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 for routine and catastrophic mortality events.

PURPOSE

This practice supports one or more of the following purposes:

- Reduce impacts to surface and groundwater resources.
- Reduce the impact of odors.
- Decrease the spread of pathogens.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to livestock and poultry operations where animal carcass treatment or disposal is needed.

This practice includes disposal of both routine and catastrophic animal mortality; however, it may not apply to catastrophic mortality resulting from disease. In cases of disease related to catastrophic mortality, this standard is applicable only when directed by the appropriate state or federal authority (typically the state veterinarian or USDA Animal and Plant Health Inspection Service) to use the methods in this standard.

CRITERIA

General Criteria Applicable to All Purposes

Design animal mortality facilities to handle routine 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 buildings and structures shall comply with the NC State Building Code. Auxiliary components such as grinders, blowers, piping systems, etc. shall be sized in accordance with the waste management plan developed for the operation. All components shall be certified by the manufacturer or supplier to comply with the site specific plans and specifications developed for the project.

Design of all structural components integral to the animal mortality facility shall meet the structural loads and design criteria as described in NRCS conservation practice standard Waste Storage Facility (313), and conservation practice standard Roofs and Covers (367), unless otherwise designated.

Divert all runoff away from the animal mortality facility.

Use safety devices such as fencing, warning signs, and refrigeration unit locks where necessary.

Address bio-security concerns in all aspects of planning, installation, and operation and maintenance of an Animal Mortality Facility.

Location. Locate the facility where movement of odors toward neighbors will be minimized.

Locate the facility down gradient from springs or wells where possible or take steps necessary to prevent contamination.

Locate animal mortality facilities above the 100-year floodplain elevation unless site restrictions require location within the floodplain. If located in the floodplain, protect the facility from inundation or damage from a 25-year flood event.

Ensure that the location of the animal mortality facility is consistent with the overall site plan for the livestock or poultry operation. Locate the facility for acceptable ingress and egress and where it will not interfere with other travel patterns on the farm.

Seepage Control. Where seepage will create a potential water quality problem, provide a liner which meets the requirements of the Agricultural Waste Management Field Handbook (AWMFH), Appendix 10D for clay liner design criteria or other acceptable liner technology.

Criteria Applicable to Routine Mortality

Locate the facility 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 facilities for composting animal mortality to conform to NRCS conservation practice standard Composting Facility (317).

Size animal mortality composting facilities according to the methods provided in the NEH Part 637, Chapter 2 – Composting (NEH 637.0210 and NEH 637.0211) and NEH Part 651, Chapter 10 – Composting (NEH 651.1004(f)) or comparable extension publication or state rules.

Refrigeration Units

General. Use refrigeration units with a construction compatible with the mechanism to be used to empty the refrigeration unit. Provide for protecting the refrigeration unit from precipitation and direct sun as deemed appropriate.

The refrigeration unit design, construction, power source, and unit installation shall be in accordance with manufacturer's recommendations. Refrigeration units shall be constructed of durable material, be leak proof, and have a life expectancy compatible with other aspects of the waste management system.

Place refrigeration units on a concrete (minimum 4” thick) pad of suitable strength to withstand loads imposed by vehicular traffic used to load or remove the box or tray.

Temperature. The refrigeration units shall be self-contained units designed to freeze animal carcasses before decomposition occurs. For best results, the temperature of the carcasses to be rendered shall be maintained between 22° and 26° F. Carcasses that will be incinerated or gasified should be stored at a few degrees above freezing in order to facilitate burning and to reduce the amount of fuel needed to incinerate or gasify the carcasses.

Capacity. Size the refrigeration units to accommodate the normal maximum volume of mortality to be expected in the interval between emptying. When calculating the volume required, 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, and a conversion factor for weight to volume. For broiler operations use a weight to volume conversion of 45 pounds per cubic foot unless a local volume conversion factor has been documented.

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

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 is not available, provide contingencies for disposal of the animal carcasses in the operation and maintenance plan.

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.

Incinerators and Gasifiers

General. Use Type 4 (human and animal remains) incinerators that have been approved for use within the state. Gasification, which is a high temperature method of vaporizing the biomass with no direct flame with oxidation of the fumes in an after-burning chamber, will meet all applicable state air quality/emissions requirements.

Capacity. Base the minimum capacity on the maximum daily weight of animal mortality and the length of time the facility will be operated each day. Refrigeration units can be used in conjunction with incinerators and gasifiers to improve the loading cycle and fuel use efficiency of the gasification unit.

