Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

Emergency Animal Mortality Management

Code 368

(No.)

DEFINITION

A means or method for the management of animal carcasses from catastrophic mortality events.

PURPOSE

This practice may be applied to achieve one or more of the following purposes:

- reduce impacts to surface water and groundwater resources
- reduce the impact of odors
- decrease the spread of pathogens

CONDITIONS WHERE PRACTICE APPLIES

This standard applies to animal operations where a catastrophic event would result in the need to manage animal carcasses.

This practice may not apply to catastrophic mortality resulting from disease. In cases of disease -related catastrophic mortality, this standard is applicable only when the appropriate State or Federal authority (typically the State veterinarian or USDA Animal and Plant Health Inspection Service (APHIS)) approves the use of the methods in this standard.

This practice does not apply to routine animal mortality. For routine animal mortality, use NRCS Conservation Practice Standard (CPS) *Animal Mortality Facility (Code 316)*.

CRITERIA

General Criteria Applicable to All Purposes

Design emergency mortality management operations to handle the catastrophic mortality in conformance with all applicable federal, state and local regulations.

As a minimum, divert runoff from a 25-year 24-hour rainfall event away from the emergency animal mortality management site.

Provide warning signs, fences, refrigeration unit locks, and other devices as appropriate, to ensure the safety of humans and livestock.

Address biosecurity concerns in all aspects of planning, installation, operation, and maintenance of a catastrophic animal mortality operation.

The landowner/contractor is responsible for locating all buried utilities in the project area, including drainage tile and other structural measures.

Include provisions for closing and/or removing temporary components of the emergency mortality management operation, where required.

Onsite Disposal

Location. Locate onsite mortality management activities so that prevailing winds and landscape elements minimize odors and protect visual resources.

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

Locate onsite mortality management operations above the 100-year floodplain elevation unless site restrictions require location within the floodplain and the management operations located within the floodplain are portable and can be quickly relocated if it becomes necessary (i.e., loading site for transportation to offsite disposal location). Use an offsite disposal method if there is not a suitable location on the farm.

Locate onsite mortality management activities to minimize disruption of ongoing daily operations.

Locate onsite mortality management activities for acceptable ingress and egress and where it will not interfere with other travel patterns on the farm such as livestock pathways and feed lanes.

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.

The soil interpretations found in the Disaster Recovery category under Soil Suitabilities and Limitations on the Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/) can be used as an initial screening tool to identify areas that are likely to be most suitable for this practice.

Use the criteria in NRCS CPS 342, Critical Area Planting, to revegetate all areas disturbed by mortality management activities.

Burial Pit/Trench

General. Bury catastrophic mortality onsite or as otherwise directed by state and local regulatory agencies. More than one pit/trench may be required. When possible, time the burial of catastrophic mortality to minimize the effects of mortality carcass expansion during the early stages of the decay process. Where possible and permitted by State law, leave large animal 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 2 feet from the edge of the burial pit/trench.

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

Soil Suitability**.** Perform an onsite soils investigation to determine the suitability of the site for a burial pit/trench. Locate burial pits on soils which do not flood and which do not have a water table within 2 feet of the bottom of the burial pit. Avoid areas that have the presence of hard bedrock, bedrock crevices, or highly permeable strata at or directly below the proposed pit/trench bottom. These sites are undesirable because of the difficulty in excavation and the potential pollution of groundwater.

Seepage Control**.** Where seepage will create a potential water quality problem, provide a liner which meets the requirements of the NEH Part 651, Agricultural Waste Management Field Handbook (AWMFH), Appendix 10D for clay liner design criteria, or other acceptable liner technology.

Size and Capacity**.** Size the pits /trench to accommodate the catastrophic mortality using appropriate weight to volume conversions. Construct the pit/trench bottoms to be relatively level. The length of the pit/trench may be limited by soil suitability and slope. If more than one pit/trench is required, separate the pits/trenches 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.

Burial Trench Loading Design and Safety. Use barriers to keep vehicular traffic at least four feet from the edge of the pit/trench edge.

Use pit excavation techniques that are OSHA compliant. For pits/trenches that are 4 to 5 feet deep, provide a step or bench 18 inches wide and 1 foot deep dug around the perimeter of the main pit so that the remaining vertical wall will not exceed 4 feet. For pits greater than 5 feet deep, provide earthen walls that are sloped at 2 horizontal and 1 vertical or flatter.

Composting

General. Use composting as described in, National Engineering Handbook (NEH) Part 637, Chapter 2, Composting; and NEH, Part 651, Chapter 10, Section 651.1007, Mortality Management.

Plan for the needed amount of carbonaceous material required to facilitate the composting action.

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 18 inches of sawdust, finished compost, or other carbonaceous material to discourage scavenging animals and minimize odors.

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, shall meet all applicable State air quality/emissions requirements.

