



# **Compost Pilots and Demos**

## **Guidelines for the Application Process**

**January 2004**

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## **Compost Pilots & Demos: Guidelines for the Application Process**

North Carolina's solid waste policy reflects the state's desire to reduce, reuse and recycle before turning to disposal as a management option for solid waste. To that end, the NC Legislature established a hierarchy of preferred alternatives to using landfills. The first option, after reduction, reuse and recycling, is composting.

The Division of Waste Management wants to encourage people and organizations to try composting. Our staff is committed to working closely with applicants and we have streamlined the permit application process for pilot and demonstration projects. In some cases, construction and siting requirements can be relaxed.

Pilot and demonstration projects help us all learn more about the different ways composting can be used to reduce the amount of solid waste in our landfills. So read on to learn more about the process and give us a call. We stand ready to assist you in getting your project started.

### **What Is Composting?**

Composting is a managed aerobic process that uses naturally occurring bacteria and fungi at thermophilic (above approximately 110<sup>0</sup> F) temperatures to break down raw organic materials. Temperatures above 110<sup>0</sup> are usually referred to as thermophilic and temperatures below 110<sup>0</sup> are usually referred to as mesophilic. The result is a relatively stable, humus-like end product that can be used to improve soil conditions, to provide plant nutrients or as mulch. NC Solid Waste Management Rules require a permit from the Solid Waste Section to operate a facility that composts solid wastes. The Solid Waste Section is part of the Division of Waste Management. To obtain your permit, contact the Solid Waste Section at 919-733-0692.

### **What Can be Composted?**

Solid wastes that can be composted include yard waste, mixed paper, food wastes and agricultural processing wastes. Wastewater treatment plant residuals and animal manure are not considered solid wastes, but may be managed at a solid waste compost facility.

### **The Application**

Application requirements for pilot or demonstration projects are found in Section .1409(b) of the Solid Waste Compost Rules. For a copy of the rules, call 919-733-0692. The rules may also be found at <http://www.wastenotnc.org/SWHOME/14RUL.htm>. Approvals normally last six months to a year, depending on the wastes managed, the composting methods used and the location. Extensions may be granted in some cases. Approvals can be revoked if projects are managed poorly or if the operation requirements are not followed. Poor management can cause odors, vectors and potential ground or surface water quality problems.

## **Getting Approval**

Applicants must supply the Solid Waste Section with certain basic information about the proposed project to receive pilot or demonstration approval. Staff members are available to assist you with completing your application. A Section staff member must also visit the proposed site to determine if the area meets the Solid Waste Compost Rules' siting requirements.

Be sure to include your reasons for wanting to conduct the project. Your reasons may be broad, such as wanting to reduce the amount of waste being land filled, to avoid tipping fees for certain wastes, or to explore the economics of composting. Producing compost for use in agricultural or horticultural operations could also be a reason. Demonstration projects may also qualify as tests of whether specific compost systems qualify for alternate setbacks.

Other waste management methods that are similar to composting, such as proposals for anaerobic digestion and vermicomposting, will also be considered for approval. The information required in an application and the monitoring requirements may vary depending on the method or methods you choose.

## **Who Is Involved**

Each application must include the name, address and phone number of the owner and, where different, the operator of the proposed facility. Operators are responsible for facility operation and serve as record keepers for project data. They also serve as the Section's primary contact, so be sure to include all the information needed to stay in touch with this individual.

When the property owner is a different person than the facility owner or operator, the application must include the landowner's name, address and phone number. The landowner must also sign and have notarized a statement approving the proposed project on their land.

## **Location**

The site location for the proposed facility must be provided, along with driving directions from the nearest obvious landmark or intersection. You must include a county road map with the site marked and an aerial photograph of the proposed site. Aerial photographs must have a scale of 1 inch = 400 feet or less. In some cases a Federal Emergency Management Act (FEMA) map showing the 100-year flood hazard area will be required.

Aerial photographs must show the area around the proposed facility for a distance of at least ¼th mile (approximately 4 inches on a 1 inch = 400 feet scale photograph). Aerial photographs are available from most county tax or planning offices.

Solid Waste Section staff will visit the site before you submit your application to determine if the proposed location is acceptable.

## **Ingredients**

Each proposed waste to be managed must be listed. The list should include all materials considered, including bulking materials such as wood chips. Any other materials being considered, either for the compost blend or as an addition to the final

product, such as gypsum or ash, must also be listed. For each waste listed, estimate the volume you anticipate working with over the life of the project.

