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

- To decrease non-point source pollution of surface and groundwater resources
- To reduce the impact of odors that result from improperly handled animal mortality
- To 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 mortality events
- To provide contingencies for 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 is 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.

CRITERIA

General

Plan and design animal mortality facilities or processes to conform to all Federal, state, and local laws, rules, and regulations. This includes provisions for closing and/or removing the facility where required.

Evaluate and avoid or minimize impact to cultural resources, wetlands and Federal and state protected species to the extent practicable during planning, design and implementation of this conservation practice in accordance with established National and Florida policy, General Manual (GM) Title 420-Part 401; Title 450-Part 401, Title 190-Parts 410.22 and 410.26, National Planning Procedures Handbook (NPPH) Florida Supplements to Parts 600.1 and 600.6, National Cultural Resources Procedures Handbook (NCRPH), National Food Security Act Manual (NFSAM), and the National Environmental Compliance Handbook (NECH).

Design all structural components integral to animal mortality management to meet the structural loads and design criteria as described in NRCS NEH, Section 6, Structural Design or other equivalent design manual(s) accepted by industry.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Location. Locate the animal mortality facility to 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, locate the facility, where practical, generally down gradient from a spring or well.

To minimize transfer of diseases, locate animal mortality facility a sufficient distance from buildings used to house the animals and other residences. Locate the animal mortality facility a minimum distance of 50 feet or as recommended by the state veterinarian, whichever is greater.

To ensure visual acceptability of this practice, locate the animal mortality facility to reduce the visibility from nearby residences and from traveled roadways. This may be accomplished by screening with privacy fences or landscaping plants.

Locate the animal mortality facility to be consistent with the overall site plan for the livestock or poultry operation.

Protection. Locate the animal mortality facility above the 25-year flood plain; however if site restrictions require location within a floodplain, protect the facility from inundation or damage.

Locate the animal mortality facility at a sufficient height above normal ground to prevent surface water from ponding and posing a problem in the loading or unloading of the facility. Grade the site to drain or divert all overland runoff from the structure and surrounding work area in a manner not to cause pollution and erosion

Seepage Control. Where seepage from animal 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.

Safety and Bio-security. Design the system with considerations to the safety of humans and animals during construction and operation.

Address bio-security concerns in all aspects of planning, installation, and operation and maintenance of an animal mortality facility as recommended by the state veterinarian.

Vegetation. Vegetate all disturbed areas in accordance with Florida NRCS conservation practice standard Critical Area Planting, Code 342.

Additional Criteria to Provide Contingencies for Normal Mortality Events

Composters

General. Design animal mortality facilities for composting animal mortality to conform to Florida NRCS conservation practice standard, Composting Facility, Code 317.

Freezers

General. There must be a vendor capable of safely collecting and transporting the carcasses from the farm to the recycling or rendering plant. The vendor used for removing frozen animal carcasses from the farm must be approved by the state. The landowner must have a written contract with the vendor stating the vendor's responsibility for properly handling animal mortality from the farm. The schedule for removing the dead animals must coincide with the freezer capacity.

Location. Locate freezers near all-weather roads to facilitate the loading and transporting of carcasses from the farm. Where needed, construct all-weather roads to facilitate the equipment used in the removal of carcasses from the freezers. Design all-weather roads to meet the requirements of Florida NRCS conservation practice standard Access Road, Code 560.

Structural Loading and Design. Specify freezer units to be of the chest type with a construction compatible with the mechanism to be used to empty the freezer. Include provisions for protecting the freezer unit from precipitation and direct sun as deemed appropriate.

Ensure the freezer unit design, construction, power source, and unit installation to be in accordance with the manufacturer's recommendations. Specify freezers to be constructed of durable material with a life expectancy compatible with other aspects of the waste management system. Specify the freezer container to be leak-proof to minimize odor and leachate pollution.

To provide for structure stability and safety, locate the freezer on a firm foundation consisting of an earthen, gravel, limerock, timber, or concrete pad as recommended by the manufacturer. Where needed, place the freezer 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. Specify the freezers to be self contained units designed to freeze animal carcasses before decomposition occurs. For best results, maintain the temperature of the carcasses between 22° and 26° F. The units must be sealed against weather and air leakage.

Capacity. Size the freezer units to accommodate the normal maximum volume of mortality to be expected in the interval between emptying. Include in the volume calculations 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. Include a removal schedule supplied by an integrator or approved vendor to support capacity calculations.

