

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

**ANIMAL MORTALITY FACILITY**

(No.)

**CODE 316**

**DEFINITION**

An on-farm facility for the treatment or disposal of livestock and poultry carcasses.

**PURPOSE**

This practice may be applied as part of a conservation management system to support one or more of the following purposes:

- Decrease nonpoint source pollution of surface and groundwater resources
- Reduce the impact of odors that result from improperly handled animal mortality
- Decrease the likelihood of the spread of disease or other pathogens that result from the interaction of animal mortality and predators
- To provide contingencies for normal and catastrophic mortality events

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies where animal carcass treatment or disposal must be considered as a component of a waste management system for livestock or poultry operations. It applies where on-farm carcass treatment and disposal are permitted by federal, State, and local laws, rules, and regulations. It also applies where a waste management system plan, as described in the National Engineering Handbook (NEH), Part 651, Agricultural Waste Management Field Handbook (AWMFH), has been developed that accounts for the end use of the product from the mortality facility. This practice includes disposal of both normal and catastrophic animal mortality; however, it does not apply to catastrophic mortality resulting

from disease.

**CRITERIA**

**General Criteria Applicable to All Purposes**

The facility shall be designed to handle normal mortality and/or catastrophic mortality.

The planning and design of animal mortality facilities or processes must conform to all federal, State and local laws, rules and regulations. This includes provisions for closing and/or removing the facility where required.

All structural components integral to animal mortality management shall meet the structural loads and design criteria as described in Virginia Conservation Practice Standard *Waste Storage Facility (Code 313)*, unless otherwise designated.

Where an animal mortality facility can be damaged by surface runoff, the runoff shall be diverted away from the facility.

**Location.** The location shall minimize the impact of the facility on odor and other air quality issues affecting neighboring residences, as well as minimizing the impact of the facility on surface and ground water resources. In addition, the facility, where practical, shall be generally down gradient from a spring or well.

The animal mortality facility shall be located outside the 100 year floodplain; however if site restrictions require location within a floodplain, the facility shall be protected from inundation or damage.

The location of the animal mortality facility shall be consistent with the overall site plan for

the livestock or poultry operation.

**Seepage Control.** Where seepage from mortality facilities will create a potential water quality problem and it is deemed necessary to reduce seepage, use AWMFH, Appendix 10D, for clay liner design criteria, or other acceptable liner technology.

**Criteria Applicable to All Purposes – Normal Mortality**

The facility shall be located as close to the source of mortality as practical, considering bio-security issues and the need to keep the facility out of sight of the general public.

**Composters**

**General.** Design of facilities for composting animal mortality shall conform to Virginia Conservation Practice Standard *Composting Facility (Code 317)*.

Location of composting facilities. Specific requirements for siting all composting facilities are:

1. Shall be a minimum of 50' from a flowing stream.
2. Shall be a minimum of 200' from any occupied dwelling not on the owner's property, off-site residential area, health care facility, school, recreational park area, or similar type public institution.
3. Shall be a minimum of 50' from a property line.
4. Shall be a minimum of 100' from a water supply well or spring.
5. The facility shall be installed on concrete slabs or other appropriate liners. All liners shall have a permeability of  $1 \times 10^{-6}$  cm/s, or less. Facilities with earth floors must be installed with the elevation of the top of the floor at least 2 feet (0.6m) above the seasonal high water table. The top of the floor elevation for structures with concrete floor shall be no lower than the seasonal high water table. The foundation materials and depth to water table shall be identified as part of the site investigation.

There are additional site location requirements for composting in windrows or static piles:

1. Shall not be located in areas which are geologically unstable or where the site topography is heavily dissected.
2. Shall not be located within 25' of a rock outcrop (except limestone). Shall not be within 50' of a limestone outcrop.
3. Shall be 100' from a sinkhole.

**Discharge Control.** Runoff from the site shall be drained to a waste treatment area or shall be recirculated within the composting process.

**Freezers**

Freezers can be used as components of a disposal system when used in conjunction with practices such as rendering.

**General.** Freezer units shall be of the chest type with a construction compatible with the mechanism to be used to empty the freezer. Provisions for protecting the freezer unit from precipitation and direct sun shall be made as deemed appropriate.

The freezer unit design, construction, power source, and unit installation shall be in accordance with manufacturer's recommendations. Freezers shall be constructed of durable material with a life expectancy compatible with other aspects of the waste management system. The freezer container shall be leakproof to minimize odor and leachate pollution.

Where needed, the freezer will be placed on a pad of suitable strength to withstand loads imposed with vehicular traffic consistent with equipment used to load or remove the box or tray.

**Temperature.** The freezers shall be self-contained units designed to freeze animal carcasses before decomposition occurs. For best results, the temperature of the carcasses shall be maintained between 22° and 26° F.

**Capacity.** Freezer units shall be sized to accommodate the normal maximum volume of mortality to be expected in the interval between emptying. Volume calculations shall include the expected mortality rate of the

animal, the period of time between emptying where mortality is given on a per day basis, the average weight of the animal between emptying, and a conversion factor for weight to volume. For broiler operations use a weight to volume conversion of a minimum of 45 pounds per cubic foot. Capacity calculations shall be supported by a removal schedule supplied by an integrator or approved vendor.

