

NATURAL RESOURCES CONSERVATION SERVICE
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 non-point 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. Some deaths caused by some types of contagious diseases require approval for disposal methods by state or local veterinarians

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 NRCS Conservation Practice Standard 313, Waste Storage Facility and Waste Facility Cover (367) as applicable, unless otherwise designated.

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Where an animal mortality facility can be damaged by surface runoff, the runoff shall be diverted away from the facility. The animal mortality facility should be located outside the 100 year floodplain; however if site restrictions require location within a floodplain, they shall be protected from inundation or damage from a 25-year, 24-hour flood event. The facility must remain high and dry.

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 location of the animal mortality facility shall be consistent with the overall site plan for the livestock or poultry operation. Traffic patterns around the facility should be planned to avoid movement across or around feed or livestock traffic areas to minimize disease transmission

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 found in conservation practice standard 521(A-D), Pond Sealing and Lining.

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. Provide all weather access from all livestock production areas to the mortality facility site.

COMPOSTERS

The Ohio Revised Code requires livestock producers that plan to compost livestock mortalities to obtain OSU Extension Mortality Composting Certification prior to commencing composting

General

Establish the size of the composting units on the basis of known or published normal mortality rates. Dead animal or bird facilities require a two stage composting system except for the use of mini-composters used for small animals or birds during periods of less than normal mortality rates. A minimum of two primary stages shall be required for all composters. The volume of the second stage shall be site specific but is generally greater than or equal to the first stage. Size the facility as described in "Ohio's Livestock and Poultry Mortality Composting Manual"

Static pile and windrow composting shall require two feet of cover over dead carcasses. Bin composting shall require one foot of cover over the dead carcasses

All composting facilities shall be located a minimum 3 feet above the high water table. Animal composting facilities without a roof shall be located on low permeability soils. A solid base of concrete or gravel with a filter fabric base shall be required for the composting area

unless it can be kept dry or free of ruts. Heavy use areas such as access to the compost area shall be managed to prevent rutting and ponding. It is recommended the access be gravel or concrete. Facilities designed with a gravel base shall be installed to conform to Conservation Practice Standard 561, Heavy Use Area Protection

Direct surface runoff away from the compost facility. Direct contaminated runoff from compost facilities to an appropriate storage or treatment facility for further management. Leachate and runoff from a composter without a roof shall be collected, stored and/or utilized as per the operation and maintenance plan. It shall be required to control the 25 year-24 hour rainfall event within the composting, storage and utilization area without discharge to the waters of the state or from the landowner's property. Runoff may be treated by meeting the requirements of Conservation Practice Standards Vegetative Treatment Area (635) or Constructed Wetlands (656).

Facilities shall have the following minimum separation distances from wells

**Minimum setback distances from water supply wells,
sinkholes & agricultural drainage wells**

Water well designation	Composting facilities and burial pits
Public water system supply well (Community, and Non-transient Non-community (NTNC))	Not within the inner management zone (1 year time of travel), or not within 1000 ft. when the time of travel has not been established
Public water system supply well (Community, and Non-transient Non-community (NTNC))	Not within a protection area determined as highly susceptible (5 year time of travel)
Transient non-community (TNC) public water system supply well	300 ft
Private water supply well not controlled by the owner of the facility to be installed under this practice	300 ft
Private water supply well controlled by the owner of the facility to be installed under this practice	100 ft
Known Sinkhole or Agricultural Drainage well	300 ft. unless it is determined by an engineering geologist or registered professional engineer that a lesser distance with special design considerations will not cause pollution; in this case the distance can be reduced to 100 ft

A subsurface geological exploration is required for all mortality composting facilities to determine conditions that may adversely affect groundwater quality or foundation stability. The exploration shall extend a minimum of three (3) ft. below the bottom of the planned facility.

Design of facilities for composting animal mortality shall conform to conservation practice standard 317, Composting Facility, or the guidance in National Engineering Handbook Part 637, Chapter 2 – Composting (NEH 637.0211, Dead Animal Composting).

Structural: Facility structural elements built on site, such as permanent bins, concrete slabs and roofs shall meet the requirements of Conservation Practice Standards Waste Storage Facility (313) and Waste Facility Cover (367) as applicable. Details of material requirements shall be determined by the designer on a case by case basis. All posts and planks shall be pressure-treated and all metal shall be galvanized.

Fabricated structures must be certified by the supplier to meet this standard.