Base average mortality on mortality data over several growing cycles (excluding catastrophic losses). Base average mortality used to determine capacity on mortality data for the period of time prior to removal off-site. In the absence of specific landowner mortality data, use mortality data on similar operations in the local area.

Power Source. Ensure electrical components and installation to meet the requirements of the National Electrical Code (NEC) and state and local codes for outdoor installation. Ensure all electric wiring to be in a conduit. Installation shall be certified in writing by a qualified licensed electrician.

Use an alternative source of power, where available, to maintain the integrity of the freezing process during power outages. Where an alternative power source will not be available, include in the operation and maintenance plan contingencies for disposal of the poultry mortality.

Safety. Post highly visible waterproof warning signs, such as "INEDIBLE" or similar signs on the facility to identify the use of the freezer.

Disposal Pit

General. Do not locate disposal pits 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) in soils with a seasonal high water table less than two feet from the bottom of the pit.

Size and Capacity. Size pits to accommodate the normal mortality in accordance with criteria acceptable to state and local regulatory agencies. Design the disposal pit to be a minimum of 4 feet wide and 4 feet long. No minimum depth is required but ensure the selected depth to accommodate 2 feet of cover over the mortality. Separate multiple pits by a minimum of three feet of undisturbed or compacted soil.

Structural Loading and Design. Keep vehicular traffic a minimum of four feet away from the pit structure. Use fences or other barriers shall be used to exclude vehicles where necessary.

Encase the disposal pit 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, design the bottom of the pit to remain exposed to the soil. If the pre-cast septic tank is used, fabricate the tank with three 6-inch openings in each end, and five six inch openings in each side. When masonry block are used, lay every fourth block in each course sideways (openings toward the outside) except the top and bottom courses. Design the bottom course to be on a reinforced concrete footing of at least one foot wide and six inches thick. When treated timbers are used for walls, place the timbers with a one-inch spacing between timbers.

For pits that are four to five feet deep, dig a step or bench 18 inches wide and one-foot deep shall around the perimeter of the main pit so the remaining vertical wall shall not exceed four feet. For pits greater than five feet deep, slope back the earthen wall at 1 ½ horizontal and 1 vertical (1 ½:1) or flatter.

Cover the top of a disposal pit with a slab constructed of reinforced concrete or treated timber having an appropriately sized hole for a drop chute. Design pits over eight feet long to have drop chutes every five feet and a minimum of two drop chutes. Design the drop chutes to 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.

Incinerator

General. Incinerator owners or operators must obtain air construction and operating permits pursuant to Florida Department of Environmental Protection (FDEP) Rules 62-210.300(1) and 62-210.300(4)(a)9 Florida Administrative Code (F.A.C.). Ensure incinerators meet the requirements contained in Rule 62.296.401(6) F.A.C. Obtain permits prior to construction and operation.

Emissions. Do not exceed the requirements of Rules 62-296.401(1) & (6) F.A.C. for incinerator particulate matter emissions, carbon monoxide (CO) emissions, and visible emissions.

Select incinerators that will not cause or permit the discharge of air pollutants, which cause or contribute to an objectionable odor.

Combustion. The incinerator must be dual chamber burning. Design the secondary chamber to have sufficient volume for at least a 1.0 second gas residence time at 1800 degrees Fahrenheit. Ensure the actual operating temperature of the secondary chamber combustion zone to be no less than 1600 degrees Fahrenheit throughout the combustion process in the primary chamber. Do not use primary chamber and stack in calculating this residence time. Select incinerators that cremation in the primary chamber shall not inititiate unless the secondary chamber combustion zone temperature is equal to or greater than 1600 degrees Fahrenheit.

Capacity. Base minimum incinerator capacity on the average daily weight of animal mortality and the length of time the incinerator will be operated each day. In the absence of specific landowner mortality data, base incinerator capacity on similar operations in the local data.

The required minimum incinerator size shall be the smallest size available that will incinerate the required minimum capacity in 2 or 3 burns within a 24 hour period of time.

Location. Locate the incinerator a minimum of 20 feet or as recommended by the manufacturer from any structure to prevent spontaneous combustion. Place the incinerator on a reinforced (fiber or steel) concrete pad for stability and safety. Extend the concrete slab sufficient distance on all sides of the incinerator base to accommodate management of the facility. Design the top of the concrete slab to be a minimum of 0.5 foot above natural ground and 2 feet above the seasonal high water table on high water table soils. If the incinerator is covered with a roof, design a minimum of six inches between the incinerator chimney and any combustible component of the roof.

