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 catastrophic mortality, this standard is applicable only when directed by the appropriate state or federal authority (typically the state veterinarian or USDA APHIS) 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.

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

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service State Office or visit the Field Office Technical Guide.

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)). ***ASAE August 2001, Vol. 16(6), p. 681-692, Procedures and Equations for Sizing of Structures and Windrows for Composting Animal Mortalities, and Department of Ecology, Washington State, Pub. No. 05-07-034, On-Farm Composting of Livestock Mortalities*** 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 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.

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.

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 incinerator capacity on the average daily weight of animal mortality and the length of time the incinerator will be operated each day. Size gasifiers to handle the average maximum daily animal mortality during a growing cycle. Refrigeration units can be used in conjunction with 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 incinerator/gasifier a minimum of 20 feet from any structure. Place the unit on a concrete pad with the fuel source as distant as practical. If the incinerator is covered with a roof, at least six inches of air space is required between the chimney and any combustible roof parts.

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.

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 two 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

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.

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. 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 three feet of undisturbed or compacted soil. Place a minimum of 2 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.

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)) ***and Department of Ecology, Washington State, Pub. No. 05-07-034, On-Farm Composting of Livestock Mortalities***

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.

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.

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.
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.
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.

Include the method, procedure, and record keeping requirements for proper utilization of compost.

Additional O&M for Catastrophic Mortality

Identify locations for catastrophic animal mortality disposal. Maintain recordkeeping of number, average weight, cause, and date of animal deaths. Provide the landowner with contact information for state authorities since they may have specific requirements dependent upon cause of death, livestock species and housing.

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.

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