

**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.

(Alabama Department of Agriculture and Industries (ADAI)/State veterinarian, ADEM, and/or USDA Animal and Plant Health Inspection Service (APHIS)) approves the use of the methods in this standard.

**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

Each producer should have an approved method to handle daily disposal of mortalities. However, in the event of a catastrophic loss, a producer will need to immediately dispose of a large volume of mortalities. ADEM requires each producer to have an emergency disposal plan in place. This plan should include a list of phone numbers of those to be contacted for approval and assistance. (See AL368 Job Sheet *Emergency Disposal Plan*).

**CONDITIONS WHERE PRACTICE APPLIES**

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

**CRITERIA**

**General Criteria Applicable to All Purposes**

This practice does not apply to routine (normal) animal mortality. For routine animal mortality, use Alabama NRCS Conservation Practice Standard (CPS) Code 316, Animal Mortality Facility. All practices regarding normal and emergency animal mortality management must comply with Alabama Department of Environmental Management (ADEM) Administrative Code Chapter 335-6-7 (AFO/CAFO Program). All animal mortality burial and landfilling activities must comply with ADEM Administrative Code Division 13 (Solid Waste Program). All animal mortality management practices, including incineration, must comply with ADEM Administrative Code Division 3 (Air Pollution Program).

Emergency mortality management operations shall be designed to handle catastrophic mortality in conformance with all applicable federal, state and local regulations.

Site shall be located, operated, and maintained to minimize offsite odors and disease vectors, and prevent discharges of pollutants to surface waters and/or groundwater.

In cases of disease related catastrophic mortality, this standard is applicable only when the appropriate State or Federal authority

At a minimum, runoff from a 25-year 24-hour rainfall event shall be diverted away from the emergency animal mortality management site.

Warning signs, fences, refrigeration unit locks, and other devices shall be provided as appropriate, to ensure the safety of humans and livestock.

Biosecurity concerns shall be addressed in all aspects of planning, installation, operation, and maintenance of a catastrophic animal mortality operation. Vehicle/equipment movement on/off farm may be restricted by ADAI based on the biosecurity concern.

Provisions for closing and/or removing temporary components of the emergency mortality management operation shall be made, where required.

The landowner is responsible for locating all buried utilities in the project area, including drainage tile and other structural measures. Alabama line location center (Alabama One-Call) is available for assistance at 811 or 1-800-292-8525.

### **Onsite Management**

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. Unless specifically waived/suspended by ADEM in writing, the ADEM/NRCS Buffer Distance Summary for Animal Feeding Operations (Under Mortality Management Structures Category) shall be followed when locating emergency mortality management facilities.

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). An offsite disposal method may be used, given approval by the State Veterinarian/USDA-APHIS, 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 two (2) feet between the bottom of the facility and the seasonal high water table and/or bedrock 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 Alabama NRCS CPS 342, Critical Area Planting, to revegetate all areas disturbed by mortality management activities.

### **Burial Pit/Trench**

General. Catastrophic mortality may be buried onsite or properly managed/disposed as otherwise directed by state and local regulatory agencies by ADAI permit only, and in accordance with applicable ADEM regulatory requirements. Prior to excavation, the landowner is required to obtain an on-site burial permit from ADAI (State Veterinarians Office). The following information should be provided to the State Veterinarians office: date lost, grower name, county where located, company and complex location, number of birds lost, age of birds, and name of person calling.

Select a location that is fully compatible with the land owner's intended future use of the land, and that is protected and excluded from future building and use, considering the potential cost to remove/remediate the burial pit if necessary for future sale of the property to a third party.

The maximum size of an individual burial excavation shall be 0.1 acre (about 4,400 sq. ft.). More than one trench may be required to dispose of all mortalities. When possible, time the burial of catastrophic mortality to minimize the effects of mortality carcass expansion during the early stages of the decay process. The burial trench shall be a minimum of two (2) feet in width with length necessary to accommodate

mortality. The final layer of carcasses shall be covered with a minimum of two (2) feet of non-compacted soil to the elevation of the existing ground surface. ADEM requires soil cover to the existing contour plus additional soil cover to mound the top of the pit to divert surface runoff.

