



**ANIMAL CARCASS ON-SITE COMPOSTING
for Animal Carcass Management
Related to a Disaster in
Franklin County, Massachusetts**



An Agricultural Emergency Response Planning Tool

Developed by

**FRANKLIN REGIONAL COUNCIL OF GOVERNMENTS
FRANKLIN COUNTY SOLID WASTE MANAGEMENT DISTRICT**

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This section of the *Comprehensive Response Plan for Animal Carcass Management Related to a Disaster in Franklin County, MA* is based on the USDA National Animal Health Emergency Management System (NAHEMS) Operational Guideline: “Disposal”, April 2005; Composting Animal Mortalities, Minnesota Department of Agriculture, July 2006; Carcass Disposal: A Comprehensive Review, Chapter 3 Composting, Kansas State University, 2004 and the Massachusetts Department of Environmental Protection (MassDEP) DRAFT Avian Flu Debris Management Plan, February 2007.

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For more information about agricultural emergency response planning contact the Franklin Regional Council of Governments at 413-774-3167 or visit www.frcog.org. Information is also available through the Franklin County Solid Waste Management District at 413-772-2438 or at www.franklincountywastedistrict.org.

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1.0 INTRODUCTION

On-site composting of animal carcasses is the preferred disposal option following an emergency situation. Prior to implementing on-site composting, it is imperative to complete the associated composting checklist (in the Response Action Plan section), review the town-specific GIS map for potential site limitations (see the Appendices), and conduct a site visit to confirm that the farm is suitable for composting of animal carcasses.

When it has become clear that on-site composting is the best disposal method for some or all of the animal mortalities, consult with MassDEP, MA Department of Agricultural Resources, and the town's Board of Health. Permits may be necessary. (See the Attachments for an excerpt of regulatory requirements.)

2.0 METHODOLOGY¹

On-site composting of animal carcasses is a complex process. There are four common composting methods:

- in-house composting (poultry operations)
- passively-aerated windrow system (PAWS)
- bin-based composting (poultry and small animals)
- "Ag Bag" composting.

It is assumed that the on-site composting checklist has been completed and a site visit has been conducted to ensure the site meets set back and other requirements.

2.1 Common Steps

Each method has implementation steps in common. These include selecting a site that meets the set back requirements listed in the Response Action Plan section, gathering and/or procuring a bulking agent as a carbon source, gathering appropriate equipment and supplies, preparing the compost pile, and monitoring the pile to maintain optimal composting conditions.

2.2 Select the Method

One of the first considerations in determining which composting method is best for each farm is the type and number of carcasses requiring disposal. All types of animals can be composted but some methods are more feasible than others. For example, poultry can be most easily composted inside the poultry house. The advantage of this method is that

¹ NAHEMS, Operational Guidelines: Disposal. April 2005.

litter is usually available to be used as a carbon source and the process is contained inside the house. Conversely, large animals such as cattle are more easily composted in windrows. The Ag Bag system can be used for small animals but requires special equipment and processing. This method would be selected at sites that meet the setback requirements but require a contained system. Table 1 below shows the feasible methods for different types of animals. However, it should be noted that large numbers of any type of animal will be most effectively composted in a windrow system.

Table 1. Composting Methods by Animal Type

Method	Poultry	Swine	Bovines	Sheep/Goats
In-House	X			
Windrows	X	X	X	X
Bins	X	X		
Ag Bag	X	X*		X*

* The Ag Bag systems requires that large animal carcasses be size reduced prior to filling the Ag Bag.

2.3 Bulking Agent

Every composting method will require a bulking agent. The bulking agent serves a number of functions in the compost pile. It is the base which holds the carcasses and carbon source up off the ground so air can circulate and provide oxygen. It serves as a “sponge” so that any excess liquids are absorbed and retained within the compost pile providing the necessary moisture content for composting to take place. And finally, it serves as a cover to partially retain any odors and to prevent birds, rodents, and other scavengers from having access to the carcasses. The most readily available bulking agent is 1-2” wood chips. The bulking agent is vitally important because after a compost pile or windrow is formed, porosity and aeration become the critical factors for preventing excessive odor formation.

