

USDA
NATURAL RESOURCES
CONSERVATION SERVICE

DELAWARE CONSERVATION
PRACTICE STANDARD

ANIMAL MORTALITY FACILITY

CODE 316
(Reported by No.)

DEFINITION

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

PURPOSES

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

1. Decrease non-point source pollution of surface and groundwater resources
2. Reduce the impact of odors that result from improperly handled animal mortality
3. Decrease the likelihood of the spread of disease or other pathogens that result from the interaction of animal mortality and predators
4. 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.

**CONDITIONS WHERE PRACTICE DOES
NOT APPLY**

This practice does not apply to:

1. Composting of normal animal mortalities. Practice Standard 317, Composting Facility should be used for the design of composters for normally expected mortalities.
2. The disposal by incineration of large quantities of dead animals that result from a catastrophic event.
3. Catastrophic mortality resulting from disease.

CONSIDERATIONS

Major considerations in planning animal mortality management are:

1. Available equipment at the operation.
2. The management capabilities of the operator.
3. The degree of pollution control required by state and local agencies.
4. The economics of the available alternatives.
5. The effect on neighbors.

Consideration should be given to prevailing wind direction and neighbors when siting animal mortality disposal facilities. Locate composters a minimum of 900 feet from the nearest neighboring residence, and 200 feet from a well, spring, or water course.

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 animal 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.

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.

If disposal is by incineration, more than one incinerator may be required for larger operations. Heavy mortalities at the end of a cycle may require loading the incinerator more than once a day.

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

Type Animal	Daily Loss Factor (lb/day/animal)
Chicken:	
Broilers (4.2 lbs)	0.0050
Laying hens (4.5 lbs)	0.0014
Roasters (6.5 lbs)	0.0080
Breeding hens (7.5 lbs)	0.0019
Breeder, male (11 lbs)	0.0082
Turkeys:	
Hen	0.0081
Tom, light	0.0193
Tom, feather production	0.0286
Swine:	
Suckling pigs (per sow)	0.0400

If detailed records are available, the following formula can be used to determine the Daily Loss Factor for sizing an incinerator for a specific operation:

$$\frac{MW \times AM}{L} = \text{Daily Loss Factor}$$

Where:

- MW = Mature weight of the animal (i.e. -4.2 lbs)
- AM = Average mortality for the life of the animals, as a decimal (i.e. - 0.05)
- L = Life of the animals in days (i.e. - 42 Days)

Example 1 (Using Formula):

- Given: 36,000 roasters
- 6.5 lb market weight
- 8% average mortality
- 65 day flock life

$$\text{Daily Loss Factor} = \frac{6.5 \times 0.08}{65} = 0.008 \text{ lb/day/bird}$$

Average daily weight of dead birds:
 $36,000 \times 0.008 = 288 \text{ lbs/day}$

Incinerator capacity:
 Minimum 288 lbs per loading capacity

Example 2 (Using Table Value):

Number of broilers = 42,000

Average daily weight of dead broilers:
 $42,000 \times 0.005 = 210 \text{ lbs/day}$

Incinerator capacity:
 Minimum 210 lbs per loading capacity

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.

Consideration should be given to providing roof protection for the incinerator to extend the life of the unit. Metal roof purlins and covering should be used to prevent spontaneous combustion from the stack.

Consideration should be given to the use of an afterburner to reduce any objectionable odors, fumes and particulate fallout to acceptable levels.

Liquid propane or natural gas fired incinerators should be considered where practical over diesel fired incinerators to reduce harmful stack emissions. Where diesel fired incinerators are used, the nearest source of low sulphur diesel fuel should be identified and the possibility of using biodiesel should be considered during planning.

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

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.

This practice has the potential to affect National Register listed cultural resources or eligible (significant) cultural resources. These may include archeological, historical, or traditional cultural properties. Care should be taken to avoid adverse impacts to these resources. Follow NRCS state policy for considering cultural resources during planning.

CRITERIA

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, unless otherwise designated.

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

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

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, they 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.

Check with the local planning and zoning office to insure that required setbacks from property lines are achieved.

Freezers. 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 leak proof to minimize odor and leachate pollution.

Where needed, the freezer will be placed on a pad of suitable strength to withstand loads from 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.

Disposal Pit. Disposal pits shall not be used for animal mortality facilities.

Incinerators. Incinerator owners are responsible for securing all required permits and approvals for the operation of incinerators in accordance with appropriate laws, rules, and regulations. Incinerators installed for dead animal disposal must have construction and operating approvals and permits from DNREC prior to installation and operation.

Delaware State Regulation No. 7 requires that all incinerators for the disposal of animal mortalities be dual chamber devices having a minimum combustion temperature of 1400⁰ F in the secondary chamber. An indicating pyrometer or other temperature control device is required to be installed on all incinerators to accurately determine the operating temperature of the combustion chamber.