Capacity**.** Base the minimum incinerator/gasifier capacity on the average weight of animals times the number of animals in the event. Refrigeration units may be necessary in conjunction with incinerators/gasifiers to improve the loading cycle and fuel use efficiency of the incineration/gasification unit.

Ashes. Remove ashes according to manufacturer recommendations to maximize efficiency of incineration. Spread ash according to NRCS CPS Code 590, Nutrient Management, or provide for other acceptable means of disposal.

Location. Locate the incinerator/gasifier a minimum of 20 feet from any structure.

Open-air Burning

Open-air burning involves combustion of waste at high temperatures, converting the waste into heat, gaseous emissions, and ash. The gaseous emissions are vented directly into the atmosphere in the human breathing zone without passing through a stack or chimney.

Open-air burning includes burning carcasses in open fields and on combustible open heaps, or pyres or air curtain destructors. Burning must take place as far away as possible from the public. Local conditions and circumstances may determine if this is the best disposal option to choose.

On-farm preprocessing may be required prior to open-air burning. Preprocessing could include the grinding of carcasses that can be transported in sealed containers or subjected to fermentation or freezing. However, grinding or shredding of carcasses infected with an infectious disease such as Highly Pathogenic Avian Influenza (HPAI) is not recommended because of the risk of aerosolizing the virus.

Open-air burning operations are strictly regulated, usually by State and/or local officials. A permit is usually required to perform open-air burning, if it is allowed at all.

Use NRCS CPS *Critical Area Planting (Code 342)* to revegetate all areas disturbed by construction.

Temporary Mortality Storage with Refrigeration Units

General**.** Catastrophic mortality may be held in refrigeration units prior to disposal. Because of the large number of dead animals normally encountered in a catastrophic mortality situation, if refrigeration is used, it is likely that multiple units will be needed. 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 and leak proof.

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. Carcasses to be rendered should be maintained between 22° and 26° F. Carcasses that will be composted, incinerated, gasified, or burned should be stored a few degrees above freezing in order to facilitate burning and to reduce the composting time or amount of fuel needed to incinerate or gasify the carcasses.

Capacity. Size the refrigeration units to accommodate the volume of mortality. When calculating the volume required, use the number of dead animals, the average weight of the animal, and a conversion factor for weight to volume. Use a weight to volume conversion of 45 pounds per cubic foot unless a local volume conversion factor has been documented.

Power Source**.** An adequate source of power will be needed to provide the large amount of electricity needed for cooling and/or freezing carcasses.

Offsite Disposal

In some instances, onsite disposal of all or a portion of the mortality may not be practical. In these instances, transportation and disposal by a third party at an offsite facility will be necessary.

Transportation.

The beds, trailers, dumpsters, etc., which will be used to transport the mortality to another location for disposal shall be leak proof, tarped and covered.

Rendering.

General. Rendering of animal mortalities involves conversion of carcasses into three end products—carcass meal, melted fat or tallow, and water—using mechanical processes (e.g., grinding, mixing, pressing, decanting and separating), thermal processes (e.g., cooking, evaporating, and drying), and/or chemical processes (e.g., solvent extraction). When the proper processing conditions are achieved, the final products will be free of pathogenic bacteria and unpleasant odors.

In an outbreak of disease such as foot and mouth disease, transport and travel restrictions may make it impossible for rendering plants to obtain material from traditional sources within a quarantine area. Additionally, animals killed because of a natural disaster, such as a hurricane, might not be accessible before they decompose to the point that they cannot be transported to a rendering facility and have to be disposed of onsite.

Animal mortalities should be collected and transferred in a hygienically safe manner according to State and local rules and regulations.

Land Fill

General. Modern subtitle D landfills are highly regulated operations, engineered and built with technically complex systems specifically designed to protect the environment. The environmental protection systems of a subtitle D landfill are generally more robust than those small, arid, or remote landfills that meet the EPA criteria for exemption from environmental protection systems, and would likely be less prone to failure following high organic loading as would occur in disposal of large quantities of carcass material.

In many States, disposal of animal carcasses in landfills is an allowed option; however, it is not necessarily an available option, as individual landfill operators generally decide whether to accept carcass material. During an emergency or instance of catastrophic loss, time is often very limited, and therefore landfills offer the advantage of infrastructures for waste disposal that are preexisting and immediately available. Furthermore, the quantity of carcass material that can be disposed of in landfills can be relatively large.

Landfill sites, especially subtitle D landfill sites, will have been previously approved, and the necessary environmental protection measures will be preexisting; therefore, landfills represent a disposal option that would generally pose little risk to the environment.