The bulking agent is not composted to any great extent but rather serves to give the compost pile the necessary porosity to ensure the availability of oxygen for aerobic decomposition. During the first period of composting, the bulking agent serves the functions listed above, but when the pile is turned and mixed, it provides for more uniform porosity.

The physical characteristics of the bulking agent will affect how well your compost piles work. In addition to choosing a bulking agent with the appropriate carbon to nitrogen (C:N) ratio, you want to find a bulking agent with a large enough particle size to let air

flow, but not to the point that it cools the pile. It should have enough surface area for the microorganisms to grab onto.²

Expect to use about 6.7 cubic yards of bulking agent per 1000 pounds of carcasses.³

2.4 Carbon Sources³

Creating and maintaining the proper ratio of carbon to nitrogen (C:N) is a crucial part of the composting process. Carbon sources or co-composting material provides the suitable balance and environment for composting carcasses which are high in nitrogen. Bulking agents are usually bigger in particle size and maintain air spaces in the compost mass while carbon sources generally facilitate the decomposition process.

If there is too little carbon (low C:N), the high nitrogen supply is converted to ammonia and is emitted from the pile, resulting in odors. If there is too much carbon (high C:N), the low nitrogen supply can limit microbial activity resulting in slow carcass decomposition and cool temperatures.⁴

A C:N ratio of 30:1 will provide the most ideal conditions for rapid composting and heating within the compost pile, although a range of 15-35:1 is acceptable. As the C:N ratio increases, the temperature peak will be depressed and the composting time will increase - which is not desirable for pathogen kill. While composting will take place over a wide range of C:N ratios, at a ratio below 20:1 the carbon will become the limiting component and some excess nitrogen will be lost to the atmosphere with resultant odor. Table 2 below lists some common sources of carbon and their properties relative to composting.

To calculate the amount of carbon needed for large animals multiply the estimated weight of the carcasses by 0.007 cubic yards. For poultry calculate carbon needed by multiplying the weight of the birds (lbs.) by 1.5 lbs of carbon.⁵

Ensure that you are able to procure an adequate supply of carbon from off-farm sources prior to beginning the composting process. Depending on the time of year and the market demand, it may not be feasible to procure enough carbon, such as sawdust. Attached to this section is a list of sawmills in the region. A list of forestry organizations is also attached. These groups may be a resource for wood chips and carbon sources.

² Composting Animal Mortalities, Minnesota Department of Agriculture, July 2006.

³ Sources discussing types of carbon sources and bulking agents are: "Carcass Disposal: A Comprehensive Review" Chapter 3; Cornell University Waste Management Institute Composting Fact Sheets and "On-Farm Composting Handbook" Appendix A; North Carolina State University "Large Scale Organic Materials Composting" NC Cooperative Extension Service, No Date; and Ontario Ministry of Agriculture Food and Rural Affairs "Windrow Composting of Poultry Carcasses," February 2008.

⁴ Composting Animal Mortalities, Minnesota Department of Agriculture, July 2006.

⁵ Guidelines for In-House Composting, Flory, G. et al, Virginia DEQ, September 2006.