Composting Pads- The following pad types are acceptable for roofed or unroofed facilities:

- Type I or Type II concrete slab as defined in the Ohio Concrete Construction Standard
- A gravel pad meeting the requirements of Heavy Use Area Protection (561) may be used when all the following apply:
 - DRASTIC index is less than 160
 - Distance to aquifer zone is > 15 feet
 - Pad is underlain with a subgrade consisting of a 3' minimum thickness of soils in permeability groups II, III, or IV as listed in Table 10D-2 of AWMFH- Appendix 10D

Dead bird composters shall have the following additional requirements:

- A roof to provide year round operation and to control rain water and percolation. Design the roof for applicable wind and dead loads for agricultural buildings.
- A concrete floor that is designed for the anticipated loads.
- All posts and planks shall be pressure-treated and all metal shall be galvanized.

In-Vessel Composters may be used when all the following conditions are met:

- In addition to the in-vessel composter, the overall mortality composting system must include a minimum of 30 days combined capacity for the secondary and storage phases
- The manufacturer documents that the in-vessel composter will produce temperatures that will rise above 135° F for a 3-day period or greater for year round operation
- The manufacturer documents that material at the composter discharge point can be maintained at a wet basis moisture content of 45 to 60%, and all provisions necessary to achieve this moisture content such as carbon amendments and supplemental air are incorporated into the design
- The in-vessel manufacturer has been building on-farm mortality composters for a minimum of 5 years for the species and size livestock on the farm; or if the manufacturer does not have a 5 year history, provide documentation during project planning
 - NRCS in another state has accepted the system, or
 - Published data from a university that validates attainment of the performance requirements of this standard
- The manufacturer must certify that the composter has a minimum functional design life of 10 years
- The manufacturer provide operating instructions for the design mortality volume to achieve necessary composting temperatures and finished moisture content for the species and size of livestock on the farm; and provide maintenance instructions to assure the 10 year functional design live can be achieved

FREEZERS (For temporary on-farm mortality storage when disposal is off-farm rendering or a licensed sanitary landfill)

General

Freezer units shall be of the walk-in or 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^o and 26^o 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.

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 unless otherwise instructed by the Ohio Department of Agriculture.

Location

The facility shall be located as far away from neighboring dwellings and the poultry or livestock operation as site conditions permit. Locate on sites with restricted percolation and a minimum of three feet between the bottom of the facility and the seasonal high water table unless special design features are incorporated that address seepage rates and non-encroachment of contaminants into the water table. Use AWMFH Appendix 10D for selection of sites where seepage will be restricted with normal construction techniques.

BURIAL PIT

Burial 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 three feet from the bottom of the 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 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.

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. The burial pit shall be a minimum of 4 feet wide with length necessary to accommodate mortality. Depth shall accommodate a minimum of 4 feet of cover over the mortality. Pit bottoms shall be relatively level. Lengths may be limited by soil suitability and slope. If more than one pit is required, they shall be separated by a minimum of three feet of undisturbed or compacted soil. The burial site shall be of sufficient volume to contain the mortality with a minimum of four feet of soil cover. The burial site shall be finish graded to slightly above natural ground elevation to accommodate settling.

Structural Loading and Design

Vehicular traffic shall not be allowed within four feet of the pit edge.

For pits that are four to five feet deep, a step or bench 18 inches wide and one foot deep will be dug around the perimeter of the main pit so the remaining vertical wall will not exceed four feet. For pits greater than five feet deep, the earthen wall shall be sloped back at 1 1/2 horizontal and 1 vertical or flatter.

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.

Windrows and static piles should be triangular to parabolic in cross-section. Windrows and static piles shall be aligned to avoid accumulation of precipitation. Positive drainage shall be maintained on the pad parallel to the windrows. Windrows and static piles shall be rounded to shed rainfall.

To decrease the chances of fire, the bin walls shall be no more than 5 feet high and static piles or windrows shall be no more than 7 feet at the peak.

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, and
- Effect on neighbors.

Consideration should be given to prevailing wind direction and neighbors when siting animal mortality disposal facilities. A minimum of 900 feet should separate the facility from the

nearest neighboring residence, and the facility should be 200 down gradient feet from a well, spring, or water course.

Ingress and egress to the facility, traffic patterns for easy loading and unloading and free access to utilities must be considered.

Runoff from the livestock or poultry facility, or from outside areas should be diverted away from the animal mortality disposal facility.

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.

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

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

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

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

State requirements for record keeping vary. Items such as burial site location, type and quantity of mortality, burial date, and other pertinent details should be noted at the time of burial.

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. If possible, entry into poultry houses or animal facilities should be avoided. However, if entry is necessary, the farm operator's permission is required.

Scavenging animals can be a problem with static pile or windrow composting. It will be necessary to use additional measures to prevent scavenging animals if a problem occurs. Static pile and windrow composting shall require two feet of cover over dead carcasses. Bin composting shall require one foot of cover over the dead carcasses

In order for proper pathogen kill to occur, it will be necessary to maintain a temperature of 135 degrees F for a minimum of three days within the active composting area. Other than testing, monitoring temperatures is a good indicator of pathogen kill.

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

OPERATION AND MAINTENANCE

A written 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.

