

NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA
OPERATION AND MAINTENANCE PLAN
ANIMAL MORTALITY FACILITY – LARGE ANIMAL COMPOSTING PAD
CODE 316

Land Owner/Operator _____

County _____ SWCD _____ Farm/Tract No. _____

Prepared By _____ Date _____

OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained animal mortality facility is an asset to your farm. The estimated life span of this installation is at least 15 years. The life of this installation can be assured and usually increased by developing and carrying out a systematic operation and maintenance program.

GENERAL

Daily operation of the animal mortality facility is described in the first section of this plan. The second section is the Mortality Management Plan that describes the landowner's plan for daily mortality management and disease or non-disease catastrophic mortality. The Mortality Management Plan is the responsibility of the landowner. Contact the NRCS office if assistance is needed with site selection. As a minimum, the plan will include the proposed method of mortality disposal, selected site, materials needed, etc. A primary plan and a backup plan for catastrophic mortality are recommended. Example: Plan 1 is to compost in windrows. Plan 2 is to landfill the mortality if composting material is not available.

- Attach records of date, average weight, and number of deaths. In the case of catastrophic mortality, also include the number of animals and cause of death.
- References and/or manufacturer or installer information for trouble shooting:

- Contact information for state authorities in the event of a mass culling or a catastrophic event. There may be specific requirements for mortality disposal depending on cause of death, livestock species and housing.

State Veterinarian: **804-692-0601** during business hours.

Virginia Department of Emergency Management: **804-674-2400** (State Vet after hours)

Other: _____

SAFETY AND BIOSECURITY

Dead poultry and livestock will be disposed of according to state or local laws and in a way that does not adversely affect ground or surface water or create public health concerns.

Composting (for routine mortality and catastrophic events)

- All dead animals will be placed in the composting area within 48 hours of carcass discovery.
- Animal carcass composting shall only be on the property which is used for the raising and husbandry of animals unless a permit is obtained.

Burial (for catastrophic events only)

- The animal carcasses shall be buried within 48 hours of death and prior to creation of an open dump, hazard, or nuisance situation. Burial of routine livestock or poultry mortality is not allowed under this conservation practice.
- Animal carcass burial shall only be on the property which is used for the raising and husbandry of animals unless a permit is obtained.

COMPOSTING

On-farm composting of routine livestock, poultry, and aquaculture mortality is regulated by Virginia DEQ Waste Guidance Memo No. 02-2009, On-site Composting of Routine Animal Mortality.

- Composting is a biological process that needs monitoring and management throughout the composting period to ensure proper composting processes. The operation may need to undergo some trial and error in the start-up of a new composting facility. Manage the compost piles for temperature, odors, moisture, and oxygen, as appropriate.
- The composter shall be loaded according to the recipe listed below. Careful attention must be paid to the recipe in order for the composter to work properly. Contact NRCS to assist with troubleshooting during the composting process.
- Failure to manage the system will result in an odorous operation that may attract flies, buzzards, and other vermin. Mosquitoes may reproduce where standing water is present. To minimize vector problems:
 - Adhere to the composting recipe.
 - Eliminate standing water.
 - Employ good housekeeping to keep the area clean.
- The compost shall be land applied at the rates outlined in the Nutrient Management Plan and in accordance with state law. At least 75% of any material accumulated and/or composted must be used within one year of accumulation or it may become subject to regulation as a solid waste. Screening may be used to remove large bones from the finished compost. The screened bones can be re-composted or placed in a landfill.

- This composter was designed to handle normal mortality rates from this operation. The facility is not designed for catastrophic losses resulting from excessive heat, collapse of buildings, loss from disease, etc. Such losses shall be disposed of as described in the catastrophic mortality management plan.
 - Include the method, procedure, and record keeping requirements for proper utilization of compost. Records must be kept for three years.
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Carbon-Nitrogen Ratio. The initial compost mix shall result in a carbon to nitrogen (C:N) ratio between 25:1 and 40:1. Compost with a lesser carbon to nitrogen ratio can be used if nitrogen mobilization is not a concern.

The initial C:N ratio will be _____

Carbon Source. Store a dependable source of carbonaceous material with a high C:N ratio to mix with nitrogen-rich waste materials.