Table 2. Properties of Carbon Sources^{6,7}

Source	C:N Ratio	Structure, Porosity	Moisture – as is	Degradability	Treatment Required	Density lbs/yd ³
Sawdust	100:1	very good	good	excellent	none	400
Wood chips	40-100:1	good	too dry	low	grinding	500
Straw						
wheat	100:1	good	dry	medium	chopping	200
oat/rye	60:1	good	dry	medium	chopping	200
barley	40-50:1	good	dry	medium	chopping	200
Bark	100-300:1	very good	medium	very good	grinding	-
Peat	60-80:1	good	medium	low	none	-
Autumn leaves	30-80:1	good	dry	medium	shredding	-
Corn silage	40:1	good	medium	good	none	-
Hay	30:1	good	dry	medium	none	-
Manure with straw	25-30:1	good	good	medium	none	-
Horse manure	25:1	good	good	medium	none	1400
Cattle manure	20:1	medium	medium	high	none	1450
Poultry manure w/ litter	13-30:1	medium	dry	medium	none	900
Poultry manure w/o litter	10:1	poor	moist	good	bulking material	-

Note: Corrugated cardboard and newspaper have very high C:N ratios (over 500:1). These materials could be used as a carbon source if other sources are not readily available. However, the compost pile will require additional monitoring to maintain moisture content and ensure the process is active.

2.5 Water Source^{4,6}

⁶ Carcass Disposal: A Comprehensive Review. Chapter 3 Composting. Kansas State University, 2004.

⁷ On-Farm Composting Handbook, Appendix A, Cornell University, Waste Management Institute, 1996.

Microorganisms require water as a medium for chemical reactions, to transport nutrients, and to move about. Compost with too little moisture will not supply sufficient water for microorganisms to survive. Too much moisture inhibits oxygen flow through the pile, causing aerobic microorganisms to slow down, which can lead to odors.

The required moisture content for carcass compost piles depends on the character of the material, but should generally be between 50% and 60% (wet basis). A moisture content of greater than 60% will generate odors and increase the chance of runoff (leachate) from the compost pile. However, turning the compost pile and adding more dry materials will solve the problem. If the compost mixture feels moist, without water dripping from a handful when squeezed, the moisture is adequate.

Water consumption for carcass composting is based on the dryness of co-composting materials. For example, if sawdust is dry, water should be added to obtain a damp feel and appearance. Up to 1-1.5 gal/ft³ of water can be added to each unit volume of sawdust.

If a source of water is not available on-site and near the composting area, it may be necessary to procure a water truck.

2.6 Equipment

The type of equipment needed for on-site composting depends on the method that is selected. In general, all methods will require a skid steer and/or bucket loader to move carcasses and add them to the compost bin or pile. Hand tools, such as shovels, pitch forks, rakes and hoes, may also be needed. A probe-type thermometer with a minimum 36-inch stainless steel stem is needed to monitor the pile.

If the situation warrants working after daylight then lighting should be provided. With any lighting system, it will be necessary to provide electricity, either with batteries, generators or drop service from power lines. The use of a drop service will require coordination with the local power company.

Personnel on site should have steel-toed boots, hard hats, impermeable gloves, tyvek suits and eye protection.

Use the MA Operational Services Division (OSD) State Contracts to obtain needed equipment. If equipment is not available from State contract firms, obtain it elsewhere, but remember to keep careful track of the procurement process. See the Procurement and Record Keeping Section for statewide contracts, FEMA documentation requirements, and FEMA tracking forms.

2.7 Composting Time

The time that it will take for initial decomposition will vary based on several conditions. However, in general, small animals less than 10 pounds will decompose in 2 weeks. Animals weighing 11-25 pounds will decompose in 3 weeks. Larger animals, such as sows, will decompose in 45 days and cattle may take several months.

3.0 IN-HOUSE COMPOSTING (POULTRY)⁸

Setting up a composting operation inside a poultry house is the preferred method for managing poultry carcasses. The poultry house allows the composting area to be managed indoors, controls runoff, and allows for the use of poultry litter as a carbon source.

