

NATURAL RESOURCES CONSERVATION SERVICE
GEORGIA
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 ____ 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

Carbon-Nitrogen Ratio

The initial compost mix shall result in a Carbon to Nitrogen ratio between 25:1 and 35:1. Compost with a greater 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, provisions shall be made for its salvage.

Moisture Level

Provisions shall be made for maintaining adequate moisture in the compost mix throughout the compost period. Moisture content should be within the range of 40 to 65 percent. Water used for moisture control must be free of deleterious substances. Care shall be taken to prevent excess moisture from accumulating in the compost. Facility covers may be required to provide for a suitable product.

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 170°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. When the management goal is to reduce pathogens, the compost shall attain a temperature greater than 130°F for at least 5 days as an average throughout the compost mass. The material should remain at or above 110°F for the remainder of the designated composting period.

When the management goal is to destroy weed seeds, the compost shall attain a temperature of 145°F. The microbial activity necessary to the composting process will slow down at temperatures greater than 145°F. Aeration or turning should be used to reduce pile temperature to a lower range after achieving the desired temperatures. 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. Closely monitor temperatures above 165°F. Take action immediately to cool piles that have reached temperatures above 185°F.

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.

Aeration

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.

Pathogens

When using the in-vessel or static aerated pile type of composting, temperature of the active pile must be maintained at 131°F or higher for 3 consecutive days to achieve pathogen reduction. To achieve pathogen destruction when composting with aerated windrows, the temperature of the active compost pile must be maintained at 131°F or higher for at least 15 consecutive days and the windrow must be turned at least 5 times during the high temperature period.

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

MAINTENANCE

- The compost facility should be inspected regularly when the facility is empty. Replace deteriorated wooden materials or hardware. Patch concrete floors and curbs as necessary to assure water tightness. Roof structures should be examined for structural integrity and repaired as needed.
- Exposed metal components should be inspected for corrosion. Corroded metal should be wire brushed and painted as necessary.
- All fences, railings, and/or warning signs shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.
- Maintain all electrical and mechanical equipment in good operating condition by following the manufacturer's recommendations. Maintain grounding rods and wiring for all electrical equipment in good condition.
- Do not compact the material by driving over it or packing it with equipment. Do not allow the operation of any equipment that exceeds the design limit on or within ten feet of the structure.

