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 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. For disease related catastrophic mortality, contact the Iowa Department of Agriculture and Land Stewardship (IDALS) as their rules and regulations apply.

CRITERIA

General Criteria Applicable to All Purposes

Laws and Regulations. Systems or processes for animal mortality facilities must be planned, designed, and constructed to meet all federal, state, and local regulations. The facility shall be designed to handle normal mortality and/or catastrophic mortality.

Consideration should be given to prevailing wind direction and neighbors when siting animal mortality disposal facilities. A minimum of 500 feet shall separate the facility from the nearest neighboring residence, and the facility shall be 200 feet from a public well and 100 feet from a private 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. Any run-on or run-off shall be controlled or contained.

Provisions shall be included for closing and/or removing the facility where required.

Design. All structural components integral to animal mortality management shall meet the structural loads and design criteria as described in Waste Storage Facility (313) unless otherwise designated.

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

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.

Consideration shall be taken to ensure animal mortality facilities are not located near public wells, private wells, property lines, existing neighboring residences, and any stream, lake, pond, or intermittent stream. Where practical, the facility shall be generally down gradient from a spring or well.

The animal mortality facility shall be located outside the 100-year floodplain, wetland, or shoreline area.

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, Chapter 10, 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.

Composters

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

Freezers

General. 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 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 22-26°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 carcasses.

Disposal Pit

General. Disposal pits shall be located on moderately well to excessively drained soils. Disposal pits shall not be located on sites with:

- Highly permeable soils or over fractured or cavernous bedrock within 2 feet of the bottom of the pit unless an approved liner is used

- Soils with a seasonal high water table less than 2 feet from the bottom of the pit unless artificial drainage is installed to maintain water-level depth more than 2 feet below burial depth of waste

Size and Capacity. Pits shall be sized to accommodate the normal mortality in accordance with criteria acceptable to state and local regulatory agencies. A maximum of 44 butcher or breeding hogs, 7 slaughter or feeding cattle, 73 sheep or lambs, 400 turkeys, or 1,600 chicken (poultry) carcasses can be buried on any given acre per year. 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 30 inches of cover over the mortality. Multiple pits shall be separated by a minimum of 3 feet of undisturbed or compacted soil.

Structural Loading and Design. Vehicular traffic shall not be allowed within 4 feet of the pit structure. Fences or other barriers shall be used to exclude vehicles where necessary.

If soil conditions will not allow for a stable disposal pit wall, it 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 6-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 1 foot wide and 6 inches thick. When treated timbers are used for walls, 1-inch spacing shall be left between timbers.

For pits that are 4 to 5 feet deep, a step or bench 18 inches wide and 1 foot deep shall be dug around the perimeter of the main pit so the remaining vertical wall shall not exceed 4 feet. For pits greater than 5 feet deep, the earthen wall shall be sloped back at 1 ½ horizontal and 1 vertical 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 8 feet long shall have drop chutes every 5 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 10-inch opening is recommended for chickens and a 12-inch opening for turkeys and suckling pigs.

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 6 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.

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 2 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, Chapter 10, 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. The reference section contains a web address of a site that details locations in Iowa suitable for burial of livestock. 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 30 inches 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 3 feet of undisturbed or compacted soil. The burial site shall be of sufficient volume to contain the mortality with a minimum of 30 inches 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 4 feet of the pit edge.

For pits that are 4 to 5 feet deep, a step or bench 18 inches wide and 1 foot deep will be dug around the perimeter of the main pit so the remaining vertical wall will not exceed 4 feet. For pits greater than 5 feet deep, the earthen wall shall be sloped back at 1 ½ horizontal and 1 vertical or flatter. The lowest elevation for a burial pit is 6 feet below the surface.

Composting

General. Catastrophic mortality composting shall be in either passive piles or windrows as described in NEH, 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.

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 geologic setting and state and local agencies
- The economics of the available alternatives
- Effect on and responses of neighbors

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.

The following table lists factors that could be used in determining minimum daily weight of animal mortality when sizing 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 (per sow)	0.0400

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.

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.

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

OPERATION AND MAINTENANCE

An operation and maintenance (O&M) 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.

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.

Burial of catastrophic mortality shall be timed to minimize the effects of mortality expansion during early stages of the decay process. Farm animals are to immediately be covered with a minimum of 6 inches of soil and finally be covered with total minimum of 30 inches of soil. 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 O&M 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 animal mortality facilities shall be in keeping with this standard and shall describe the requirements for applying this practice to achieve its intended purpose.

The following list of Construction Specifications is intended as a guide to selecting the appropriate specifications for a specific project. The list includes most, but may not contain all, of the specifications needed for a specific project:

IA-1 Site Preparation
IA-3 Structural Removal
IA-5 Pollution Control
IA-6 Seeding and Mulching for Protective Cover
IA-11 Removal of Water
IA-21 Excavation
IA-23 Earthfill
IA-24 Drainfill
IA-26 Salvaging and Spreading Topsoil
IA-27 Diversions
IA-31 Concrete
IA-32 Concrete for Nonstructural Slabs
IA-45 Plastic (PVC, PE) Pipe
IA-81 Metal Fabrication and Installation
IA-83 Timber Fabrication and Installation
IA-92 Fences

REFERENCES

USDA-NRCS, National Engineering Handbook (NEH), Part 651, Agricultural Waste Management Field Handbook (AWMFH)

Iowa Department of Natural Resources, Iowa Livestock Burial Zones, http://csbweb.igsb.uiowa.edu/imsgate/maps/livestock_burial_zones.asp

USDA-NRCS, National Engineering Handbook (NEH), Part 637, Chapter 2

USDA-NRCS, General Manual 420 (GM 420), Part 401, Cultural Resources

USDA-NRCS, National Handbook of Conservation Practices (NHCP)

Standard Specification for Pre-cast Septic Tanks, American Society of Testing Materials (ASTM), C1227-00b,