As described, the bottom of the trench shall be located at least two (2) feet above the seasonal high water table (defined as the zone of saturation at the highest average depth during the wettest season) or bedrock. The bottom of the trench shall be located at least four (4) feet above the seasonal high water table or bedrock for highly pathogenic animal disease mortality burial unless waived by ADAI on a case-by-case basis. Topsoil should be retained to re-grade the disposal site after the ground has settled following completion of the decay process. The stockpiled soil shall be placed no closer than two 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 trenches/pits on soils which do not flood and which do not have a water table within two (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. Mortality shall not be buried in highly permeable soils (permeability greater than two (2) in/hr) without additional design considerations. Where these site conditions are unavoidable or 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 pit/trench to accommodate the catastrophic mortality using

appropriate weight to volume conversions. For poultry mortality, *Alabama Catastrophic Mortality Trench Design Version 1.0 Worksheet* is available in the Field Office Technical Guide, Section IV, Tools, and Engineering Spreadsheets. Construct the pit/trench bottoms to be relatively level. The length of the pit/trench may be limited by soil suitability, slope, and other characteristics of the site. If constructing more than one burial pit/trench, separate the pits/trenches by a minimum of three (3) feet of undisturbed or compacted soil. Refer to drawing AL-ENG-368-01 *Low Pathogenic Disease and Other Catastrophic Mortality Burial Trench* for additional construction details.

Burial Procedure. For small animals (poultry, nursery pigs, etc.) place carcasses in a layer no thicker than one (1) foot and cover each layer with at least one (1) foot of soil. Carcasses of large animals (hogs, cattle, etc.) shall be placed in a single layer with a minimum of two (2) feet of overlying soil. For deep soils (where water table/bedrock is not a problem) carcasses and soil can be placed in alternating layers to a total depth of eight (8) feet. This layering process is critical to prevent problems caused by bloating of the carcasses. Place a minimum of two (2) feet of soil cover over the final layer of mortality. Provide a finished grade for the burial site at the time of burial that is slightly above natural ground elevation to accommodate settling and reduce ponding from precipitation events. As settling occurs, add more soil material to maintain the finished grade slightly above the existing ground surface with drainage away from the site. The site shall be vegetated immediately after completion to prevent erosion of the soil covering according to Alabama NRCS Critical Area Planting CPS code 342.

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

Burial pit/trenches are required to be excavated in compliance with OSHA specifications. For pits/trenches that are four (4) to five (5) feet deep, provide a step or bench 18 inches wide and one (1) foot deep dug around the perimeter of the pit/trench so that the remaining vertical

wall will not exceed four (4) feet. For pits greater than five (5) feet deep, provide earthen walls that are sloped at two horizontal to one vertical (2:1) 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. Composting mortality piles can be protected from excess precipitation by shaping the piles as described in NEH Part 637 Chapter 2, Composting, or other means if required by ADAI. 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.

During a disease related emergency mortality event such as mortality associated with Highly Pathogenic Avian Influenza (HPAI), additional composting procedures and protocol shall be required as indicated by the USDA-APHIS Mortality Composting Protocol Guidance and/or the State Veterinarian composting procedures.

### **Incinerators and Gasifiers**

General. Use type 4 (human and animal remains) incinerators that have been approved for use by the Alabama Department of Environmental Management (ADEM). 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 the 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 Alabama 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 and in accordance with ADEM AFO/CAFO buffer requirements.

### **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, by State and/or local officials. The State Veterinarian's office (ADAI) must authorize and approve open air burning and all other methods contained herein prior to their use. A permit from ADEM is also required to perform open-air burning.

