilization.
- Protect surface and groundwater resources.
- Reduce energy use.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where a Comprehensive Nutrient Management Plan (CNMP) or a nutrient management plan (NMP) has been developed and where a temporary stockpile or storage is needed because:

- Clean out of animal housing facilities or transfer of manure is required at a time when the manure cannot be readily land applied due to weather, soil conditions, or farm management requirements.
- Daily spreading operations are not possible when weather or cropping conditions are not appropriate for field spreading.
- Land area is limited and split applications of manure nutrients are required for proper nutrient management and water quality protection.
- Temporary stockpiling of solid manure is needed until it is applied to the field where it is stockpiled or transferred off-site.
- Imported organic material is temporarily stored on farm for the purpose of Wisconsin NRCS Conservation Practice Standard (WI NRCS CPS) Waste Recycling (Code 633).

This practice does not apply to the short-term management of human waste or animal mortality.

For long-term stockpile periods (greater than 30 days) in [animal production areas](#), use WI NRCS CPS Waste Storage Facility (Code 313), Table 5.

CRITERIA

General Criteria

Laws and Regulations. Plan, design, and implement the practice to meet all federal, state, and local laws and regulations.

Nutrient Utilization. Utilize nutrients in the amounts, at the location, at the identified rates, and at the specified time consistent with the requirements of WI NRCS CPS Nutrient Management (Code 590).

Consistency. Waste stockpiled will be of a consistency that permits stacking and pile formation. Total solids (manure solids plus bedding or amendments) will be greater than 25 percent. Waste having a lower percentage of solids may be acceptable with verification that suitable pile formation is achievable. For the purpose of this standard, stackable solids are defined as the ability to maintain at least a 4 foot high stack, with a 4:1 angle of repose or steeper, in a non-frozen state.

Criteria Applicable To Temporary Field Stockpile Areas

Locate the storage pad on a site-specific basis to minimize seepage and meet conditions and functional requirements. Table 1 contains siting requirements for these facilities. Use WI NRCS CPS Waste Storage Facility (Code 313) criteria to determine subsurface saturation and [bedrock](#) depth.

The separation distance between stacks shall be at least 100 feet. Provide positive drainage away from the field stockpile area in all directions. Protect adjacent infrastructure and water bodies such as ponds, streams, and springs from runoff.

Maintain at least 30 feet of vegetative buffer on the downslope side of the stockpile storage area for filtering solids in the runoff. A manure stockpile may be placed in a fallow field when appropriately sited.

Provide adequate germination of newly established buffers prior to stockpile formation. Install a sediment barrier (synthetic silt fence or hay bales) around the pile if vegetation is not well established.

Maintain the stockpile so that no dust and debris transport to waters or drainage ways occurs.

Seed all disturbed areas beyond the edges of the stored manure to an approved vegetative cover.

Size. Design field stockpile storage areas to store the manure until it can be utilized as identified in the CNMP or NMP. Base the size on the required manure utilization schedule.

The manure stockpile area may be at one or more locations and will have sufficient area to store accumulated manure. Consider manure consistency and moisture characteristics when locating and sizing the manure stockpile area.

Soils and Foundation. Perform the stacking operations on a firm, uniform surface. When compaction of on-site soils alone are not adequate to resist rutting from normal equipment operation, select a more suitable site or use WI NRCS CPS Waste Storage Facility (Code 313).

Covering. When specific site and local conditions or regulations require covers, cover field stacked manure or store in geotextile bags.

Acceptable materials include geotextiles (tarps) that shed rainfall and allow transpiration, opaque plastic or polyethylene sheeting having a minimum thickness of 6 mils, or other water resistant material.

Ensure that the cover is placed over the pile with care to prevent tearing. Provide a minimum of 24 inches of overlap. Use weights, anchors or other tie down mechanisms to anchor the cover and prevent tearing during high winds. Place screw type anchors on 2-foot centers around the pad.