The carbonaceous material will be _____ and it will come from _____

It will be stored _____

Bulking Materials. Add bulking materials to the mix as necessary to enhance aeration. The bulking material may be the carbonaceous material used in the mix or a non-biodegradable material that is salvaged at the end of the compost period. Make provision for the salvage of any non-biodegradable material used in the composting process.

___ Carbonaceous material will be used as the bulking material.

___ A non-biodegradable material will be used as the bulking material. At the end of the composting process, it will be salvaged by _____

Moisture Level. Maintain the moisture content at 40 to 60 percent during the composting process (40% - does not leave your hand moist when squeezed, 60% will allow about one drop of water to be released when squeezed, > 60% - if more than two drops drip from your hand the material is too moist, therefore add sawdust or dry carbon source). Prevent excess moisture from accumulating in the compost in high precipitation climatic regions. The compost pile must be shaped to shed water.

Temperature of Compost Mix. Manage the compost to attain and then maintain the internal temperature for the duration required to meet management goals. Temperatures over 160°F are detrimental to the compost bacteria population. Turn the pile and reduce pile depth to cool the pile.

Closely monitor temperatures above 165°F. Take action immediately to cool piles that have reached temperatures above 185°F. If temperature rises above 185° F, the material should be

removed from the facility and cooled by spreading on the ground in an area away from buildings to a depth not to exceed six inches. Water should be added only if flames occur. After cooling, reload the compost facility.

A poultry or small animal bin-type facility used to compost animal carcasses shall have the capacity to maintain the compost temperature greater than 130° F for at least 5 days as an average throughout the compost mass followed by a comparable time for secondary composting. Temperatures must exceed 130° F for three consecutive days during this time period.

For a windrow, static pile, or large animal bin-type facility, the temperature of the compost shall be above 130° F for 15 days. Temperatures must exceed 130° F for three consecutive days during this time period.

Temperature is the primary indicator to determine if the composting process is working properly. If the minimum temperature is not reached, turn the compost and add water as needed. Compost managed at the required temperatures will favor destruction of any pathogens and weed seeds.

Turning/Aeration. Turn the compost pile when the temperature begins to drop. Check the moisture in the compost mix prior to turning so that water can be added during the turning process, as needed.

Monitoring: Test the finished compost as appropriate to assure that the required decomposition has been reached.

Troubleshooting: Good carcass compost should heat up to the 140° range within a few days. If temperature falls significantly during the composting period and odors develop, or if material does not reach operating temperature, investigate piles for moisture content, porosity, and thoroughness of mixing.

Compost Mix. Develop a compost mix that encourages aerobic microbial decomposition and avoids nuisance odors. See NEH Part 637, Chapter 2, for examples of compost recipe determinations. The initial compost mix will consist of

- ___ Straw, sawdust, or other bedding material
- ___ Carbon material _____
- ___ Sawdust or other cover material

Runoff. Prevent outside run-off water from entering the compost piles and prevent runoff from the composter from entering surface water.

COMPOSTER OPERATION – Windrows or Static Piles

The compost windrow or pile shall be built in a series of layers.

1. Build the primary pile to one side of the pad as shown in Figure 1. Place a minimum of 24 inches of sawdust or similar material on the pad to form an absorbent bedding layer. If the compost pile is seeping leachate, the bedding material must be deeper or more absorbent. The other choice is to capture the leachate and store in a liquid storage facility.
2. Place the dead animal on the bedding and cover with a carbon material. Approximately 12 cubic yards of base/cover material is needed per 1,000 pound carcass.

Animals will be placed: ___ spine-to-spine (two animals in each row)
 ___ end-to-end (two animals in each row)
 ___ one animal per row.

See Figures 1 and 3 for general placement of carcasses.

(This facility is designed for the typical animal placed as identified above. If a much smaller animal dies, then the mortality can be placed three animals wide. If a much larger animal dies, such as the bull, put the carcass in the center of the pile and only put one animal in the row. The composting time should be extended by one month for that section of the windrow.)

