NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

COMPOSTING FACILITY

(No.)
CODE 317

DEFINITION

This is a treatment component of an agricultural management system for the biological stabilization of organic material.

PURPOSES

To reduce the pollution potential of organic agricultural wastes to surface and ground water.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where:

- Organic waste material is generated by agricultural production or processing;
- A composting facility is a component of a planned agricultural waste management system.
- A composting facility can be constructed, operated and maintained without polluting air and/or water resources.
- There is a need to improve air quality by reducing the emissions of odorous gases.
- The facility is operated as a component of an agricultural management system.

CRITERIA

General Criteria Applicable To All Purposes

Laws and Regulations. The installation and operation of the composting facility shall comply with all federal, state and local laws, rules and regulations.

The installation and operation of an animal composting facility shall specifically comply with **Illinois Administrative Code Title 8, Part 90, Section 90.110 "On Farm Disposal (of Dead Animals)"**. The Illinois Administrative Code listed above has very specific requirements for design and operation of composting facilities and should be reviewed and followed in detail. Where there is a conflict between NRCS policy and the State of Illinois "On farm disposal of dead animals act" the more conservative interpretation will be used.

Safety. Safety and personal protection features and practices shall be incorporated into the facility and its operation as appropriate to minimize the occurrence of equipment hazards and biological agents during the composting process.

Facility Siting. The bottom elevation of the composting facility shall be above the seasonal high water table and on soils with slow to moderate permeability that do not allow materials to contaminate the ground water, and meet all applicable regulations, or the facility shall be installed on a concrete slab or other appropriate liner.

The composting facility shall be located outside the 100 year floodplain. However, if site restrictions require location within a floodplain, it shall be protected from inundation or damage from a 25-year flood event, at a minimum.

The Illinois Administrative Code Title 8, Part 90, Section 90.110 "On Farm Disposal (of Dead Animals)" has specific requirements for site permeability and setback distances for facilities used for the composting of dead animals.

Locate compost facilities so prevailing winds and landscape elements such as building arrangement, landforms, and vegetation minimize odors and protect the visual resource.

Direct surface runoff away from the compost facility. Direct contaminated runoff from

compost facilities to an appropriate storage or treatment facility for further management.

The facility shall have all year, all weather access.

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

Carbon-Nitrogen Ratio. The initial compost mix shall result in a carbon to nitrogen ratio between 25:1 and 40:1. Compost with a greater carbon to nitrogen ratio can be used if nitrogen immobilization is not a concern.

Where more than two ingredients are to be blended, the two main ingredients are to be used in the analysis for the desired C:N and mixed accordingly. Adding up to 50% by weight of the other ingredients to improve workability and air movement is permissible as long as the C:N of the added ingredient does not exceed the target C:N of the compost.

Carbon Source. A dependable source of carbonaceous material with a high carbon to nitrogen ratio (C: N) shall be stored and available to mix with nitrogen rich waste materials. Wood chips, sawdust, peanut hulls, straw, corn cobs, bark, peat moss, and well bedded horse manure are good sources of carbon. (Note: Illinois Administrative Code Title 8, Part 90, Section 90.110 “On Farm Disposal (of Dead Animals) requires that saw dust must makeup over half of the carbon source used.)

Bulking Materials. Add bulking materials to the mix as necessary to enhance aeration.

The bulking material shall be the carbonaceous material used in the mix or a non-biodegradable material that is salvaged at the end of the compost period. If a non-biodegradable material is used, provision shall be made for its salvage.

Moisture Level. Provision may be made for maintaining adequate moisture in the compost mix throughout the compost period within the range of 40 to 65 percent (wet basis).

In high precipitation climatic regions, care shall be taken to prevent excess moisture from accumulating in the compost. Facility covers will be required for poultry and fish. Facility covers may be required for swine to provide for a suitable product.

Temperature of Compost Mix. Manage the compost to attain and then maintain the internal temperature for the duration required to meet management goals.

The temperature requirements and temperature documentation for animal composting must comply with **Illinois Administrative Code Title 8, Part 90, Section 90.110 “On Farm Disposal (of Dead Animals)”**. (Note the Illinois Administrative Code listed above has very specific requirements for temperature and documentation of temperature and should be reviewed and followed in detail).

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.

Facility Type. Selection of the composting facility/method shall be based on the availability of raw material, the desired quality of final compost, equipment, labor, time, and land available.

See National Engineering Handbook, Part 651 Agricultural Waste Management Field Handbook, Chapter 10 for design of each type of facility.

Facility structural elements such as permanent bins, concrete slabs, and roofs shall meet the requirements of Conservation Practice Standard 313, Waste Storage Facility.

Facility Size. Size the compost facility to accommodate the amount of raw material planned for active composting plus space required for curing.

Dimensions selected for elements of the compost facility shall accommodate equipment used for loading, unloading, and aeration.

Sizing of facilities for composting dead animals shall be based on normal mortality loss records for the operation. Or, if not available, locally established mortality rates for the type of operation shall be used.

Compost Period. Continue the composting process long enough for the compost mix to reach the stability level where it can be safely stored without undesirable odors. It shall also possess the desired characteristics for its use, such as lack of noxious odor, desired moisture content, level of decomposition of original components and texture. The compost period shall involve primary and secondary composting as required to achieve these characteristics.

Test the finished compost as appropriate to assure that the required stabilization has been reached.

Use of Finished Compost. Land application of finished compost shall be in accordance with Conservation Practice Standards 590, Nutrient Management, and 633, Waste Utilization.

CONSIDERATIONS

Planning and operation of a composting facility for dead animals must meet the Illinois "Dead Animal Disposal Act". Develop an initial compost mix with a Carbon to Nitrogen ratio of at least 30:1 to reduce most offensive 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.

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

In humid areas, do not locate piles (windrows) across the slope. This prevent ponding and sogginess.

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

Composting operations require close management. Management capabilities of the operator and availability of labor should be assessed as part of the planning and implementing process.

Appropriate equipment must be available for initial mixing, turning, and hauling composted material and carbonaceous material. Appropriate long stem thermometers must be available for managing the composting material.

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.

OPERATION AND MAINTENANCE

Develop an operation and maintenance plan that is consistent with the purposes of this practice, and the life of the composting facility. Recipe ingredients and sequence that they are layered and mixed shall be given in the plan.

Safety requirements for operation of the composting facility shall be provided.

Manage the compost piles for temperature, odors, moisture, and oxygen, as appropriate. Make adjustments throughout the composting period to insure proper composting processes.

Closely monitor temperatures above 165^{o}F. Take action immediately to cool piles that have reached temperatures above 185^{o}F.

The operation and maintenance plan shall state that composting is a biological process. It requires a combination of art and science for success. Hence, the operation may need to undergo some trial and error in the start-up of a new composting facility.

REFERENCE

National Engineering Handbook, Part 651 Agricultural Waste Management Field Handbook, Chapter 10.

State of Illinois Administrative Code, Title 8: Agriculture and Animals, Part 90 Illinois Dead Animal disposal Act, Chapter I: Department of Agriculture, Section 90.110 On-http://www.legis.state.il.us/commission/jcar/admincode/008/008000900001100R.htmlThe-Farm Disposal

NRCS, Illinois

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