Ashes. Remove ashes daily or according to manufacturer recommendations. Spread ash according to NRCS conservation practice standard Nutrient Management (590) or provide for other acceptable means of disposal.

Location. Locate the facility a minimum of 20 feet from any structure. Place the unit(s) on a concrete pad with the fuel source as distant as practical. The pad shall be at least 4 inches thick. The concrete pad shall extend sufficient distance on all sides of the unit(s) to accommodate management of the facility. The top of the concrete pad shall be a minimum of 6 inches above natural ground.

If the facility is covered with a roof, it shall be made of metal and at least 6 inches of air space is required between the chimney and any combustible roof parts. In addition, the size and other clearances shall be as recommended by the incinerator manufacturer.

The facility must be located on a farm and is owned and operated by the farm owner or by the farm operator. The facility is used solely to dispose of animals or poultry originating on the farm where the facility is located. Incinerators and gasifiers shall only be used for the cremation of dead animals.

The site shall be graded to drain or divert all overland runoff safely away from the structure and surrounding work area.

Installation. 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 manufacturer's recommendations.

Fuel storage for diesel powered units shall be installed in accordance with manufacturer's recommendation and shall meet all applicable state and local codes, rules, and regulations.

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

Criteria Applicable to Catastrophic Mortality

General. Burial and composting are the only processes addressed by this standard. Collect and treat catastrophic mortality as soon as practical and move it away from the production facility. Animal burial during a declared emergency shall follow the guidelines of the State Animal Response Team, as published by the NC Department of Agriculture and Consumer Services, Veterinary Division.

Location. Locate the animal mortality facility site 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. Use AWMFH Appendix 10D for selection of sites where seepage will be restricted with normal construction techniques.

Burial Pit (Catastrophic Mortality Only)

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

Remove or render inoperable all field tile (subsurface drains) within the operational area of the burial pit.

Location. The burial site must be at least 300' from any existing stream, public body of water, or public water supply well. It shall be at least 100 feet from any well. The burial site cannot include any portion of a waste lagoon or lagoon wall. If the burial site is located in a sprayfield, the burial site will not be available for subsequent spraying until a new, viable, crop is established on the site. The burial site shall not be located in the tiled area of an underdrained field.

Soil Suitability. Perform onsite soils investigation to determine the suitability of the site for a burial pit. Locate burial pits on soils which do not flood and which do not have a water table within two feet of the bottom of the burial pit. Avoid areas which have the presence of hard bedrock, bedrock crevices, or highly permeable strata at or directly below the proposed trench bottom. These sites are undesirable because of the difficulty in excavation and the potential pollution of underground water.

Size and Capacity. Size pits to accommodate catastrophic mortality using appropriate weight to volume conversions. Capacity shall be in accordance with criteria acceptable to state and local regulatory agencies. Dig the pit bottoms to be relatively level. Lengths may be limited by soil suitability and slope. If more than one pit is required, separate the pits by a minimum of 3 feet of undisturbed or compacted soil. Place a minimum of 3 feet of cover over the mortality. Provide a finished grade for the burial site that is slightly above natural ground elevation to accommodate settling and reduce ponding from precipitation events. Vegetate all disturbed areas according to NRCS conservation practice standard Critical Area Planting (342).

Structural Loading and Design. Use barriers to keep vehicular traffic at least four feet from the pit edge.

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

Composting

General. Use composting as described in NEH Part 637, Chapter 2 – Composting (NEH 637.0210 and NEH 637.0211) and NEH Part 651, Chapter 10 – Composting (NEH 651.1004(f)).

Protect composting mortality from precipitation as necessary, or provide an appropriate filter area or means for collecting contaminated runoff. Cover dead animals in static piles or windrows with a minimum of 1 foot of sawdust, finished compost, or other carbonaceous material to discourage scavenging animals and minimize odors.

CONSIDERATIONS

Major considerations in planning animal mortality management are:

- Available equipment and land application area at the operation,
- The management capabilities of the operator,
- The degree of pollution control required by state and local agencies,
- Effect on wildlife and domestic animals,

- The economics of the available alternatives, and
- Effect on neighbors.

Initial planning of site suitability should include referring to the web Soil Surveys' soil interpretations for "disaster recovery planning" http://websoilsurvey.nrcs.usda.gov/.

Establish traffic patterns to avoid crossing livestock pathways and feed lanes with mortality transport.