**Power Source.** An alternative source of power, where available, shall be used to maintain the integrity of the freezing process during power outages. Where an alternative power source will not be available, the operation and maintenance plan shall contain contingencies for disposal of the poultry mortality.

#### **Disposal Pit.**

**General.** Disposal pits shall not be located on sites with:

- 1) highly permeable soils or over fractured or cavernous bedrock within two feet of the bottom of the pit unless an approved liner is used, or
- 2) soils with a seasonal high water table less than two feet from the bottom of the pit.

**Size and Capacity.** Pits shall be sized to accommodate the normal mortality in accordance with criteria acceptable to state and local regulatory agencies. The disposal pit shall be a minimum of 4 feet wide and 4 feet long. The pit shall have a minimum depth of six feet and a minimum capacity of 150 CF. There shall be 2 feet of soil cover. One or more openings shall be provided for the introduction of poultry. Openings shall be a minimum size of eight inches square and equipped with tight lids. Multiple pits shall be separated by a minimum of three feet of undisturbed or compacted soil.

**Structural Loading and Design.** Vehicular traffic shall not be allowed within four feet of the pit structure. Fences or other barriers shall be used to exclude vehicles where necessary.

The disposal pit shall be cased with masonry blocks, treated timber, or a pre-cast concrete septic tank conforming to American Society of Testing Materials (ASTM) C1227-00b

Standard Specification for Pre-cast Septic Tanks. In all cases, the bottom of the pit shall remain exposed to the soil. If the pre-cast septic tank is used, it shall be fabricated with three 6-inch openings in each end, and five 6-inch openings in each side. When masonry block are used, every fourth block in each course shall be laid sideways (openings toward the outside) except the top and bottom courses. The bottom course shall be on a reinforced concrete footing of at least one foot wide and six inches thick. When treated timbers are used for walls, a one-inch spacing shall be left between timbers.

For pits greater than six feet deep, the earthen wall shall be sloped back at 1 1/2 horizontal and 1 vertical or flatter.

The top of a disposal pit shall be covered with a slab constructed of reinforced concrete or treated timber having an appropriately sized hole for a drop chute. A pit over eight feet long shall have drop chutes every five feet and a minimum of two drop chutes. The drop chutes shall be appropriately covered and made of drainage tile, or concrete, clay, or polyvinyl chloride (PVC) pipe. A ten-inch opening is recommended for chickens, and a twelve-inch opening for turkeys and suckling pigs.

#### **Incinerators**

**General.** Incinerators shall be dual burning Type 4 (human and animal remains) approved for use within the state.

**Capacity.** Minimum incinerator capacity shall be based on the average daily weight of animal mortality and the length of time the incinerator will be operated each day.

**Location.** The incinerator shall be located a minimum of 20 feet from any structure. The incinerator shall be placed on a concrete pad with the fuel source as distant as practical. If the incinerator is covered with a roof, at least six inches are required between the incinerator chimney and any combustible roof parts.

**Criteria Applicable to All Purposes – Catastrophic Mortality**

**General.** Processes addressed by this standard shall be limited to burial and composting. Catastrophic mortality shall be collected as soon as practical and moved away from the production facility. A written plan for disposal shall include pre-selection of the site, a materials list with identified sources of the material, and a closure plan, and shall comply with all State and local regulations.

**Burial Pit**

**General.** Catastrophic mortality resulting from natural conditions such as temperature extremes shall be buried on-site or as otherwise directed by state and local regulatory agencies. Burial of catastrophic mortality shall be timed to minimize the effects of mortality expansion during early stages of the decay process. Where possible and permitted by state law, mortality shall remain uncovered or lightly covered until bloating has occurred or methods have been employed to reduce or eliminate bloating. Topsoil shall be retained to re-grade the disposal site after the ground has settled as the decay process is completed. Stockpiled soil shall be no closer than 20 feet from the edge of the burial pit.

Items such as burial site location, type and quantity of mortality, burial date, and other pertinent details shall be noted at the time of burial.

**Location.** The location of burial pit(s) shall be in accordance with State regulations.

**Size and Capacity.** Pits shall be sized to accommodate catastrophic mortality using appropriate weight to volume conversions. Capacity shall be in accordance with criteria acceptable to state and local regulatory agencies.

**Structural Loading and Design.** Vehicular traffic shall not be allowed within four feet of the pit edge.

**Composting**

**General.** Catastrophic mortality composting shall be in either passive piles or windrows as

described in National Engineering Handbook Part 637, Chapter 2 – Composting (NEH 637.0210 and NEH 637.0211).

Composting mortality shall be protected from precipitation as necessary, or provisions made for collecting contaminated runoff. Static piles or windrows covered with sawdust, finished compost, or other benign material will not need further protection.