Follow these step-by-step instructions for layering poultry carcasses:

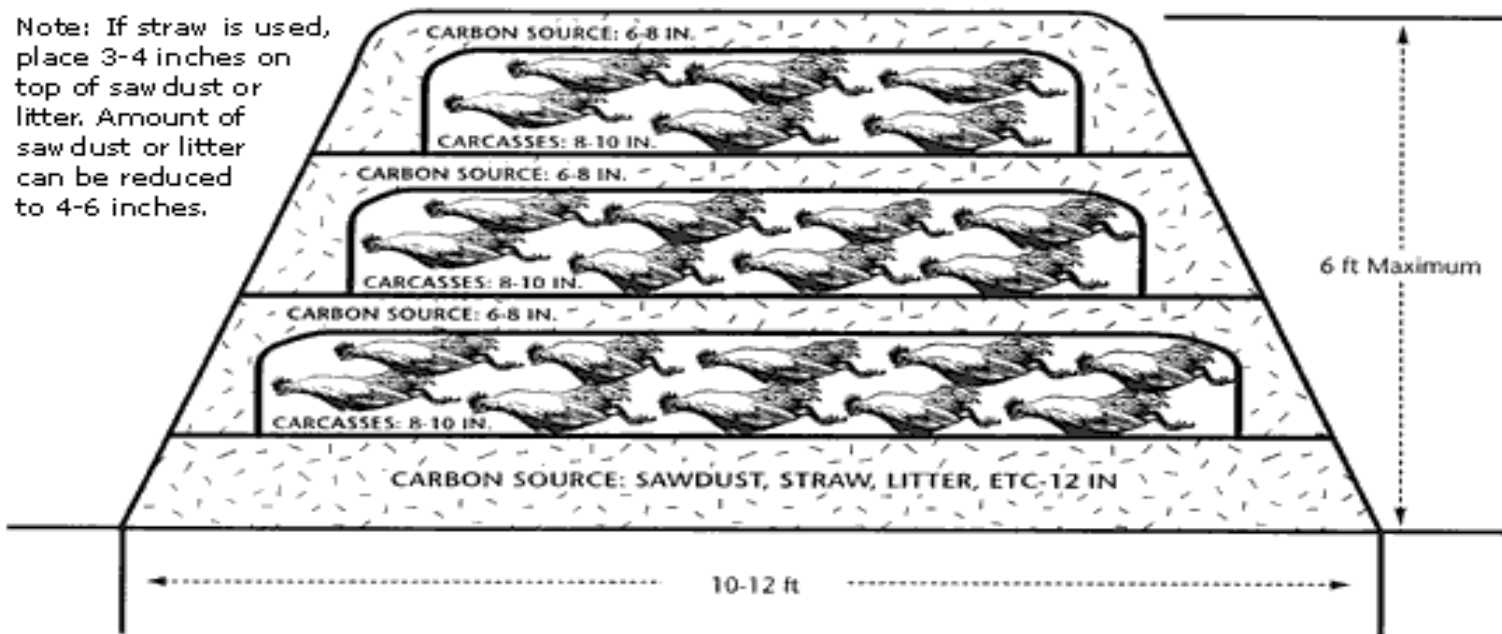
1. Make a 10-12 foot wide base of a carbon material (litter, sawdust, straw, etc.) that is 3-4 inches thick.
2. Lay the bird carcasses on the base using a skid steer or bucket loader. First shred or crush large birds (greater than 5 lbs.).
3. Spread the carcasses evenly with a rake or pitchfork until they are about 8 to 10 inches thick.
4. Add 6 to 8 inches of carbon material on top of the carcasses.
5. Repeat the layering procedure as needed until the pile is 6 feet high. If this height is not possible, make the pile height at least 3-4 feet.
6. Deposit a 6- to 8-inch layer of litter/sawdust “cap” over the birds with a foot overlap on the sides. Leave no carcasses or bird parts exposed.
7. If the windrow is too dry, add water in small amounts.
8. On a daily basis, monitor the temperature of each windrow every 50-100 feet. Temperatures should reach 130° F in 7 days.
9. Aerate the windrow if the temperature drops below 105°F. The pile can be turned using a skid steer or bucket loader. Make sure that all exposed carcasses are covered again.

