

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

ANIMAL MORTALITY FACILITY

(No.)
Code 316



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.

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 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 mortality events,
- To provide contingencies for catastrophic mortality events.

CRITERIA

General

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 NEH, Section 6, Structural Design or other equivalent design manual(s) accepted by industry.

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.

To minimize transfer of diseases, animal mortality facility shall be located a sufficient distance from buildings used to house the

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animals and other residences. The minimum distance shall be 50 feet or as recommended by the state veterinarian, whichever is greater.

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

The location of the animal mortality facility shall be consistent with the overall site plan for the livestock or poultry operation.

Protection. The animal mortality facility shall be located above the 25-year flood plain; however if site restrictions require location within a floodplain, the facility shall be protected from inundation or damage.

The animal mortality facility shall be located a sufficient height above normal ground to prevent surface water from ponding and posing a problem in the loading or unloading of the facility. The site shall be graded 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. The system design shall consider the safety of humans and animals during construction and operation.

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

Vegetation. All disturbed areas shall be vegetated in accordance with NRCS conservation practice standard Critical Area Planting, Code 342.

Additional Criteria to Provide Contingencies for Normal Mortality Events

Composters

General. Design of facilities for composting animal mortality shall conform to 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. Freezers shall be located near all-weather roads to facilitate the loading and transporting of carcasses from the farm. Where needed, all-weather roads shall be constructed to facilitate the equipment used in the removal of carcasses from the freezers. All-weather roads shall meet the requirements of NRCS conservation practice standard Access Road, Code 560.

Structural Loading and Design. 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 included as deemed appropriate.

The freezer unit design, construction, power source, and unit installation shall be in accordance with the 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.

To provide for structure stability and safety, the freezer shall be located on a firm foundation consisting of an earthen, gravel, limerock, timber, or concrete pad as recommended by the manufacturer. 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. The units must be sealed against weather and air leakage.

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.

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

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

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.

Safety. Highly visible waterproof warning signs, such as "INEDIBLE" or similar signs shall be posted on the facility to identify the use of the freezer.

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) in 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. No minimum depth is required, but the selected depth shall accommodate 2 feet of cover over the mortality. 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 six 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 that are four to five feet deep, a step or bench 18 inches wide and one-foot deep shall be dug around the perimeter of the main pit so the remaining vertical wall shall not exceed four feet. For pits greater than five feet deep, the earthen wall shall be sloped back at 1 ½ horizontal and 1 vertical (1 ½:1) 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.

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.). Incinerators shall meet the requirements contained in Rule 62.296.401(6)

F.A.C. Permits must be obtained prior to construction and operation.

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

The incinerator shall not cause, suffer, or allow or permit the discharge of air pollutants, which cause or contribute to an objectionable odor.

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

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. In the absence of specific landowner mortality data, incinerator capacity shall be based 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. The incinerator shall be located a minimum of 20 feet or as recommended by the manufacturer from any structure to prevent spontaneous combustion. The incinerator shall be placed on a reinforced (fiber or steel) concrete pad for stability and safety. The concrete slab shall extend sufficient distance on all sides of the incinerator base to accommodate management of the facility. The top of the concrete slab shall 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, at least six inches are required between the incinerator chimney and any combustible component of the roof.

The fuel source placed 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. Electrical components and installation shall meet the requirements of the National Electrical Code (NEC) and state and local codes for outdoor installation. All electric wiring shall 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 Liquefied 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.

Fuel storage for diesel powered units shall be installed 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. Catastrophic mortality shall be collected as soon as practical and moved away from the production facility.

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.

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 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 used for burial 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 2 feet of cover over the mortality. Pit bottoms shall be relatively level and be two feet above seasonal high water table. 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 two 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 NEH Part 637, Chapter 2 – Composting.

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.

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.

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 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 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.

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)

Poultry operations often experience higher rates of mortality as the birds reach maturity. The capacity of incinerators should be sized to ensure 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.

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

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 facility shall be in keeping with this standard and shall describe the requirements for applying this practice to achieve its intended purpose(s).

OPERATION AND MAINTENANCE

O&M for All Animal Mortality Facility

An operation and maintenance plan applicable to this practice that includes, but 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.

The O&M plan shall include but not limited to 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

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, the facility shall be inspected to note any maintenance needs or indicators of operation problems.

Additional O & M for Incinerators

Incinerators shall only be used for the cremation of dead animals.

Incinerators must be operated properly to maximize equipment life and minimize emission problems. Any operator of an incinerator shall 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.

The incinerator must be loaded according to the manufacturer's recommendations. Ashes should be removed frequently to maximize combustion and prevent damage to equipment. Plans shall include methods for collecting and disposing of the ash material remaining after incineration. The plan shall include an ash collection box or bucket and disposal of the ash on the land or through a community trash disposal system.

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

Additional O & M for Freezers

Freezers must be operated properly to maximize equipment life and minimize potential problems. Temperatures should be monitored regularly to ensure proper freezing of carcasses.

The freezer must be loaded according to manufacturer's recommendations and not exceed the design capacity.

Freezers shall only be used only for the freezing of dead animals associated with the planned operation.

The freezer must be inspected 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. The inspection shall check for leaks and structural integrity of the freezer unit and proper freezing temperature.

The O&M plan shall include but not limited to 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

The operation and maintenance plan shall state 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.

The O&M plan shall include 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.

The compost facility should be inspected regularly when the facility is empty. Replace deteriorated wooden materials or hardware. Patch concrete floors and curbs as necessary to assure water tightness. Roof structures should be examined for structural integrity and repaired as needed. Exposed metal components should be inspected for corrosion. Corroded metal should be wire brushed and painted 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

Disposal pits shall be used only for the disposal of dead animals associated with the planned operation.

The disposal pit must be inspected periodically to ensure that all components are operating as planned. The inspection shall check for structural integrity of the disposal pit.

O & M Applicable to All Catastrophic Mortality

Potential locations for catastrophic animal mortality facilities shall be located during the planning process. Recordkeeping of number, average weight, cause, and date of animal deaths, will be maintained.

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)

FDEP Chapters
62-4 F.A.C.
62-210 F.A.C.
62-296 F.A.C.
62-297 F.A.C.

NEH, Part 637, Chapter 2, Composting

NEH, Section 6, Structural Design

NRCS GM 420 Part 401 – Cultural Resources

NRCS National Handbook of Conservation Practices

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

NRCS FL Conservation Practice Standards
Access Road, Code 560
Composting Facility, Code 317
Critical Area Planting, Code 342