Windrows will be ___ end-to-end ___ side-by-side

3. Add water as needed to bring the moisture content of the pile to 40-60 percent.
4. An additional 18-inch cap layer of sawdust or similar material will be placed over the pile. The cap layer will be stacked such that rain will be shed from the pile. The maximum stacking height is 12 feet.
5. Mark the pad with a spot or line of spray paint at the end of each row of carcasses. The mark is placed beside the carcass rather than at the end of the windrow because the cover material will be scraped away and the next carcass will be placed close to the last one before the cover material is replaced. Since the typical pad is designed to have two carcasses in each row, it will be necessary to keep track of the number of animals in the row for the pad location. After the first animal has been placed, the cover material will have to be pushed aside in order to place each of the subsequent mortalities. The pile will then be re-covered.
6. Virginia Engineering Design Note 316 – Design of Large Animal Mortality Composting Facilities contains a **Mortality Management Worksheet** to be used with windrow composting. Use the worksheet to keep track of the stage of the compost on a monthly basis.

Primary Compost Time – days (PCT-d) = _____ (From Design Note 316)

Primary Compost Time – months (PCT-m) = _____ (PCT-d converted to months)

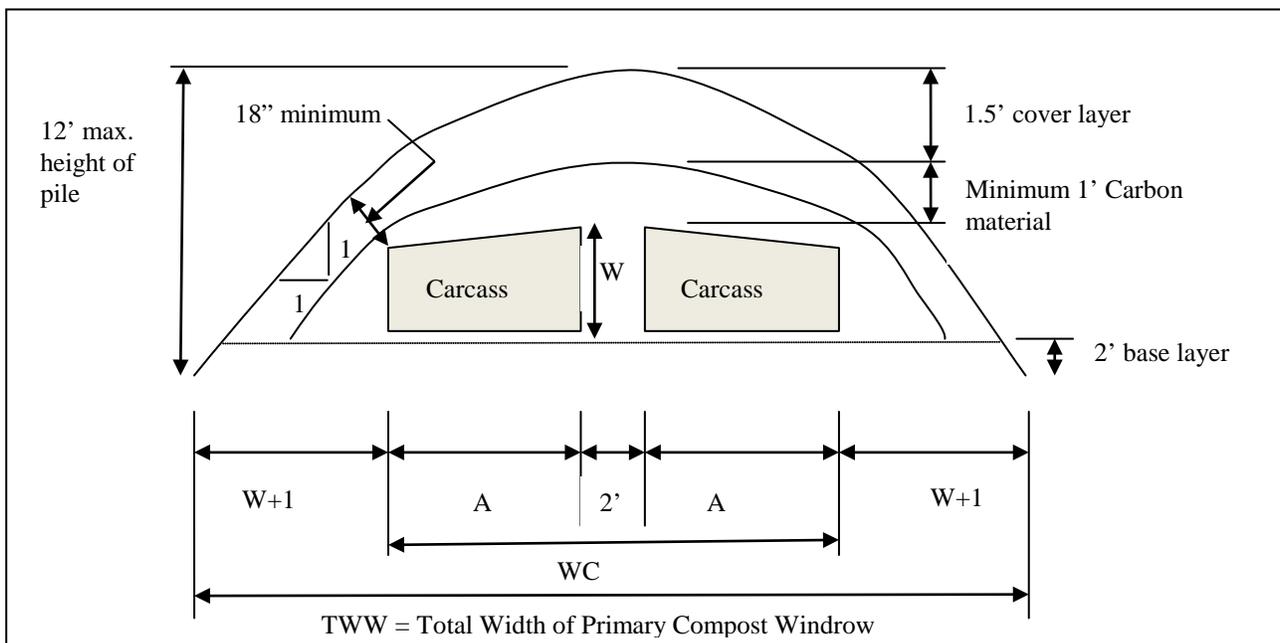
Secondary Compost Time – days (SCT-d) = _____ (From Design Note 316)

Secondary Compost Time – months (SCT-m) = _____ (SCT-d converted to months)

(Round the numbers of months up when converting the composting time.)

7. At the end of the primary compost period, the secondary pile will be created by turning the primary pile to the other side of the pad as shown in Figure 2. The compost must be lifted during the turning process in order to get enough oxygen into the pile. Check the moisture content using the squeeze method described in the O&M Plan to determine if water should be added.
8. After the secondary compost time has been achieved, the compost must “finish” for an additional 30 days before it can be utilized. For the finishing time, the compost can be left on the pad until the compost space is needed or it can be stored off the pad. If the compost is left on the pad, it must stirred at the beginning of the finishing time. During the active composting processes in the primary and secondary stages, the weed seeds in the compost will be destroyed by the heat. Since the finished compost will not heat up much, it will not destroy any seeds that are blown onto the material. If re-contamination by weed seeds will cause a problem on the land where the compost will be spread, cover the compost during the finishing and storage stages.

