

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**ANIMAL MORTALITY FACILITY**

**Code 316**

**(No.)**



**DEFINITION**

An on-farm facility for the treatment or disposal of animal carcasses due to routine mortality.

**PURPOSE**

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

- reduce pollution 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 livestock and poultry operations where routine animal carcass storage, treatment, or disposal is needed.

This standard does not apply to catastrophic animal mortality. In cases of catastrophic animal mortality, use Florida NRCS conservation practice standard (CPS) Emergency Animal Mortality Management, Code 368.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

**CRITERIA****General Criteria Applicable to All Purposes**

**Laws and regulations.** Design animal mortality system to comply with all Federal, state, and local laws, rules and regulations.

Evaluate and avoid or minimize impact to cultural resources, wetlands and Federal and state protected species to the extent practicable during planning, design and implementation of this conservation practice in accordance with established National and Florida policy, General Manual (GM) Title 420-Part 401; Title 450-Part 401, Title 190-Parts 410.22 and 410.26, National Planning Procedures Handbook (NPPH) Florida Supplements to Parts 600.1 and 600.6, National Cultural Resources Procedures Handbook (NCRPH), National Food Security Act Manual (NFSAM), and the National Environmental Compliance Handbook (NECH). Design emergency mortality management operations to handle the catastrophic mortality in conformance with all applicable federal, state and local regulations.

Include the facility in the waste management system plan for the operation.

Meet the structural and foundational requirements of Florida NRCS CPS Waste Storage Facility, Code 313 when designing slabs, walls, and support structures.

Use Florida NRCS CPS Roofs and Covers, Code 367 for animal mortality storage facility covers and roofs.

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

Include provisions for closing and/or removing the facility where required.

**Safety.** 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 an animal mortality facility.

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

**Location.** Locate the facility so that prevailing winds and landscape elements minimize odors and protect visual resources.

Locate the animal mortality facility 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.

Locate the facility down-gradient from springs or wells where possible or take steps necessary to prevent contamination of groundwater supply sources. Investigate hydrogeological conditions.

Direct surface runoff away from the animal mortality facility. Direct contaminated runoff from the animal mortality facility to an appropriate storage or treatment facility for further management.

Select a location for the animal mortality facility that is consistent with the overall site plan for the livestock or poultry operation. Locate the onsite mortality facility 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 the facility as close to the source of mortality as practical, considering biosecurity issues and the need to keep the facility out of sight of the general public.

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

**Temporary Storage.** Where the mortality management system depends on periodic or cyclic operation (including, but not limited to, offsite disposal such as rendering), provide a facility with adequate capacity

for temporary storage of carcasses until they can be processed or picked up. The temporary storage may be implemented as a pad or bin, a refrigeration unit, or other.

#### **Additional Criteria Applicable to Composters.**

**General.** Design animal mortality facilities for composting animal mortality to conform to Florida NRCS CPS Composting Facility, Code 317.

**Location.** Locate on a base of low -permeability soils, concrete, or other liner material that will not allow contamination of groundwater. The floor of the composting facility shall be at least 2 feet above the seasonal high water table.

Locate so that water is available to the facility during dry periods to ensure proper moisture and acceptable curing times to meet the management goals.

**Facility Type.** Base the selection of the composting facility/method on availability of raw material, desired quality of final compost, equipment, labor, time, and land available.

**Facility Size.** Size the compost facility to accommodate the amount of raw material planned for active composting plus space required for curing. Base the size of the facility on normal mortality loss records for the operation. If this data is not available, use locally established mortality rates for the type of operation. Ensure that the final product of the composting process has no visible pieces of soft tissue remaining.

The facility shall have the capacity to maintain the compost temperature greater than 130° F for at least 5 days as an average throughout the compost mass followed by a compatible time for secondary composting. For a windrow system, the temperature of the compost shall be above 130° F for 15 days with a minimum of 5 turnings of the compost.