### **Testing**

Testing may be required on the materials you propose to manage before you start composting. Most materials should be tested to determine the ratio of carbon to nitrogen (C: N) in the waste. The C:N ratio is used to determine the percentages of specific materials that are blended together to be composted.

A NC Department of Agriculture and Consumer Services (NCDA&CS) waste analysis is usually sufficient. Be sure to request every test the NCDA&CS lab can run. The forms you will need for these tests are available at your county's NC Cooperative Extension Service office. Extension staff can help you complete the forms and submit the samples. Call 919.733.2655 or visit the NCDA&CS web site at <http://www.agr.state.nc.us/> for more information on the lab tests they run.

The Section decides, on a case-by-case basis, which wastes should be further tested to rule out the presence of regulated metals and potentially harmful chemicals. Normally, these tests are not required unless the Section has reason to suspect their presence or if the chemical origin of the material is unknown. If you test before you compost, you may reduce or eliminate the need for some tests that might be required for the final compost product.

### **The Schedule**

You must propose a length of time for your project. If you request more than 12 months, provide a detailed explanation of why this amount of time is needed. After you begin your project, initial time periods can be extended if adequate justification is provided. The anticipated length of time for the compost process must also be given. The clock begins when the materials are blended and stops when the compost has reached the desired maturity level.

### **Methodology**

Explain in detail the specific compost process you plan to use. Windrows or aerated bins are some examples. If you want to try more than one composting method, discuss each method in detail. If you plan to use different methods in a sequence, explain every method in the order in which it will be used.

Construction information for each method is also required. For windrow systems, include the surface area to be used for windrows and the dimensions of the individual windrows. Windrow dimensions would include height, length and width at the base of the windrow. For bins, include the number you propose to use, bin dimensions and construction materials. If you plan to use any self contained or pre-constructed units, include the manufacturers' specifications.

### **Aeration**

Describe the method you will use to aerate for each composting method. For windrows, describe the size of front-end loader or windrow turner. For aerated bins, describe the type of air distribution system you plan to use and the size of the system's components. Be sure to include the dimensions of the aeration holes and the distance

between them. For pipes, include the number proposed for use and the dimensions for each different size. If fans are used, include the capacity for each in cubic feet per second or per minute.

### **Blending**

Describe the blending methods you plan to use. Be sure to include the initial proportions of the wastes you plan to compost (these figures can be estimates). For example, if you plan to compost food waste and mixed paper with ground yardwaste, explain how you plan to blend the materials to avoid:

- 1) mixed paper on windrow exteriors that could blow away;
- 2) food waste on windrow exteriors that would create odors and attracts flies or other animals;
- 3) food wastes and paper matting in such a way as to restrict airflow.

If any of the materials you plan to manage will be or could be wet, give a detailed explanation of the steps you will take to contain the liquid. For composting purposes, “wet” is defined as the state where your composting material contains unabsorbed water.

### **Monitoring**

Monitoring must include temperatures to determine if pathogen reduction requirements are met and should include moisture content data. Depending on the composting method and the equipment available, you may want to monitor oxygen or carbon dioxide levels as well.

Compost temperatures must be maintained at elevated levels for at least 15 days. The specific temperature requirements are given in .1406(10), (11), and (12) of the Solid Waste Compost Rules.

The rules require you to record every temperature taken, without using averages, to demonstrate that you are meeting temperature requirements. The application should explain the methods used to measure and record each temperature taken. Details should include the thermometer (type and size) and the time period between readings. Be sure to include the physical distance between readings and the depth at which they are taken.

The standards vary for bins and windrows, so be sure the data collection system you plan complies with your system’s requirements. Windrows, for example, typically require temperatures be taken approximately every 25 feet, and, ideally, at varying depths. Temperatures should not be taken at depths less than six to eight inches.

If moisture content, oxygen or carbon dioxide levels are monitored, explain the method you will use for each. Moisture measurement can be taken quite simply by squeezing a handful of the compost-in-progress. When unabsorbed water can be squeezed out, for example, there is too much moisture. If the handful of compost refuses to form a ball, it is too dry. If the compost forms a ball in your hand with no water escaping through your fingers, it is within the acceptable moisture levels. For optimal composting rates, moisture and gases must be maintained at proper levels.

## **Leachate**

Leachate is not always a significant problem. However, composting wet materials or heavy rain can create a problem quickly. To avoid leachate problems, be sure to mix or layer your compost materials in proper proportions of wet and dry materials. The optimum moisture content should be 55 to 60 percent. Windrows should be laid out to prevent water from standing between them, which can cause excessive wetness.

