**NATURAL RESOURCES CONSERVATION SERVICE**

**CONSERVATION PRACTICE STANDARD**

# SHORT TERM STORAGE OF ANIMAL WASTE AND BY-PRODUCTS

**(Cubic feet)**

**CODE 318**

## 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 NRCS Conservation Practice Standard *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 in production areas, use NRCS Conservation Practice Standard *Waste Storage Facility*, Code 313.

## 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 NRCS Conservation Practice Standard *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.

### 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.

Provide positive drainage away from the field stockpile area in all directions. Protect water

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.

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.

Locate stockpile:

- above the 100-year floodplain elevation unless site restrictions require location within the floodplain. If within the floodplain, protect the facility from inundation or damage from a 100 -year flood event.
- as far away as practical and at least 100 feet from neighboring residences or public roads or areas.
- at least 150 feet from wells, springs, streams, and ponds or 300 feet from wells, springs, streams, and ponds when water resource is located down gradient from the stockpile area.
- at least 100 feet from all drainage ways.
- where the seasonal high water table will be no closer than 3 feet below the bottom of the stored manure, unless a geosynthetic liner is used.
- where there is no groundwater spring, seep, or subsurface drainage tile lines that could be contaminated by the stored waste.
- on soils with a maximum saturated hydraulic conductivity class (kSAT) of moderately high (~ 2 in/hr) or on a soil pad, geomembrane lined pad, or similar lining method and the stockpile is covered.
- where there will be positive drainage from the stack in all directions and clean water runoff is excluded from the stockpile storage area.
- where access is not limited by poor weather conditions such as excessive ice, snow, or muddy ground.

**Stockpile Storage Period.** Base the maximum stockpile period on the timing required for environmentally safe manure utilization considering the climate, crops, soil, equipment, and local, state, and federal regulations but not greater than 180 days.

**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.

To reduce the potential for spontaneous combustion, the maximum height when stacking the manure will be no greater than 7 feet. Allow a minimum of 4 feet around the edges of the stack to properly anchor the covering and facilitate the removal of the manure.

**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 NRCS Conservation Practice Standard *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.

**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:

- unless there is evidence on the farm that the manure is more stackable, assume that it will not stack higher than 4 feet with a 4:1 angle of repose.
- 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.

## 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;
- the solids percentage of the material;
- the date of the transfer;
- the name and address of the source and destination of the material; and
- the 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.