Size the animal mortality composting facility using one of the methods provided in the NEH, Part 637, Chapter 2, Composting Section 637.0210; and NEH, Part 651, Chapter 10, Section 651.1007, Mortality Management; or comparable extension publication or State rules. Dimensions selected for elements of the compost facility shall accommodate equipment used for loading, unloading, and aeration.

**Use of Finished Compost.** Spread finished compost according to Florida NRCS CPS Nutrient Management, Code 590 or provide for other acceptable means of disposal.

#### **Additional Criteria Applicable to Refrigeration Units**

**General.** Refrigeration units used shall be compatible with the emptying mechanism. Protect the refrigeration unit from precipitation and direct sun as deemed appropriate. The vendor used for removing frozen animal carcasses from the farm must be approved by the state. The landowner must have a written contract with the vendor stating the vendor's responsibility for properly handling animal mortality from the farm. The schedule for removing the dead animals must coincide with the freezer capacity.

**Location.** Locate freezers near all-weather roads to facilitate the loading and transporting of carcasses from the farm. Where needed, construct all-weather roads to facilitate the equipment used in the removal of carcasses from the freezers. Design all-weather roads to meet the requirements of Florida NRCS CPS Access Road, Code 560.

**Structural loading and design.** Unit design, construction, power source, and installation shall be in accordance with manufacturer's recommendations and all applicable building and electrical codes. 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 the 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 will 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, or gasified 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. The units must be sealed against weather and air leakage.

**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 daily mortality rate of the animal, the period of time between emptying, 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. Include a removal schedule supplied by an integrator or approved vendor to support capacity calculations.

**Power Source.** Ensure electrical components and installation to meet the requirements of the National Electrical Code (NEC) and state and local codes for outdoor installation. Ensure all electric wiring to be in a conduit. Installation shall be certified in writing by a qualified licensed electrician.

Provide an alternative source of power, where available, to maintain the integrity of the freezing process during power outages. Where an alternative power source is not available, identify the contingencies for disposal of the animal carcasses in the operation and maintenance plan.

**Safety.** In addition to general safety requirements, use refrigeration locks where necessary. Post highly visible waterproof warning signs, such as "INEDIBLE" or similar signs on the facility to identify the use of the freezer.

#### **Additional Criteria Applicable to Incinerators and Gasifiers**

**General.** Incinerator and gasifier owners or operators must obtain air construction and operating permits pursuant to Florida Department of Environmental Protection (FDEP) Rules 62-210.300(1) and 62-210.300(4), Florida Administrative Code (F.A.C.). Ensure incinerators meet the requirements contained in Rule 62.296.401(6) F.A.C. Obtain permits prior to construction and operation.

Use a Type 4 (human and animal remains) (as defined by the Incinerator Institute of America) incinerator that has 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, gasifiers shall meet all Florida air quality/emissions requirements.

**Emissions.** Do not exceed the requirements of Rules 62-296.401(1) & (6) F.A.C. for incinerator particulate matter emissions, carbon monoxide (CO) emissions, and visible emissions.

Select incinerators that will not cause or permit the discharge of air pollutants, which cause or contribute to an objectionable odor.

**Combustion.** The incinerator must be dual chamber burning. Design the secondary chamber to have sufficient volume for at least a 1.0 second gas residence time at 1800 degrees Fahrenheit. Ensure the actual operating temperature of the secondary chamber combustion zone to be no less than 1600 degrees Fahrenheit throughout the combustion process in the primary chamber. Do not use primary chamber and stack in calculating this residence time. Select incinerators that cremation in the primary chamber that does not initiate unless the secondary chamber combustion zone temperature is equal to or greater than 1600 degrees Fahrenheit.

**Capacity.** Size the incinerator/gasifier to handle the average maximum daily animal mortality during a growing cycle. Refrigeration units may be used in conjunction with the incinerator/gasifier to improve the loading cycle and fuel use efficiency of the incineration/gasification unit.