Some proposed compost operations may be required to submit plans for leachate management. Plans for soil erosion and runoff control may also be required, or you may need to apply for a discharge permit. The project's size and facility design, the type of waste you manage, your handling methods and your composting system will determine if these plans are necessary.

## **On-Site Storage**

You may need to store waste materials on-site before they are composted. Storage is usually an issue only if large quantities of material are involved or if the materials have a potentially foul smell or high moisture content. The primary concern is that adequate space is available and that your stockpiles are stored in such a manner that they do not start to compost, attract insects or other animals, create odors or result in leachate formation.

## **Product Testing**

Before you distribute your product, you must test it. Tests are usually required before the first batch can be used. After the first batch is complete, you will need to run additional tests every 6 months or 20,000 tons. If process time, aeration, and temperature requirements are not met, more frequent testing may be required.

Describe the tests you plan to perform in your application. Usually, an NCDA&CS waste analysis, an analysis for pathogens, and a test for foreign matter is sufficient.

Testing for fecal coliform is the simplest and usually most affordable test for pathogens. There are a number of labs in North Carolina that can run the tests for you. When you collect your samples, be sure to use clean equipment for every sample, keep the samples cool and deliver them to the lab quickly to ensure accurate results. If unusual pathogens are suspected, however, additional tests for that specific pathogen could be required.

You can usually determine foreign matter content. This is a measure of how much trash -- such as plastic, metal, and glass --exists in the final compost product. Manual separation is the method used to determine the percentage of foreign matter. For details, turn to section .1408(a)(5) in your copy of the compost rules.

Usually, the NCDA&CS waste analysis will provide the required chemical analysis of your compost. Remember to ask for all the parameters that the lab can provide. In addition to being required for the final product approval, the tests can provide valuable information about the best use for your compost.

The materials you choose to compost will determine if any additional tests are needed. Typically, these are cases where a waste analysis showed significant levels of regulated metals or something about the process generating the waste indicates that

potentially harmful chemicals may be present. NCDA&CS labs cannot run these tests, so you will need to hire a private lab. If you plan to manage wastewater treatment plant residuals (also known as sludge or biosolids), you must report the total metal level numbers for all regulated metals and meet the requirements of federal regulations (40 CFR 503).

### **Record Keeping**

Provide an outline of the records you plan to keep in your application. At the very least, you must satisfy reporting requirements, but you may want to go further. Record keeping requirements are outlined in Section .1408 of the Solid Waste Compost Rules and reporting requirements are covered later in the document.

All compost operations should keep detailed records, but pilot or demonstration projects should be especially diligent. Without detailed records of blends and monitoring, it is almost impossible to keep up with what worked, what worked better and what did not work at all. Facility operators may also want to track composting time and man-hours to help determine the project's cost effectiveness.

### **Product Use**

Compost can be used in a variety of ways, so it is important that the Section knows how your final product will be used. In some cases, the final planned use can affect what levels of pathogens or contaminants will be allowed. This section of your application must show that you have given careful consideration to how the compost is used. Your final product must be marketed or disposed of appropriately. Compost is not allowed to pile up indefinitely while operators continue to accept waste.

### **EPA Standards**

The Section's Compost Rules require that compost used in areas where there may be public contact meet EPA's "Process to Further Reduce Pathogens" (PFRP) standard. That standard for fecal coliform is less than 1,000 most probable number (mpn) per gram. If your method is not EPA approved, you must test each batch of compost to demonstrate to the Section that your final product meets EPA standards. An alternative to repeated testing is to contact the EPA directly to gain approval for your process. The EPA Pathogen Equivalent Committee in Cincinnati, Ohio handles these requests. They can be reached at 513-569-7355.

### **Finishing the Application**

The final element of your application is an outline of your end of project report. This report must be submitted to the Section with the following details:

- 1) The amount and type of materials received in tons;
- 2) The amount of compost produced in tons;
- 3) The amount of compost distributed in tons;
- 4) Copies of all test results;
- 5) Monitoring records; and
- 6) A narrative explanation of why the project was a success or failure.

The Section recognizes that some of the information required for your application will have to be estimates. Report data, however, must be quite specific. One of the project's purposes is for the applicant to have time to experiment with composting methods, blending methods or recipes. The process is intended to be a learning experience for each pilot operator. By adding the data you collect to other pilots' results, the Section continually updates a source of information that is useful to everyone interested in learning more about composting.