Use Alabama NRCS CPS Code 342, Critical Area Planting, to revegetate all areas disturbed by construction.

### **Temporary Mortality Storage with Refrigeration Units**

General. Catastrophic mortality may be stored 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 normal maximum 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 Management**

In some instances, onsite disposal of all or a

portion of the mortality may not be practical, environmentally compliant, and/or desirable by the landowner. In these instances, transportation and disposal by a third party at an offsite facility will be necessary. Authorization for offsite disposal of mortality must be obtained from the State Veterinarians office.

### **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. ADAI approved biosecurity procedures must be followed.

### **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 of

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. Disposing animal mortality in a landfill that is not permitted by ADEM to accept animal mortality is prohibited.

In Alabama, disposal of animal carcasses in an ADEM permitted landfill is an allowed option given authorization by the State Veterinarian; 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.

Existing landfill sites permitted by ADEM to accept animal mortality (subtitle D landfill sites), have the necessary environmental protection measures; therefore, ADEM permitted landfills represent a disposal option that would generally pose little risk to the environment.

In an outbreak of disease, biosecurity measures required by ADAI and USDA-APHIS must be followed at the farm as well as the landfill to clean and decontaminate trucks, other equipment, and associated personnel. These biosecurity measures are critical to prevent the spread of the disease.

## CONSIDERATIONS

Major considerations in planning emergency animal mortality management are:

- Early communication/coordination with resource and regulatory agencies
- 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
- Future planned land use or sale of the disposal site/property by 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
- 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/>. ADEM requires AFOs/CAFOs to have a plan for catastrophic animal mortality as part of ADEM’s comprehensive waste management system plans/practices requirements.

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.

Consider using native plant materials that promote forage production, benefit wildlife or pollinators in any measures requiring revegetation.

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

An emergency generator or secondary source of power should be available in case of primary power source failure of refrigeration/freezer unit.

If the incinerator is covered with a roof, the roof should be constructed of non-combustible materials.

Consideration should be given to the use of an afterburner to further reduce odors and fumes if an incinerator is to be installed in a sensitive area.

Mortality managed using an onsite burial pit/trench is subject to future use limitations and

restrictions by ADEM, ADAI, and the USDA-APHIS. Therefore, consideration should be given to a burial location that is fully compatible with the land owner's intended future use of the land, and that is protected and excluded from future building and use, considering the potential cost to remove/remediate the burial pit if necessary for future sale of the property to a third party.

## 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.
- Onsite measured required buffer distances from wells, waterbodies, property lines, offsite dwellings, etc.
- 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.
- 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.

Keep detailed records of mortality information. Items such as maps of burial site location, type and quantity of mortality, burial date, and other pertinent details should be maintained. Total volume of excavation, number trenches constructed, and trench dimensions should be recorded.

### **Additional O&M for Burial Pit/Trench**

Keep a detailed location map/record of all burial site. The location and size/depth of the pit must be documented and recorded for planning future onsite activities.

Burial site/area must be left undisturbed/unused and continually maintained into the future until the waste is remediated.

### **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. Identify the most likely compost medium, possible compost recipes, operational information, and equipment that will need to be readily available.

Composting of poultry mortality will be delayed if the bird carcasses are allowed to freeze. Carcasses should be kept in a dry, non-freezing environment until being added to the compost mix.

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.

#### **REFERENCES**

ADEM Administrative Code Chapter 335-6-7 (AFO/CAFO Program)  
<http://www.adem.state.al.us>

ADEM Administrative Code Division 13 (Solid Waste Program)  
<http://www.adem.state.al.us>

ADEM Administrative Code Division 3 (Air Pollution Program)  
<http://www.adem.state.al.us>

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.

USDA, APHIS. Mortality Composting Protocol for Avian Influenza infected Flocks. FY2016 HPAI Response Plan. February 5, 2016. Washington, D.C.

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](#).