TABLE 1. TEMPORARY, UNCONFINED STACKS OF MANURE AND DERIVATIVES OUTSIDE THE ANIMAL PRODUCTION AREA ^{NOTE 1}

Waste Consistencies		
	≥ 25% Solids	< 25% and Stackable Solids
Size & Stacking Period		
Stacking Period	180 Days	180 Days
Maximum Volume/Stack ^{NOTE 2}	≤ 40,000 cu. feet	≤ 15,000 cu feet
Maximum Number of Stacks/40 acres	–	2
Maximum Stack Height	7 feet	7 feet
Frequency of Stacking Site Use ^{NOTE 3}	1 year out of 2	1 year out of 3
Hydrologic Soil Groups		
	B, C, or D	B, C, or D
Subsurface Separation Distance		
Subsurface Saturation	≥ 3 feet	≥ 3 feet
Bedrock	≥ 3 feet	≥ 5 feet
Surface Separation Distance		
Wells ^{NOTE 4}	≥ 250 feet	≥ 250 feet
Lakes	≥ 1,000 feet	≥ 1,000 feet
Sinkholes or other Karst Features	≥ 1,000 feet	≥ 1,000 feet
Quarries	≥ 1,000 feet	≥ 1,000 feet
Streams	≥ 300 feet	≥ 500 feet
Wetlands and Surface Inlets	≥ 300 feet	≥ 500 feet
Areas of Concentrated Flow	≥ 100 feet	≥ 300 feet
Land Slope Down Gradient of Stack	≤ 6%	≤ 3%
Floodplain	≥ 100 feet	≥ 300 feet
Public Roads, or Neighboring Residences	≥ 100 feet	≥ 100 feet
Tile lines	≥ 40 feet	≥ 40 feet

^{Note 1} This table may not meet the requirements of Wisconsin Administrative Code, Chapter NR 243, and additional or different criteria may apply.

^{Note 2} 1.24 cubic feet = 1 bushel.

^{Note 3} New stacks shall be located outside of the footprint of the previous year's stack.

^{Note 4} Community water system wells may require larger separation distances (see Wisconsin Administrative Code, Chapter NR 811).

CONSIDERATIONS

Divert non-polluted runoff around the storage facility site to the fullest extent possible. Consider runoff from the covering in water management planning around the stockpile site.

To reduce migration of nutrients into the soil, consider spreading a bedding layer of compost, sawdust or similar material prior to stockpile formation.

Consider monitoring the temperature of the manure stack to ensure temperature does not reach unsafe levels.

Where material is spread on land not owned or controlled by the producer, a nutrient management plan establishing environmentally acceptable utilization of the material is recommended.

Due consideration should be given to environmental concerns, economics, the overall waste management system plan, and safety and health factors.

Considerations for Site Selection

Consider the following factors in selecting a site for manure stockpile areas:

- Proximity of the manure stockpile storage facility to its source and land application area;
- Access to other facilities;
- Ease of loading and unloading manure;
- Adequate maneuvering space for operating loading and unloading equipment.
- Appropriate health regulations;
- Compatibility with respect to prevailing winds and landscape elements such as building arrangement, landforms, and vegetation, in order to minimize odors and protect aesthetic values.

Considerations for Improving Air Quality

Maintain appropriate manure moisture content for solid manure stockpile facilities. Excessive moisture will increase the potential for air emissions of volatile organic compounds, ammonia, and nitrous oxide, and may lead to anaerobic conditions, which will increase the potential for emissions of methane and hydrogen sulfide. Too little moisture will increase the potential for particulate matter emissions, although covering the stockpile will reduce that potential.

Some fabric covers are effective in reducing odors.

PLANS AND SPECIFICATIONS

Plans and specifications shall describe the requirements for applying this practice. As a minimum, include in the engineering plans, specification, and reports the following:

- Plan view of stockpile location(s) and layout. A plan map showing the location of all stockpile areas, access roads to these areas, slopes, surfaces to be graded, necessary cuts and fills, and location of sensitive areas such as wells, springs, streams, and floodplains, with setback distances from water bodies, streams, sinkholes, etc.
- Stockpile period. The stockpile needs to be linked to the nutrient management plan/ crop rotation for the field in which the manure is stockpiled.