Place the fuel source at a distance from the incinerator, buildings, waste storage facility, and wells as recommended by the manufacturer or according to state and local rules, laws and regulations.

Power Source. Ensure electrical components and installation meet the requirements of the National Electrical Code (NEC) and state and local codes for outdoor installation. Ensure all electric wiring be in a conduit. Installation shall be certified in writing by a qualified licensed electrician.

Gas hook-up must be certified in writing by a qualified licensed Liquified Petroleum contractor to meet applicable National Fire Protection Association (NFPA) codes, all other National, state and local codes, and in conformance with the manufacture's recommendations.

Install fuel storage for diesel powered units in accordance with the manufacturer's recommendations and shall meet all applicable state and local codes, rules and regulations.

Additional Criteria to Provide contingencies for Catastrophic Mortality Events

General. Processes addressed by this standard shall be limited to burial and composting. Collect catastrophic mortality as soon as practical and moved away from the production facility.

Location. Locate the facility 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.

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. Time the burial of catastrophic mortality to minimize the effects of mortality expansion during early stages of the decay process. Where possible and permitted by state law, leave the mortality uncovered or lightly covered until bloating has occurred, or methods employed to reduce or eliminate bloating. Retain topsoil to re-grade the disposal site after the ground has settled as the decay process is completed. Stockpile soil no closer than 20 feet from the edge of the burial pit.

Size and Capacity. Size pits used for burial to accommodate catastrophic mortality using appropriate weight to volume conversions. Calculate capacity in accordance with criteria acceptable to state and local regulatory agencies. Design the burial pit to be a minimum of 4 feet wide with length necessary to accommodate mortality. Design the depth to accommodate a minimum of 2 feet of cover over the mortality. Design pit bottoms to be relatively level and be two feet above seasonal high water table. Limit lengths by soil suitability and slope. If more than one pit is required, separate the pits by a minimum of three feet of undisturbed or compacted soil. Size the burial site to be of sufficient volume to contain the mortality with a minimum of two feet of soil cover. Finish-grade the burial site to slightly above natural ground elevation to accommodate settling.

Structural Loading and Design. Do not allow vehicular traffic within four feet of the pit edge.

For pits that are four to five feet deep, dig a step or bench 18 inches wide and one-foot deep around the perimeter of the main pit so the remaining vertical wall will not exceed four feet. For pits greater than five feet deep, slope the earthen wall back at 1.5 horizontal and 1 vertical or flatter.

Composting

General. Design catastrophic mortality composting to be in either passive piles or windrows as described in NEH Part 637, Chapter 2 – Composting.

Protect composting mortality 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.

CONSIDERATIONS

Major considerations in planning animal mortality facilities 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.

Consider prevailing wind direction and neighbors when siting animal mortality disposal facilities. Consider requiring a minimum of 900 feet to separate the facility from the nearest neighboring residence. Consider locating the facility to be 200 feet from a well, spring, or water course.

Consider diverting runoff from the livestock or poultry facility, or from outside areas 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.

Table 1 lists factors that could be used in determining minimum daily weight of animal mortality when sizing incinerators:

Table 1 – Minimum Daily Weight Factors for 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	0.0400 (per sow)

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

Consider opening animal thoracic and abdominal cavities and viscera prior to placing required cover as an alternative to prevent bloating of catastrophic mortality die of.

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

Consider the necessity of safety devices such as fencing, warning signs, and freezer locks at certain sites.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for animal mortality facility that describe the requirements for applying this practice according to this standard. As a minimum include the following in the plans and specifications

- A plan view showing the location and extent of the practice.
- Pertinent elevations of the facility.
- Location of electrical lines, gas lines, and requirements for burial and quality of materials.
- Standard details when concrete or timber is used for the facility foundation.
- Number, capacity, and quality of facility(ies).
- Location of utilities and notification requirements.
- Where a roof structure is used to protect the facility, include design data and building dimensions.
- Vegetative requirements

OPERATION AND MAINTENANCE

O&M for All Animal Mortality Facilities

Develop an operation and maintenance plan applicable to this practice that includes, but not limited to, the items listed below with the operator. The requirements in the individual operation and maintenance plan shall be consistent with the practice purposes, intended life, and design criteria. Prominently display safety considerations in the plan.