The recommended incinerator size will be the smallest size available that will handle the required minimum capacity.

Incineration produces varying quantities of ash that will need to be properly handled. Perform lab tests to determine the nutrient value of the ash. Apply ash according to the recommendations of the Comprehensive Nutrient Management Plan (CNMP) established for the operation.

Electrical hook-up to be installed as per standard industry practices but in no case less than the minimum requirements of the most recent edition of the National Electrical Code. Installation must

be certified by a qualified licensed electrician. All electrical wiring shall be in conduit at the incinerator. Wherever installation could be classified as a hazardous location, specific conformance to Article 500 of the National Electrical Code will be met.

Gas hook-up must be certified in writing by a qualified state licensed Liquefied Petroleum Contractor to meet National Fire Protection Association (NFPA) Code 54 & 58; all other state, national, and local codes; and in accordance with the manufacturer's recommendations. Other fuel sources must meet all state and local codes for transmission of flammable or volatile fuels. For diesel-fired incinerators, a Spill Prevention, Control, and Countermeasures (SPCC) Plan shall be prepared by a registered professional engineer for any individual fuel storage tank in excess of 660 gallons or cumulative storage capacity of multiple tanks in excess of 1,320 gallons.

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 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.

Locate the incinerator according to the following requirements:

1. At least 20 feet from any building to prevent spontaneous combustion.
2. At least 50 feet from any surface water source.
3. At least 100 feet from any well or subsurface water source.
4. At least 500 feet from any residence located off the property of the owner/operator.
5. On a concrete slab.

Criteria Applicable to All Purposes – Catastrophic Mortality

Processes addressed by this standard shall be limited to burial and composting. Catastrophic mortality shall be collected as soon as practical

and moved to the location identified in Planning for the Disposal of Large Mortalities.

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 two 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.

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

Burial Pit. Burial pits shall not be used for animal mortality facilities.

Composting. 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.

PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared in accordance with the previously listed criteria. Plans and specifications shall contain sufficient detail to ensure successful implementation of this practice. Documentation shall be in accordance with the section "Supporting Data and Documentation" in this standard.

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.

Operations using incinerators for disposal of dead poultry will have a plan for collecting and disposing of the ash material remaining after incineration. The plan will require the use of an ash collection box or bucket and disposal of the ash on the land or through a community trash disposal system.

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. 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.

SUPPORTING DATA AND DOCUMENTATION

The following is a list of the minimum data and documentation to be recorded in the case file:

1. Location of the practice on the conservation map.
2. Assistance notes. The notes shall include dates of site visits, name or initials of the person who made the visit, specifics as to alternatives discussed, decisions made, and by whom.

Field Data and Survey Notes

The following is a list of the minimum data needed:

1. Description of the objectives of the practice, including the desired functions which the animal mortality facility is expected to provide.

2. Soils investigation logs and notes, as appropriate for site conditions and the proposed design.
3. Topographic survey of the site, as appropriate for site conditions and the proposed design.

Design Data

Record on appropriate engineering paper. For guidance on the preparation of engineering plans see Chapter 5 of the Engineering Field Handbook – Part 650.05. The following is a list of the minimum required design data:

1. Soil Survey map with the site identified.
2. Computations establishing the design capacity of the animal mortality facility.
3. Details of grading/drainage plan as needed.
4. A set of plans and specifications for the animal mortality facility, as appropriate.

Utilities Notification

1. Forms ENG-5 and ENG-6 can be used to assist in tracking utility notifications.
2. Document of CPA-6 initial discussion about his or her responsibility to notify Miss Utility.
3. Document of CPA-6 any information from the landowner about the existence and location of know utilities.
4. Document of CPA-6 assurances from the landowner that Miss Utility has been notified, including staking by the utilities.

Construction Check Data/As-Built Plans

Check notes recorded during and after completion of construction showing as-built conditions of the practice.

Red line the construction plans to indicate the construction's conformance to the design.

Sign and date check notes and plans by someone with appropriate approval authority. Include statement that practice meets or exceeds plans and NRCS practice standards.

REFERENCES

1. Dougherty, M. (Ed.) (1999) Field Guide to On-Farm Composting. NRAES-114. Ithaca, NY: Northeast Regional Agricultural Engineering Service.
2. Rynk, R. (Ed.) (1992) On-Farm Composting Handbook. NRAES-54. Ithaca, NY: Northeast Regional Agricultural Engineering Service.
3. USDA, Natural Resources Conservation Service, National Engineering Handbook (NEH), Part 637 Environmental Engineering, Chapter 2, "Composting".
4. USDA, Natural Resources Conservation Service, National Engineering Handbook (NEH), Part 651 agricultural Waste Management Field Handbook (AWMFH), Chapter 10, "Component Design".