CONSIDERATIONS

Major considerations in planning emergency animal mortality management are:

- Available equipment and land application area at the operation
- The management capabilities of the operator
- The emotional impact on the producer caused by the mortality losses
- The degree of pollution control required by State and local agencies
- Effect on wildlife and domestic animals
- The economics of the available alternatives
- Effect on neighbors (aesthetic, odors, traffic on public roads)

Animal operations with a Comprehensive Nutrient Management Plan (CNMP) may have planned for catastrophic mortality disposal under the “Farmstead Safety and Security” element. Initial planning of site suitability should include referring to the Web Soil Surveys’ soil interpretations for “disaster recovery planning” http://websoilsurvey.nrcs.usda.gov/.

Consider taking measures to maintain appropriate visual resources, reduce odor, and provide dust control. Measures may include use of existing vegetative screens and topography to shield the catastrophic animal mortality disposal from public view, to reduce odors, and to minimize visual impact.

An alternative to prevent bloating of catastrophic mortality includes 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

Prepare plans and specifications for animal mortality facilities that describe the requirements for applying this practice. As a minimum the plans and specifications shall include:

- Contact information for state authorities since they may have specific requirements dependent upon cause of death, animal species and housing.
- Amount, type, and weight of mortality.
- Layout and location of on-farm mortality management activities.
- Number, capacity, and type of on-farm disposal methods.
- Grading plan showing excavation and fill. Include drainage features, as appropriate.
- Soil and foundation findings, interpretations, and reports, as appropriate.
- Requirements for onsite disposal (i.e. composting, burial, etc.) and quantity of materials, as appropriate.
- Structural details of all components, as appropriate.
- Vegetative requirements for preventing erosion, as appropriate.
- Odor management or odor minimization requirement.
- Where offsite disposal such as rendering or landfilling is to be used, the name, location, and contact information for the selected offsite transportation and disposal facility.

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) Plan shall be developed and reviewed with the operator responsible for the application of this practice. At a minimum, the plan will include:

- Specific instructions for proper operation and maintenance of each component of this practice. Detail the level of inspection and repairs needed to maintain the effectiveness and useful life of the practice.
- Safety considerations.
- Address biosecurity concerns in all aspects of installation, operation and, maintenance.
- Identify onsite locations for emergency animal mortality management activities and disposal sites as appropriate.
- Contact(s) and phone numbers of person(s) to contact for catastrophic losses (figure 1).
- Maintain recordkeeping of number, average weight, cause, and date of animal deaths.
- Method and procedures of catastrophic mortality disposal.
- Periodic inspections of disposal sites as appropriate.
- Prompt repair or replacement of damaged components as appropriate.
- Site references and/or manufacturer or installer for trouble shooting mechanical equipment as appropriate.

Additional O&M for Incinerators and Gasifiers

Operate units properly to maximize efficiency of disposal and minimize emission problems.

Load the units according to the manufacturer’s recommendations.

Remove ashes frequently to maximize combustion and prevent damage to equipment. Include methods for collecting and disposing of the ash material remaining after incineration.

Additional O&M for Refrigeration units

Load the refrigeration unit according to manufacturer's recommendations and do not exceed the design capacity.

Inspect the refrigeration unit periodically for leaks, structural integrity and temperature.

Additional O&M for Composters

Identify operational information and equipment that will need to be readily available.

Locate, as soon as practical, a source for carbonaceous material sufficient to provide for the catastrophic event.

Include a recipe of ingredients that gives the layering/mixing sequence.

Provide maximum and minimum temperatures for operation, land application rates, moisture level, management of odors, testing, etc.

Become familiar with composting methods and procedures as soon as practical.

REFERENCES

Code of Federal Regulations. Title 40 - Protection of Environment. Chapter I - Environmental Protection Agency (Continued). Subchapter I - Solid Wastes. Part 258 - Criteria for Municipal Solid Waste Landfills. Subpart A – General, Section 258.1(4)(f)(1) http://www.gpo.gov/fdsys/pkg/CFR-2014-title40-vol25/xml/CFR-2014-title40-vol25-sec258-1.xml

EPA Criteria for Meeting the Small, Arid, and Remote Municipal Solid Waste Landfill Exclusion http://yosemite.epa.gov/osw/rcra.nsf/ea6e50dc6214725285256bf00063269d/148f6afee54217be852568e300468382!OpenDocument.

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

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

Figure 1

EMERGENCY MORTALITY RESPONSE

Emergency Contacts and Farm Information

Plan Date:	
Farm Name:	
Owner/Operator:	
County:	
Physical Address of Facility:	
Directions to Facility:	
Emergency Contacts	
Local Veterinarian:	
On-Call Veterinarian:	
Integrator	
Other:	
Local Emergency Number:	
List of Agencies to notify within 24 hours:	
State Animal Health Agency:	
State Veterinarian:	
Federal Area Veterinarian in Charge:	
Heavy Equipment Contractor	
for handling carcasses:	
for excavating burial pits:	
Composting Material Supplier:	
Incinerator:	
Landfill:	
Rendering Facility:	
Other (specify):	