Include in the O&M plan, as a minimum, the following.

- Method and procedures of mortality disposal for normal losses
- Method and procedures of mortality disposal for catastrophic losses
- Contact(s) and phone numbers of person(s) to contact in case of catastrophic losses.
- Records of date, average weight, and number of deaths
- Periodic inspections
- Prompt repair or replacement of damaged components.

O & M Applicable to All Normal Mortality

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

Additional O & M for Incinerators

Use incinerators only for the disposal of dead animals.

Operate incinerators properly to maximize equipment life and minimize emission problems. Require any operator of an incinerator to be trained and licensed by the manufacturer's representative or an equivalent organization using a state-approved training program. A licensed operator must be on-site when the incinerator is in operation.

Load the incinerator according to the manufacturer's recommendations. Remove ashes frequently to maximize combustion and prevent damage to equipment. Include in the plans methods for collecting and disposing of the ash material remaining after incineration. Include in the plan an ash collection box or bucket and disposal of the ash on the land or through a community trash disposal system.

Inspect the incinerator periodically to ensure that all components are operating as planned and in accordance with the manufacturer's recommendations.

Additional O & M for Freezers

Operate freezers properly to maximize equipment life and minimize potential problems. Monitor temperatures regularly to ensure proper freezing of carcasses.

Load the freezer according to manufacturer's recommendations and not exceed the design capacity.

Use freezers only for the freezing of dead animals associated with the planned operation.

Inspect the freezer periodically (e.g. after each transfer of the carcasses to trucks for transport off-site) to ensure that all components are operating as planned and in accordance with the manufacturer's recommendations. Check for leaks and structural integrity of the freezer unit and proper freezing temperature.

Include in the O&M plan, as a minimum, the following.

- name and telephone number of the vendor responsible for removing animal carcasses from the freezers to off-farm facilities.
- schedule for removing animal carcasses from the freezer(s).
- capacity of freezer.
- maximum loading capacity of freezer(s).
- freezer operating temperature.

Additional O & M for Composters

State in the operation and maintenance plan that composting is a biological process. It requires a combination of art and science for success. Hence, the operation may need to undergo some trial and error in the start-up of a new composting facility.

Include in the O&M plan recipe ingredients and sequence that they are layered and mixed, maximum and minimum temperature for operation, land application rates, moisture level, management of odors, testing, etc. Make adjustments throughout the composting period to ensure proper composting processes.

Inspect the compost facility regularly when the facility is empty. Replace deteriorated wooden materials or hardware. Patch concrete floors and curbs as necessary to assure water tightness. Examine roof structures for structural integrity and repaired as needed. Inspect exposed metal components for corrosion. Wire-brush and paint corroded metal as necessary.

Closely monitor temperatures above 165°F. Take action immediately to cool piles that have reached temperatures above 185°F.

Additional O & M for Disposal Pit

Use disposal pits only for the disposal of dead animals associated with the planned operation.

Inspect the disposal pit periodically to ensure that all components are operating as planned. Check for structural integrity of the disposal pit.

O & M Applicable to All Catastrophic Mortality

Identify potential locations for catastrophic animal mortality facilities during the planning process. Maintain recordkeeping of number, average weight, cause, and date of animal deaths.

Additional O & M for Burial Pit

Size of burial pits shall be specified. Number and depth of cover of burial pits shall be recorded. 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.

Additional O & M for Composting

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

Agricultural Waste Management Field Handbook (AWMFH)
ASTM C1227-00b Standard Specification for Pre-cast Septic Tanks
Florida NRCS Conservation Practice Standards
Access Road, Code 560
Composting Facility, Code 317
Critical Area Planting, Code 342
Florida Department of Environmental Protection Chapters
62-4 F.A.C.
62-210 F.A.C.
62-296 F.A.C.
62-297 F.A.C.
General Manual (GM)
Title 420-Part 401
Title 450-Part 401

Title 190-Parts 410.22 and 410.26
National Cultural Resources Procedures Handbook
National Electrical Code
National Engineering Handbook, Part 637, Chapter 2, Composting
National Engineering Handbook, Section 6, Structural Design
National Environmental Compliance Handbook
National Food Security Act Manual
National Planning Procedures Handbook
Florida Supplements to Parts 600.1 and 600.6