



**Operation and Maintenance Plan
Composting Facility, Code 317**



Landowner/Operator:				Date:	
NRCS Service Center:		Conservation District:			
Location of Practice:	Lat:		Long:		
UTM Coordinates:					
	SEC:		TS:		Field ID: <input type="text"/>

GENERAL

The purpose of this practice is to provide a structure or device used to contain and facilitate the controlled aerobic decomposition of manure or other organic material into a biologically stable organic material that is suitable of use as a soil amendment. The estimated life span of this installation is 15 years. The life of the composting facility can be assured and possibly increased by performing operation and maintenance (O&M) activities.

This practice will require you to perform the O&M activities as listed below.

O&M REQUIREMENTS

Operation

- **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.
- **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 material. If a non-biodegradable material is used, provisions should be made for its salvage.
- **Moisture Level.** Provisions should 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. Care shall be taken to prevent excess moisture from accumulating in the compost. Facility covers may be required to provide 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 130 °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. 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 185 °F. Take action immediately to cool piles that have reached this temperature.

- **Aeration.** Heat generated by the process causes piles to dehydrate. As the process proceeds, material consolidates, and the volume of voids decreases, restricting airflow. Select materials for the composting mix that will 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 130 °F or higher for three consecutive days to achieve pathogen reduction. The total compost period shall include time for the initial primary stage of composting and time for secondary stage composting. To achieve pathogen destruction when composting with aerated windrows, the temperature must be maintained at 130 °F or higher for 15 consecutive days and the windrow must be turned at least five times during the high temperature period.
- **Vectors.** Flies, rats and birds may be attracted to raw compost feedstocks. Mosquitoes may reproduce where standing water is present. To minimize vector problems, reduce exposed feedstock storage, turn piles frequently, eliminate standing water and keep the area clean.
- **Nutrients.** Keep compost well aerated to maintain nitrogen loss by denitrification. Keep pH at neutral or slightly lower to avoid nitrogen loss by ammonification. High amounts of available carbon will aid in nitrogen immobilization. Include compost nutrients in nutrient management plans. Prevent loss of nutrients and pollutants to surface and ground water.
- **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 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 ensure that the required stabilization has been reached.
- **Finished Compost.** Utilization of finished compost shall be in accordance with federal, state, local and tribal laws. Compost will be applied to land at rates outlined in the Nutrient Management Plan and in accordance with state law.

Inspection and 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.
- Do not compact the material by driving over it or packing it with equipment. Do not allow any equipment that exceeds design load limits on or within ten feet of the structure.
- Poison gasses are often heavier than air and may be trapped in closed waste storage structures. Do not allow human entry into any closed structure without safety equipment, including ladders and breathing apparatus. Maintain all lids, grates and shields on openings to enclosed structures.
- Maintain all electrical and mechanical equipment in good operating condition by following electrical codes and manufacturer's recommendations. Inspect and repair ground rods, switches, and wiring.
- To prevent erosion, a good vegetative cover should be established and maintained around facilities. Mowing twice a year should kill noxious weeds and ensure a vigorous vegetative stand. Traffic accesses shall be maintained and/or replaced as necessary.
- Check backfill areas around structure for excess settlement. Make necessary repairs. Positive drainage shall be maintained around the structure. Inspect and maintain runoff control structures and practices.
- Immediately repair any vandalism, vehicular or animal damage to the structure, earthen areas surrounding the structure, or any appurtenances.