Figure 1. Width of primary compost windrow for two animals placed side-by-side.



A = dimension of animal measured along width of pad W = width (thickness) of largest animal

Figure 2. Placement of secondary compost pile in relation to primary pile.

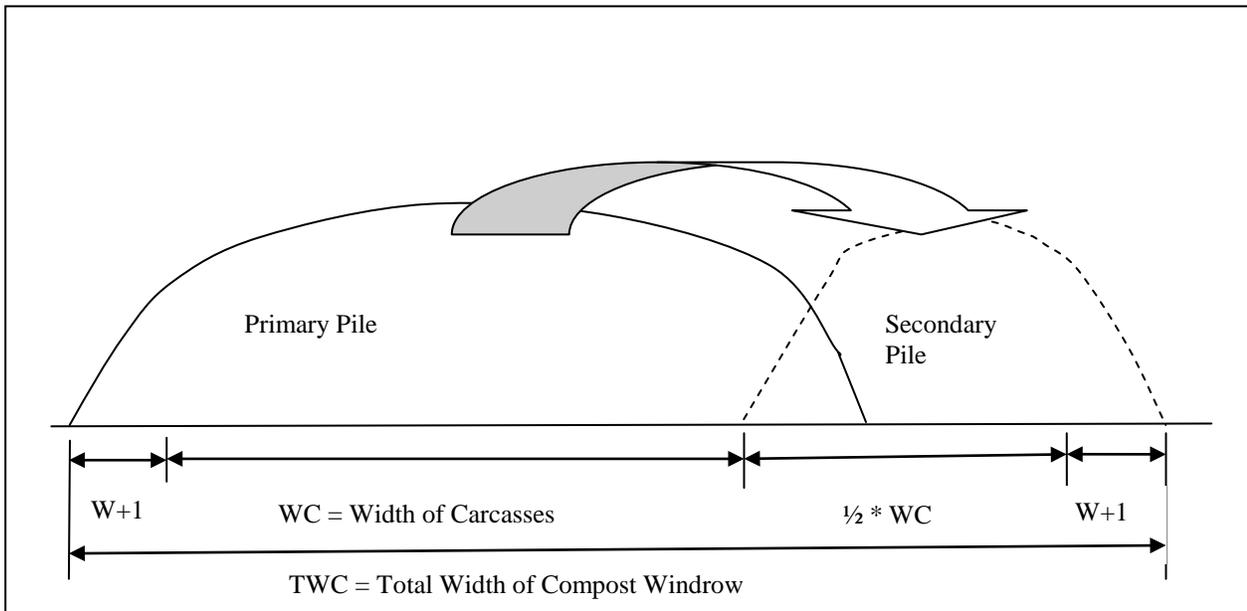
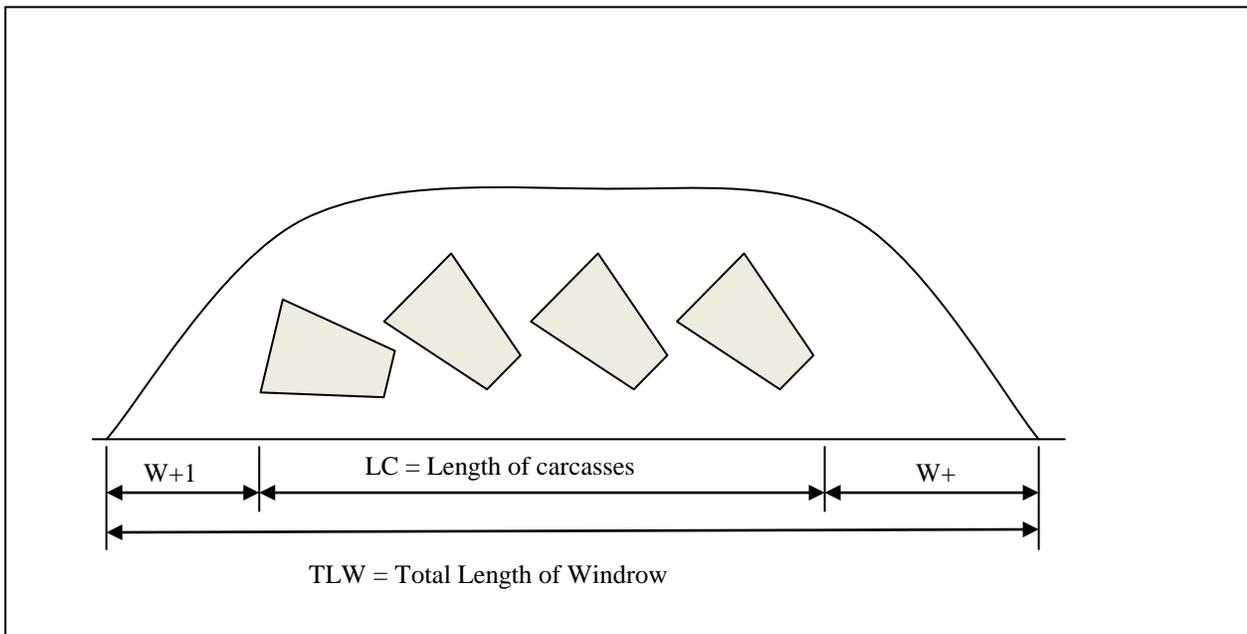