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

**Location.** Locate the incinerator/gasifier a minimum of 20 feet from any structure or as recommended by the manufacturer. Place the incinerator on a reinforced (fiber or steel) concrete pad for stability and safety. Extend the concrete slab sufficient distance on all sides of the incinerator base to accommodate management of the facility. Design the top of the concrete slab to be a minimum of 0.5 foot above natural ground and a minimum of 2.0 feet above the seasonal high water table on high water table soils. If the incinerator is covered with a roof, design a minimum of six inches between the incinerator chimney and any combustible component of the roof.

Place the fuel source at a distance from the incinerator, buildings, waste storage facility, and wells as recommended by the manufacturer or according to state and local rules, laws and regulations.

## CONSIDERATIONS

Major considerations in planning animal mortality management are:

- the management capabilities of the operator,
- available equipment and land application area at the operation,
- the economics of the available alternatives,
- the degree of pollution control required by state and local agencies,
- effect on wildlife and domestic animals,

Take measures to maintain appropriate visual resources, reduce odor, and provide dust control. Vegetative screens and topography can be used to shield the animal mortality facility from public view, to reduce odors, and to minimize visual impact.

Consider specifying the diesel powered unit to meet the Florida CPS Combustion System Improvement, Code 372.

For facilities that are organic producers or that sell compost to organic producers, ensure that the treated lumber used in the facility meets the requirements for organic production. It may be best to have the producer consult with the organic certifier as to the use and acceptability of treated lumber.

### **Additional Considerations for Composting**

Initial planning of site suitability should include referring to the web Soil Survey's soil interpretations for "composting facility" <http://websoilsurvey.nrcs.usda.gov/>.

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, nonfreezing 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.

Poultry operations often experience higher rates of mortality as the birds reach maturity.

To reduce offensive odors increase the carbon nitrogen ratio. A carbon nitrogen ratio of 30:1 in the initial mix should have minimal odors.

Minimize odors and nitrogen loss by selecting carbonaceous material that, when blended with the nitrogenous material, provides a balance of nutrients and porous texture for aeration.

A chemical neutralizing or other additive agent should be used if structural components do not provide adequate odor reduction.

Maximize solar warming by aligning piles north to south configured with moderate side slopes.

Orient windrows to prevent ponding of surface runoff.

Protect compost facilities from the wind in cold or dry climates. Wind protection may help prevent excess drying of the compost.

Minimize blown-in rain by providing roof overhang.

## PLANS AND SPECIFICATIONS

Prepare plans and specifications for animal mortality facilities that describe the requirements for applying the practice according to this standard. As a minimum the plans and specifications shall include, but not limited to, the following items:

- a plan view showing the location and extent of the practice.
- description of facility.
- number, capacity, and quality of facility(ies).
- size, type and number of animals that will be the feedstock.
- pertinent elevations of the facility, if applicable.
- soil and foundation findings, interpretations, and reports.
- standard details when concrete or timber is used for the facility foundation.
- where a roof structure is used to protect the facility, include design data and building dimensions.
- structural details of all components.
- location of electrical lines, gas lines, water supply and other utilities.
- requirements for burial.
- quality of materials.
- drainage/grading plan showing direction of drainage, areas of excavation and fill, profiles and cross sections, as appropriate., if needed.
- temporary erosion control measures during construction.
- vegetative requirements.
- safety requirements for the facility.

## **OPERATION AND MAINTENANCE**

The Operation and Maintenance (O&M) Plan developed for the animal mortality facility will become part of the overall Comprehensive Nutrient management Plan (CNMP). The CNMP will document needed actions to ensure that the practice performs adequately throughout its expected life.

At a minimum, the O&M Plan will include, but not limited to, the following items:

- method and procedures of mortality disposal for normal losses.
- odor management or minimization requirements.
- biosecurity protocols.
- safety measures and procedures.
- periodic inspections.
- need for prompt repair or replacement of damaged components.
- site references and/or manufacturer or installer for trouble shooting.

### **Additional O&M for Composters**

**Compost Recipe.** Include a recipe of ingredients which gives the ingredient quantities and layering/mixing sequence.

**Carbon-Nitrogen Ratio.** The initial compost mix shall result in a carbon-to-nitrogen (C:N) ratio between 25:1 and 40:1. Compost with a lesser C:N ratio can be used if nitrogen mobilization is not a concern.

