

NATURAL RESOURCES CONSERVATION SERVICE

VIRGINIA

OPERATION AND MAINTENANCE REQUIREMENTS

COMPOSTING FACILITY

CODE 317

Land Owner/Operator _____

County _____ SWCD _____ Farm/Tract No. _____

Prepared By _____ Date _____

OPERATION AND MAINTENANCE ITEMS

A properly operated and maintained composting facility is an asset to your farm. This composting facility was designed and installed for temporary storage and treatment of animal wastes. The estimated life span of this installation is at least 15 years. The life of this installation can be assured and usually increased by developing and carrying out a systematic operation and maintenance program.

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.

This practice will require periodic maintenance and may also require operational items to maintain satisfactory performance. Your operation and maintenance program requirements include:

OPERATION

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 lesser carbon to nitrogen ratio can be used if nitrogen immobilization is not a concern.

Typical carbon to nitrogen ratios of common composting amendments:

Material C:N ratios _____	Material C:N ratios _____	Material C:N ratios _____
Alfalfa (broom stage) 20	Cattle manure (with straw) 25–30	Green leaves 30–60
Alfalfa hay 12–18	Cattle manure (liquid) 8–13	Green rye 36
Asparagus 70	Clover 12–23	Horse manure (peat litter) 30–60
Austrian pea straw 59	Clover (sweet and young) 12	Leaves (freshly fallen) 40–80
Austrian peas (green manure) 18	Corn & sorghum stover 60–100	Newspaper 400–500
Bark 100–130	Cucumber 20	Oat straw 48–83
Bell pepper 30	Dairy manure 10–18	Paper 173
Breading crumbs 28	Garden wastes 20–60	Pea vines (native) 29
Cantaloupe 20	Grain rice 36	Peat (brown or light) 30–50
Cardboard 200–500	Grass clippings 12–25	

Carbon Source

A dependable source of carbonaceous material shall be stored and available to mix with nitrogen-rich waste materials. 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.

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 non-biodegradable material that is salvaged at the end of the compost period. If a non-biodegradable material is used, make provisions for its salvage.

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

Manage the compost to attain and then maintain the internal temperature for the duration required to meet management goals. For best results, operating temperature of the composting material should be 131°F to 145°F once the process has begun. It should reach operating temperature within about 7 days and remain elevated for up to 14 days to facilitate efficient composting. **Identify the management plan for this system.**

_____ A facility for manure and other agricultural organic waste (not including animal mortality) that is to be used on the farm shall have the capacity to produce compost that can be safely stored without undesirable odors. The temperature of the compost will be maintained above 104°F for five days with at least four hours above 130°F during that time period. The compost will be turned at least one time.

_____ It is necessary for the compost to reach 145°F to adequately destroy weed seeds.

_____ A facility to produce compost for use off the farm or for sale shall have the capacity to significantly reduce pathogens.

_____ For a static pile or within vessel facility, the temperature of the compost will be maintained above 130°F for three days. The total compost period shall include time for the initial primary stage of composting and time for secondary stage composting. The compost will be turned at least one time.

_____ For a windrow system, the temperature of the compost will be maintained above 130°F for 15 days and the compost will be turned a minimum of five times.

_____ A bin-type facility that is used to compost animal carcasses 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 comparable time for secondary composting. Temperatures must exceed 130°F for three consecutive days within this time period. Ensure that the final product of the composting process has no visible pieces of soft tissue remaining. These requirements shall be met for all non-windrow systems.

_____ A windrow system that is used to compost animal carcasses shall have the capacity to maintain the temperature of the compost above 130°F for 15 days with a minimum of five turnings of the compost. Temperatures must exceed 130°F for three consecutive days within this time period. Ensure that the final product of the composting process has no visible pieces of soft tissue remaining.

Long stem thermometers shall be used for managing the composting material. Document the daily temperatures of the compost to ensure that adequate heat has been achieved and maintained for the

compost period. Never allow temperatures to get above 165° F. Take action immediately to cool piles that have reached this temperature.

If the temperature falls significantly during the composting period and odors develop, or if material does not reach operating temperature, investigate piles for moisture content, porosity, and thoroughness of mixing. Compost managed at the required temperatures will favor destruction of any pathogens, plant diseases and weed seeds.

Turning/Aeration. The compost will be turned a minimum of ____ times. Additional turning may be needed if there are problems with the composting process.

Heat generated by the process causes piles to dehydrate. As the process proceeds, material consolidates, and the volume of voids through which air flows decreases. Materials selected for the composting mix should be carefully selected to ensure adequate air movement throughout the composting process. Periodically turning the pile and maintaining proper moisture levels for windrows and static piles will normally provide adequate aeration. Appropriate equipment must be available for initial mixing, turning, and hauling composted material and carbonaceous material.

Vectors

Flies, rats and birds may be attracted to the compost facility. Mosquitoes may reproduce where standing water is present. To minimize vector problems:

- Turn piles frequently to promote rapid decomposition.
- Eliminate standing water.
- Employ good housekeeping to keep the area clean.

Nutrients

Keep compost well-aerated to minimize nitrogen loss by denitrification. Keep pH at neutral or slightly lower to avoid nitrogen loss by ammonification. High amounts of available carbon will aid nitrogen immobilization. Phosphorus losses will be minimized when the composting process is properly managed. Include compost nutrients in nutrient management plans; determine the effects of use and management of nutrients on the quality of surface water and ground water as related to human and livestock consumption.

Testing Needs

Test compost material for carbon, nitrogen, moisture, and pH if compost fails to reach desired temperature or if odor problems develop. The finished compost material should be periodically tested for constituents that could cause plant phytotoxicity (poisoning) as the result of application to crops. Composted materials that are prepared for the retail market will require testing for labeling purposes.

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 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.

Finished Compost

Utilization of finished compost shall be in accordance with federal, state and local laws. Compost will be applied to the land at the rates outlined in the Nutrient Management Plan and in accordance with state law.