Figure 3. Animal placement along length of windrow.



COMPOSTER MAINTENANCE

- Inspect the composting facility at least twice each year when the facility is empty.
- Maintain all fences, railings, and/or warning signs used to provide warning and/or prevent unauthorized human or livestock entry.
- Check backfill areas around structure for excessive settlement. Make necessary repairs.
- Check pad often for cracks and/or separations. Make any necessary repairs.
- To prevent erosion, a good vegetative cover should be established and maintained around facilities. Clip twice a year to ensure a vigorous stand. Control noxious weeds. Traffic accesses shall be maintained and/or replaced as necessary.
- Do not compact the compost material by driving over it or packing it with equipment. Do not allow the operation of any equipment that exceeds the design limit on or within ten feet of the structure.
- Immediately repair any vandalism, vehicular or livestock damage to the structure, earthen areas surrounding the structure, or any appurtenances.
- Maintain positive drainage around the structure.

MORTALITY MANAGEMENT PLAN

DAILY MORTALITY. Daily mortality will be managed by:

_____ (method)

Anticipated daily mortality is ____ birds/animals at an average weight of ____ lbs.

Soils, Geology, Water Table, and Other Site Conditions:

Permit Required (Y/N): _____

Closure Plan:

NON-DISEASE CATASTROPHIC MORTALITY.

First Plan of Action. Non-disease catastrophic mortality will be done by

_____ (method)

at _____ (location).

Contract Needed (Y/N)? With _____

Permits Required (Y/N)? _____

Soils, Geology, Water Table, and Other Site Conditions:

Materials Needed (Type and quantity):

Source of Materials:

Equipment Needed:

Backup Plan for obtaining materials:

Second Plan of Action (Backup plan): Non-disease catastrophic mortality will be done by _____ (method)
at _____ (location).

Contract Needed (Y/N)? With _____

Permits Required (Y/N)? _____

Soils, Geology, Water Table, and Other Site Conditions:

Materials Needed (Type and quantity):

Source of Materials:

Equipment Needed:

Backup Plan for obtaining materials:

Closure Plan (for Plan 1 and/or Plan 2, as needed):

DISEASE CATASTROPHIC MORTALITY

First Plan of Action. *Disposal of catastrophic mortality caused by disease will be done as directed by the State Veterinarian.* The most likely scenario is _____
_____ (method)
at _____ (location).

Contract Needed (Y/N)? With _____

Permits Required (Y/N)? _____

Soils, Geology, Water Table, and Other Site Conditions:

Materials Needed (Type and quantity):

Source of Materials:

Equipment Needed:

Backup Plan for obtaining materials:

Second Plan of Action (Backup plan): *Disposal of catastrophic mortality caused by disease will be done as directed by the State Veterinarian.* The second most likely scenario is _____ (method) at _____ (location).

Contract Needed (Y/N)? With _____

Permits Required (Y/N)? _____

Soils, Geology, Water Table, and Other Site Conditions:

Materials Needed (Type and quantity):

Source of Materials:

Equipment Needed:

Backup Plan for obtaining materials:

Closure Plan (for Plan 1 and/or Plan 2, as needed):

Site Map for Catastrophic Mortality Disposal:

See Virginia Engineering Design Note 2 – Separation Distances for Animal Waste Facilities for information on required separation distances.

