

Animal Mortality Facility (No.) 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 normal or routine and catastrophic animal mortality; however, it may not apply to catastrophic mortality resulting from natural disasters or disease. In cases of natural disasters or disease-related catastrophic mortality, this standard is applicable only when directed by the Michigan Department of Agriculture and Rural Development (MDARD) to use the methods in this standard.

CRITERIA

General Criteria Applicable to All Purposes

Design animal mortality facilities to handle normal or routine mortality and/or catastrophic mortality.

Laws and Regulations. Animal mortality facilities shall be planned, designed and installed to conform to all federal, state, local, and tribal laws, rules and regulations. This includes provisions for closing and/or removing the facility where required. Refer to

the State of Michigan Bodies of Dead Animals (BODA), Act 239 of 1982; as amended.

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, installing, 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 well or 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. 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.

All field tile (subsurface drains) within the operational area of the animal mortality facility shall be removed and capped.

Animal mortality facilities shall minimize the impact on odor and other air quality issues affecting neighboring residences, as well as minimizing the impact of the facility on surface and ground water resources.

Animal mortality facility locations must meet the following minimum separation distances:

Surface waters	200 ft
Seasonal High Water Table ^{1/}	2 ft
Any Well	200 ft
Nearest non-farm residence	200 ft

^{1/} As defined by NRCS conservation practice standard Waste Storage Facility (313)

Structural. All structural components integral to 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.

If the facility is to have a roof, snow and wind loads shall be as specified in the current Michigan Building Code.

Seepage Control. All effluent generated or runoff shall incorporate one of the following:

- Retain volume within a manure transfer system and reintroduce into animal mortality facility, as needed.
- Collect and store in a storage facility with a liner in accordance with NRCS conservation practice standard Waste Storage Facility (313).
- Divert effluent and runoff to a treatment system in accordance with NRCS conservation practice standard Vegetated Treatment Area (635).

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 and size facilities for composting animal mortality to conform to NRCS conservation practice standard Composting Facility (317).

Refrigeration Units

General. In accordance with BODA, dead animals may be kept in secured temporary cold storage of 40° F or below for a maximum of 7 days or frozen and securely stored at 0° F or below for a maximum of 30 days.

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 reduce the temperature of

the animal carcasses before decomposition occurs. Follow the temperature requirements for the storage duration in accordance with BODA. For best results, carcasses that will be rendered, composted, incinerated, or gasified should be stored at as warm a temperature as allowed by BODA. Freezing requires a period of thawing and increases 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.

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. An air use permit from the Michigan Department of Environmental Quality (MDEQ), Air Quality Division is required for the operation of an incinerator or gasifier.

Burning of animal carcasses must take place in a location that does not cause a public nuisance.

Gasification is a high temperature method of vaporizing the biomass with no direct flame with oxidation of the fumes in an after-burning chamber. Heat transfers through the hearth ceiling of the lower after-burning chamber into the upper chamber where the biomass is placed.

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. Disposal of ashes from the burning process may be any of the following methods:

- Buried in accordance with the burial criteria of BODA.
- Spread according to NRCS conservation practice standard Nutrient Management (590).
- Hauled to a landfill licensed by MDEQ, Solid Waste Management Division.
- Any other method acceptable to MDEQ.

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 unit is covered with a roof, at least 6 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. For natural disasters or disease-related catastrophic mortality, proceed as directed by MDARD.

In accordance with BODA, any increase in normal natural daily mortality, due to any cause known or unknown, shall be reported to MDARD immediately.

Catastrophic mortality resulting from natural conditions such as temperature extremes, an incursion of a foreign animal disease, or a toxic substance shall follow the criteria established in the MDARD, Standard Operating Procedures for Michigan Mass Carcass Disposal.

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 NRCS conservation practice standard Waste Storage Facility (313) or AWMFH appendix 10D for selection of sites where seepage will be restricted with normal construction techniques.

Burial Pit

General. Bury catastrophic mortalities on-site as directed by MDARD. Time the burial of catastrophic mortality to minimize the effects of mortality expansion during early stages of the decay process. If directed by MDARD, lightly cover the mortality 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 ground water.

Size and Capacity. Size pits to accommodate catastrophic mortality in accordance with the BODA criteria as specified in the Standard Operating Procedures for Michigan Mass Carcass Disposal and directed by MDARD. 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 2 feet of soil as a final cover over the mortality. Provide a finished graded for the burial site that is slightly above the 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). Use vegetation adapted to the site that will accomplish the desired purpose. Preference shall be given to native species in order to reduce the introduction of invasive plant species; provide management of existing invasive species; and minimize the economic, ecological, and human health impacts that invasive species may cause. If native plant materials are not adaptable or proven effective for the planned use, then non-native species may be used. Refer to the Field Office Technical Guide, Section II, Invasive Plant Species, for plant materials identified as invasive species.

Structural Loading and Design. Use barriers to keep vehicular traffic at least 4 feet from the pit edge.

Use pit excavation techniques which are OSHA compliant. For pits 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 back 2 horizontal and 1 vertical or flatter.

Composting

General. Catastrophic mortality composting shall be in accordance with the BODA criteria as specified in the Standard Operating Procedures for Michigan Mass Carcass Disposal and as directed by MDARD.

Protect composting mortalities from precipitation as necessary, or provide an appropriate filter area or means for collecting contaminated runoff. Cover carcasses 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

Consider the potential effects of installation and operation of Animal Mortality Facilities on the cultural, archeological, historic and economic resources.

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

Consideration should be given to prevailing wind direction, property lines, recreational sites, aesthetics and landscaping when locating animal mortality facilities.

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.

Animal carcasses should be inaccessible at all times to scavengers, livestock, or live poultry.

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

Composting of any mortality will be hindered if the carcasses are allowed to freeze. Carcasses 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.

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

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

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

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use.

Support data documentation requirements are as follows:

- Inventory and evaluation records
 - Assistance notes or special report
- Survey notes, where applicable
 - Design survey
 - Construction layout survey
 - Construction check survey
- Design records
 - Physical data, functional requirements and site constraints, where applicable
 - Soils/subsurface investigation report, where applicable
- Design and quantity calculations
- Construction drawings/specifications with:
 - Location map
 - "Designed by" and "Checked by" names or initials
 - Approval signature
 - Job class designation
 - Initials from preconstruction conference
 - As-built notes
- Construction inspection records
 - Assistance notes or separate inspection records
 - Construction approval signature

- Record of any variances approved, where applicable
- Record of approvals of in-field changes affecting function and/or job class, where applicable.

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan shall be developed for this practice. The O&M plan shall be consistent with the purposes of the practice, its intended life, safety requirements, and the criteria for the design.

REFERENCES

Michigan Bodies of Dead Animals Act 239 of 1982; as amended July 7, 2005.

Michigan Animal Tissue Compost Operational Standard; October 11, 2007.

<https://www.msu.edu/~rozeboom/catrn.html>

Disposing of Swine Carcasses and After-Birth by Composting. Rozeboom, D.W. 1997. ANS Memo Number 369

On-Farm Composting Handbook; 1992. NRAES-54

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

Standard Operating Procedures for Michigan Mass Carcass Disposal, Michigan Department of Agriculture and Rural Development

NRCS GM 420 Part 401- Cultural Resources

NRCS National Handbook of Conservation Practices

USDA. 2008. NRCS National Engineering Handbook, Part 651, Agricultural Waste Management Field Handbook (AWMFH)