- Dimensions of field stockpile storage areas including length, width, and additional width for edge area for working and cover anchor, as appropriate.
- Maximum design height for stacking manure.
- Type of covering and details for anchoring the cover, as needed.
- Specifications for cover or bagging material, as needed.
- Vegetative buffer requirements.
- Quantities of stockpiled material to be managed.
- Soil and foundation findings, interpretations, and reports, as required for site suitability
- Pad and liner specifications, as required.
- Temporary erosion control measures during construction, as required.
- Odor management or minimization requirement and pest management (fly control)
- Location of utilities and notification requirements.
- Applicable Wisconsin Construction Specifications

Documentation for siting temporary, unconfined stacks of manure and derivatives outside the animal production area shall include:

- Management assessment,
- Site assessment, and
- Location maps, soils maps, and USGS quadrangle maps.

OPERATION AND MAINTENANCE

Develop an operation and maintenance plan that is consistent with the purposes of the practice and safety requirements.

Provide for the proper utilization of the stockpiled material in the plan. Include the requirement that manure will be removed from the stockpile and utilized at locations, times, rates, and quantities in accordance with the overall waste management system plan.

Include a strategy for removal and disposition of manure with the least environmental damage during the normal stockpile period. Provide for establishment of vegetation on areas disturbed by removal of the stockpiled material.

Develop an emergency action plan where there is a potential for an accidental manure spill event. Include site-specific provisions for emergency actions that will minimize these impacts.

Include instruction for replacement of plastic or polyethylene covering which will deteriorate over time. Provide for disposal of damaged liners and covers in conformance with local laws and regulations.

Provide maintenance and reconstruction of the soil pads if soil material is inadvertently removed during the manure removal process.

Where geomembranes are used to line the pad, care must be taken during removal of the stored material to not damage the geomembrane. Insure that any needed repairs of the geomembrane are completed promptly.

Inspect and repair, as needed, the pad, cover, and adjacent area after each major storm event.

Maintain the area surrounding the field stockpile area in such a manner to prevent ponding of water and to ensure runoff is diverted from the stockpile area.

Provide instructions for record keeping for the hauling of stockpiled material from one geographical area to another including the:

- Type, and amount of material transferred;
- Solids percentage of the material;
- Date of the transfer;
- Name and address of the source and destination of the material; and
- Condition of the material as left at the destination (spread, stockpiled and covered, etc.).

REFERENCES

USDA Natural Resources Conservation Service. National Engineering Handbook. Part 651. Agricultural Waste Management Field Handbook. USDA-NRCS, Washington, DC.

USDA Natural Resources Conservation Service. Soil Survey Technical Note 6, Saturated Hydraulic Conductivity: Water Movement Concepts and Class History, USDA-NRCS, Washington, DC.

DEFINITIONS

Animal Production Area – Means any part of the livestock operation that is used for the feeding and housing of livestock. This includes the entire animal confinement and feeding area, and any adjacent manure storage areas, raw materials storage areas, and waste containment areas. This does not include pasture and cropland.

Bedrock – The solid or consolidated rock formation typically underlying loose surficial material such as soil, alluvium or glacial drift. Bedrock includes but is not limited to limestone, dolomite, sandstone, shale and igneous and metamorphic rock.

Note: Although solid or consolidated bedrock can sometimes be removed with typical excavation equipment, these materials are included in the above definition.

Hydrologic Soil Groups – Hydrologic Groups (HSG) are assigned for all soils mapped by USDA soil scientists. The HSG, designated A, B, C, or D, indicates, in general, the amount of runoff to be expected from the soil after prolonged wetting. Soils in Group A yield very little runoff because they are rapidly permeable. Soils in Hydrologic Group D take water very slowly and yield large amounts of runoff. See Section II of the NRCS Wisconsin Field Office Technical Guide for HSG designations.

Karst features – Refers to areas of land underlain by carbonate bedrock (limestone or dolomite). Typical land features in karst areas include sinkholes, network of interconnected fissures, fractures, disappearing streams, closed depressions, blind valleys, caves, and springs. See the companion document in Chapter 10 of the AWMFH for additional discussion of karst features.

Sinkholes – Closed, usually circular depressions which form in karst areas. Sinkholes are formed by the downward migration of unconsolidated deposits into solutionally enlarged openings in the top of bedrock.