**Location.** The criteria for location of compost piles or windrows is the same as for normal mortality.

**CONSIDERATIONS**

Major considerations in planning animal mortality management are:

- Available equipment at the operation
- The management capabilities of the operator
- The degree of pollution control required by state and local agencies
- The economics of the available alternatives
- Effect on neighbors.

Consideration should be given to prevailing wind direction and neighbors when siting animal mortality disposal facilities.

Composting of poultry mortality will be hindered if the bird carcasses are allowed to freeze. Birds should be kept in a dry, non-freezing environment until added to the compost mix.

Facility sizes for composting large animal carcasses should reflect the longer compost periods required.

The following table lists factors that could be used in determining minimum daily weight of animal mortality when sizing incinerators:

TYPE OF ANIMAL	DAILY LOSS FACTOR (pounds/day/animal)
Chicken:	
Broilers	0.0024
Laying hens	0.0014
Breeding hens	0.0019
Breeder, male	0.0082
Turkeys:	
Hen	0.0081

Tom, light	0.0193
Tom, feather production	0.0286
Swine:	
Suckling pigs (per sow)	0.0400

Poultry operations often experience higher rates of mortality as the birds reach maturity. The capacity of incinerators should be sized to ensure that the mortality of the large birds can be handled within the time frame allowed for incineration.

Incineration produces varying quantities of ash that will need to be properly handled.

An alternative to prevent bloating of carcasses could include opening animal thoracic and abdominal cavities and viscera prior to placing required cover.

Vegetative screens and topography can be used to shield the animal disposal facility from public view, and to minimize visual impact.

Operators should maintain a list of current phone numbers for state and local officials to aid in notification if disease-related catastrophic mortality occurs.

Safety devices such as fencing, warning signs, and freezer locks may be necessary at certain sites.

Bio-security concerns should be addressed in all aspects of planning, installation, and operation and maintenance of an Animal Mortality Facility.

Ground disturbing activities such as excavation and site preparation for disposal facilities have the potential to affect significant cultural resources.

## PLANS AND SPECIFICATIONS

Plans and specifications for animal mortality facilities shall be in keeping with this standard and shall describe the requirements for applying this practice to achieve its intended purpose.

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. Soils investigation, including depth to water table, location of rock outcrops, and geology information, as needed.
3. Survey and plot data: profile, cross-sections, topography, as needed.
4. Design computations, including purpose of practice and references used.
  - a. Type of animal, number, average weight, expected daily mortality.
  - b. Type of carbon source and amount needed. Storage requirements.
  - c. Complete design computations and drawings to describe the horizontal and vertical position of facilities and their relation to adjacent physical features. Structural details of all components.
  - d. References and certifications of components supplied by others (pumps, commercial liner specifications, truss manufacturer certification, etc.).
  - e. Drainage/grading plan.
  - f. Equipment needed.
  - g. Power supply information, as needed.
  - h. Special safety requirements.
  - i. Nutrient Management Plan for disposal of composted material or ash. Note end uses of finished product if not utilized on farm.
  - j. Type of roof or cover that will be used.
  - k. Facility Closure plan.
  - l. A completed Waste Management System Plan for the owner's total livestock operation that addresses types and numbers of animals.
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. Component certifications such as truss rafters, liners, existing components of new waste system, etc.
4. NRCS or PE storage facility certification.
5. Locations of appurtenant practices.
6. Adequacy of vegetation and/or ground cover.
7. Complete as-built section of Cover Sheet.
8. A copy of any required permits.

#### OPERATION AND MAINTENANCE

An operation and maintenance plan applicable to this practice that includes, but is not limited to, the items listed below will be developed with the operator, and will become a part of the overall waste management system plan. The requirements in the individual operation and maintenance plan shall be consistent with the practice purposes, intended life, and design

criteria. Safety considerations shall be prominently displayed in the plan.

#### ***Normal Mortality***

Animal mortality facilities will normally be operated or used on a daily basis. At each operation or use, the facility shall be inspected to note any maintenance needs or indicators of operation problems.

#### ***Catastrophic Mortality***

Possible locations for catastrophic animal mortality facilities shall be located during the planning process to be operated as needed.

Where composting is used for catastrophic mortality disposal, the operation and maintenance plan shall identify the most likely compost medium, possible compost recipes, operational information, and equipment that will need to be readily available.

#### REFERENCES

1. American Society of Testing Materials (ASTM) C1227-00b Standard Specification for Pre-cast Septic Tanks
2. USDA-Natural Resources Conservation Service. Virginia Electronic Field Office Technical Guide (eFOTG), Section IV. [On-line]. Available at: <http://www.nrcs.usda.gov/technical/eFOTG>
3. National Engineering Handbook, Part 651, Animal Waste Management Field Handbook.
4. USDA-Natural Resources Conservation Service. Virginia Engineering Technical Note 316 – A Review of Animal Mortality Laws in Virginia [On-line]. Available at: <http://www.nrcs.usda.gov/technical/eFOTG>
5. USDA-Natural Resources Conservation Service. Virginia 700 Series Construction Specifications. [On-line]. Available at: <http://www.nrcs.usda.gov/technical/eFOTG>
6. Virginia Standard Drawings

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