**Carbon Source.** Store a dependable source of carbonaceous material with a high C: N ratio to mix with nitrogen-rich waste materials.

**Bulking Materials.** Add bulking materials to the mix as necessary to enhance aeration. The bulking material may be the carbonaceous material used in the mix or a nonbiodegradable material that is

salvaged at the end of the compost period. Make provision for the salvage of any nonbiodegradable material used in the composting process.

**Compost Mix.** Develop a compost mix that encourages aerobic microbial decomposition and avoids nuisance odors.

**Moisture Level.** Maintain adequate moisture in the compost mix throughout the compost period within the range of 40 to 65 percent (wet basis). Prevent excess moisture from accumulating in the compost in high precipitation climatic regions. This may require the facility to be covered.

**Temperature of Compost Mix.** Closely monitor temperatures above 165°F. Take action immediately to cool piles that have reached temperatures above 185°F. If the pile is too hot, turn it to aerate the pile and release heat build-up.

**Turning/Aeration.** The frequency of turning/aeration shall be appropriate for the composting method used, and to attain the desired amount of moisture removal and temperature control while maintaining aerobic degradation.

**Concrete Pad and Roof.** Inspect the compost facility regularly when the facility is empty. Replace deteriorated wooden materials or hardware. Patch concrete floors and curbs as necessary to assure water tightness. Examine roof structures for structural integrity and repaired as needed. Inspect exposed metal components for corrosion. Wire-brush and paint corroded metal as necessary.

**Monitoring.** The operation and maintenance plan shall state that composting is a biological process that needs monitoring and management throughout the composting period to insure proper composting processes. The operation may need to undergo some trial and error in the start-up of a new mortality composting facility. Manage the compost piles for temperature, odors, moisture, and oxygen, as appropriate. Test the finished compost as appropriate to assure that the required decomposition has been reached. Include the method, procedure, and record keeping requirements for proper utilization of compost.

#### **Additional O&M for Incinerators and Gasifiers**

Use the incinerator and gasifier only for the disposal of animal carcasses.

Operate the unit properly to maximize equipment life and minimize emission problems. Require any operator of an incinerator to be trained and licensed by the manufacturer's representative or an equivalent organization using a state-approved training program. A licensed operator must be on-site when the incinerator is in operation.

Load the unit 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. Include in the plan an ash collection box or bucket and disposal of the ash on the land or through a community trash disposal system.

Inspect the unit periodically to ensure that all components are operating as planned and in accordance with the manufacturer's recommendations.

#### **Additional O&M for Refrigeration Units**

Operate the refrigeration unit properly to maximize equipment life and minimize potential problems.

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

Use the refrigeration unit only for the dead animals associated with the planned operation.

Inspect the refrigeration unit periodically for leaks and structural integrity.

Check the refrigeration unit periodically to ensure the proper temperature is maintained within the specified range.

## REFERENCES

### Florida NRCS CPS

- Emergency Animal Mortality Management, Code 368
- Composting Facility, Code 317
- Waste Storage Facility, Code 313
- Roofs and Covers, Code 367
- Nutrient Management, Code 590
- Critical Area Planting, Code 342
- Combustion System Improvement, Code 372
- Access Road, Code 560

### General Manual

- Title 420-Part 401
- Title 450-Part 401
- Title 190-Parts 410.22 and 410.26

### National Cultural Resources Procedures Handbook

Florida Administrative Code Rule 62.296.401 (1) & (6)

### Florida Department of Environmental Protection Chapters

- 62-210 F.A.C.
- 62-256 F.A.C.

### National Engineering Handbook, Part 637, Chapter 2, Composting

National Engineering Handbook, Part 651, Agricultural Waste Management Field Handbook (AWMFH)

### National Environmental Compliance Handbook

### National Food Security Act Manual

National Planning Procedures Handbook, Florida Supplements to Parts 600.1 and 600.6.