As a minimum, the operation and maintenance plan shall include:

1. The mix proportions, moisture requirements, and materials to be used.
2. The design sheet used to size the facility.
3. The process to be followed in loading the bins, windrows, or static piles.
4. Temperature monitoring requirements.
5. The aeration or turning schedule.
6. Frequently encountered mistakes in composting and brief "fix it" scenarios.
7. Utilization Plan as per the Waste Utilization Standard, 633.

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. In the event of a catastrophic mortality event, the producer should contact the Ohio Department of Agriculture for guidance.

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. Some topsoil shall be retained to re-grade the disposal site after the ground has settled as the decay process is largely completed.

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.

PLANS AND SPECIFICATIONS

Plans and specifications for dead poultry or animal composting shall be in keeping with this and other referenced standards. They shall be site specific and describe the requirements for applying the practice or practices to achieve their intended purpose. All standard drawings shall be accepted for this practice provided that they comply with this standard and are approved by a Registered Professional Engineer in Ohio, or the Natural Resources Conservation Service, or are issued by the Extension Service. For standard drawings that originate in other states, special attention should be paid to the structure's ability to handle the snow or wind loads required in Ohio. If no agricultural building code exists, a minimum snow load of 20 pounds per square foot shall be used.

REFERENCES

Ohio Revised Code – Rules for disposal of dead or destroyed animals
<http://codes.ohio.gov/orc/941.14> ; <http://codes.ohio.gov/orc/941.15>
<http://codes.ohio.gov/orc/1511.022>

Ohio's Livestock and Poultry Mortality Composting Manual, :
http://efotg.nrcs.usda.gov/references/public/OH/Ohio_composting_manual.pdf

Ohio Department of Agriculture, Mortality Management Plan (required for permitted facilities):

http://www.agri.ohio.gov/public_docs/forms/lepp/Lepp_3900-PTO-006.pdf

Livestock and Poultry Environmental Stewardship (LPES) Program –Lesson 51
http://www.lpes.org/Lessons/Lesson51/51_Mortality_Management.html

USDA, Agricultural Waste Management Field Handbook (AWMFH)

National Engineering Handbook, Part 637, Chapter 2, Composting

NRCS GM 420 Part 401 – Cultural Resources

NRCS National Handbook of Conservation Practices

ASTM C1227-00b Standard Specification for Pre-cast Septic Tanks

Murphy, D.W. and T.S. Handwerker, Preliminary investigation of composting as a method of dead bird disposal, Proc. National Poultry Waste Mgt. Symp., Columbus, Ohio; Apr 1988.

Murphy, D.W., Composting of Dead Birds, University of Maryland, Cooperative Extension Service; Handout. (Unpublished).

Murphy, D.W. and L.E. Carr, Composting Dead Birds, Fact Sheet 537, Cooperative Extension Service, University of Maryland System.

Delaware Cooperative Extension Service, Delaware Two-Stage Composter; Construction Details, 1988.

Maryland Cooperative Extension Service, Maryland Free-Standing 2-Stage Composter; Isometric Poultry Composting Shed. 1988.1.

Murphy, D.W. Video. Composting Poultry Mortality. University of Maryland. Video Resource Center, 0120 Symons Hall, College Park, Maryland. 20742.

Fulhage, C., Water Quality Publication # 225, Composting Dead Swine, Extension Publications, University of Missouri-Columbia, 2800 Maguire, Columbia, MO 65211.

Arkansas Cooperative Extension Service, Suggested Composter Size, University of Arkansas, 2201 Brookwood Drive, P.O. Box 391, Little Rock, Arkansas 72203. (501) 671-2000

Arkansas Cooperative Extension Service, Recommended Operating Procedures (for) Swine Composting (Recipe), University of Arkansas, 2201 Brookwood Drive, P.O. Box 391, Little Rock, Arkansas 72203. (501) 671-2000

Arkansas Cooperative Extension Service, Basic Operating Procedures, University of Arkansas, 2201 Brookwood Drive, P.O. Box 391, Little Rock, Arkansas 72203. (501) 671-2000

NRCS drawing and design reference Web Sites:

The Agricultural Waste Management Field Handbook and Animal Waste Management (AWM) design program:

http://www.oh.nrcs.usda.gov/technical/engineering/engineering_software.html

Ohio NRCS Standard engineering drawings:

<http://www.oh.nrcs.usda.gov/technical/engineering/cadd2.html>

Ohio conservation practice standards (e-FOTG):

http://www.oh.nrcs.usda.gov/technical/ohio_eFOTG.html

NRCS Ohio Construction Specification - Concrete:

<http://www.oh.nrcs.usda.gov/technical/engineering/neh20.html>

Ohio technical references- general link:

http://www.oh.nrcs.usda.gov/technical/engineering/references/tech_refs.html