Consider taking measures to maintain appropriate visual resources, reduce odor, and provide dust control. Vegetative screens and topography should be used to shield the animal mortality facility from public view, to reduce odors, and to minimize visual impact. A minimum of 300 feet should separate the facility from the nearest neighboring residence. The facility should be no closer than 100 feet to a well, spring, or water course.

Composting of any mortality will be hindered if the carcasses are allowed to freeze. Dead animals or birds should be placed in the compost mix as quickly as practical or kept in a dry, non-freezing environment until added to the compost mix. Composting frozen carcasses will lengthen the amount of time needed for composting to occur and will likely require added management to ensure that proper composting temperatures are reached.

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.

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

State requirements for record keeping vary. Items such as burial site location, type and quantity of mortality, burial date, and other pertinent details may be required by state or local regulations.

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

PLANS AND SPECIFICATIONS

Plans and specifications shall describe the requirements for applying this practice. At a minimum, include the following:

1. A plan view showing the location and extent of the practice.
2. Pertinent elevations of the facility.
3. Location of electrical lines, gas lines, and requirements for burial and quality of materials.
4. Structural details of all components.
5. Number, capacity, and quality of facility(ies).
6. Where a roof structure is used to protect the facility, include design data and building dimensions.
7. Vegetative requirements.
8. Odor management or minimization requirement.

OPERATION AND MAINTENANCE

An operation and maintenance (O&M) plan containing the items listed below will be developed with the operator, and will become a part of the overall waste management system plan. Safety considerations shall be prominently displayed in the plan. As a minimum, include the following information in the O&M plan:

1. Method and procedures of mortality disposal for normal losses.
2. Method and procedures of mortality disposal for catastrophic losses.
3. Biosecurity concerns.
4. Contact(s) and phone numbers of person(s) to contact in case of catastrophic losses.
5. Records of date, average weight, and number of deaths.
6. Periodic inspections.
7. Prompt repair or replacement of damaged components.
8. Site references and/or manufacturer or installer for trouble shooting.

Additional O&M for Incinerators and Gasifiers

1. Use incinerators and gasifiers only for the disposal of animal carcasses.
2. Operate units properly to maximize equipment life and minimize emission problems.
3. Load the units according to the manufacturer's recommendations. An operator, trained by the manufacturer's representative or an equivalent organization, must be on-site when the facility is in operation.
4. Remove ashes frequently to maximize combustion and prevent damage to equipment. Include methods for collecting and disposing of the ash material remaining after incineration. The facility shall include a dedicated metal ash collection box or container. The ash shall be land applied at agronomic rates.
5. Inspect the units periodically to ensure that all components are operating as planned and in accordance with the manufacturer's recommendations.

Additional O&M for Refrigeration units

1. Operate refrigeration units properly to maximize equipment life and minimize potential problems.
2. Load the refrigeration unit according to manufacturer's recommendations and do not exceed the design capacity.
3. Use refrigeration units only for the dead animals associated with the planned operation.
4. Inspect the refrigeration unit periodically for leaks, structural integrity and temperature.

Additional O&M for Composters

1. Include a recipe of ingredients which gives the layering/mixing sequence.
2. Provide maximum and minimum temperatures for operation, land application rates, moisture level, management of odors, testing, etc.
3. Inspect the compost facility regularly when the facility is empty.
4. Replace or repair any damaged structural components.
5. Closely monitor temperatures above 165°F. Take action immediately to cool piles that have reached temperatures above 185°F.
6. Include the method, procedure, and record keeping requirements for proper utilization of compost.

Additional O&M for Catastrophic Mortality

1. Identify locations for catastrophic animal mortality disposal.
2. Maintain recordkeeping of number, average weight, cause, and date of animal deaths.
3. Provide the landowner with contact information for state authorities since they may have specific requirements dependent upon cause of death, livestock species and housing.
4. Where composting is used for catastrophic mortality disposal, identify in the O&M plan the most likely compost medium, possible compost recipes, operational information, and equipment that will need to be readily available.

REFERENCES

Nutsch, A., J. McClaskey, and J. Kastner, Eds., 2004. Carcass disposal: a comprehensive review, National Agricultural Biosecurity Center, Kansas State University, Manhattan, Kansas.

USDA, NRCS. 1992. National Engineering Handbook, Part 651, Agricultural Waste Management Field Handbook. Washington, D.C.

USDA, NRCS. 2000. National Engineering Handbook, Part 637, Chapter 2, Composting, Washington, D.C.

North Carolina State Statutes 106-403, 106-549.70 and 143-215.10C.

North Carolina Administrative Code Title 02 Ag and Consumer Services, Subchapter 52C, Section .0100.