⁸ Guidelines for In-House Composting, Flory, G. et al, Virginia DEQ, September 2006 and In-House Composting of Poultry Mortalities Due to Catastrophic Disease, N. Tablante and G. Malone, U of MD and U of DE.

10. The compost is finished when temperatures drop consistently and there is no sign of fleshy body parts. The final compost product should be screened prior to use.

Diagram 1. In-house Poultry Composting Pile

Note: If straw is used, place 3-4 inches on top of saw dust or litter. Amount of saw dust or litter can be reduced to 4-6 inches.



CARCASSES COMPOSTING WINDROW X-SECTION

Credit: Tablante and Malone, U of MD and U of DE.

4.0 PASSIVELY AERATED WINDROW SYSTEM (PAWS)⁹

While the procedure for constructing a windrow pile is similar for carcasses of various animal species, carcass size dictates the layering configuration within the pile. Regardless of carcass size, the length of a windrow can be increased to accommodate more carcasses. Carcasses can be generally categorized as small (e.g., poultry and turkey), medium (e.g., sheep and young swine), large (e.g., mature swine), or very large (e.g., cattle and horses).

Follow these step-by-step directions for windrow composting:

⁹ Carcass Disposal: A Comprehensive Review. Chapter 3 Composting. Kansas State University, 2004.

1. Locate the windrow on the highest point of the site. Lay a plastic liner ¼ inch thick on the windrow location. This serves as a moisture and leachate barrier.
2. Cover the liner completely with a carbon material, such as wood chips, sawdust, straw, etc.
 - 1 foot thick for small carcasses
 - 1.5 feet thick for medium carcasses
 - 2 feet thick for large and very large carcasses.
3. A layer of highly porous, pack-resistant bulking material (such as litter) should then be placed on top of the carbon material to absorb moisture from the carcasses and to maintain adequate porosity. The thickness of the bulking material should be:
 - 0.5 feet for small carcasses
 - 1 feet for all others.
4. An evenly spaced layer of carcasses should then be placed directly on the bulking material layer.
 - Large animal carcasses (e.g., cattle, horses, hogs, sheep, and goats) should be opened to permit the escape of gas. This can be accomplished by opening the thorax and abdomen of all species, and the rumen of ruminants and the cecum of horses. A bucket loader, back hoe, etc. can be used to crush the carcasses instead of opening each carcass separately. **This step is extremely important!**
5. In the case of small and medium carcasses, carcasses can be covered with a 1 foot layer of carbon materials and then a second layer of evenly spaced carcasses can be placed on top of the carbon material. This layering process can be repeated until the windrow reaches a height of 6 feet.
6. Cover the entire windrow with 1 foot of bulking material. Make sure that no carcasses are showing.
7. If the windrow is too dry, add water in small amounts.
8. On a daily basis, monitor the temperature of each windrow every 50-100 feet. Temperatures should reach 130° F in 7 days.
9. Aerate the windrow if the temperature drops below 105°F. The pile can be turned using a skid steer or bucket loader. Make sure that all exposed carcasses are covered again.
10. The compost is finished when temperatures drop consistently and there is no sign of fleshy body parts. The final compost product should be screened prior to use.

Diagram 2. Layout of Compost Windrows For Dairy Cows

Assumptions:

1. There will be **two feet of cover material beyond the carcass on the ends and sides of the windrow.**
2. There will be **18 inches of material below and two feet +/- of material over the carcass.** (more in winter)
3. The back of one carcass may rest on the legs of the adjacent carcass.
4. Volume of cover material needed will be determined by formula:

Vol. = 6X + 6 where X is the number of cows being composted.

Example: for **one cow**

Vol. = $6 \times 1 + 6 = 12$ **cu. yds.**

for **four cows,**

Vol. = $6 \times 4 + 6 = 30$ **cu. yds.**

5. Windrow length may be determined by formula:

Length = 4 x X + 4 where X is the number of cows being composted.

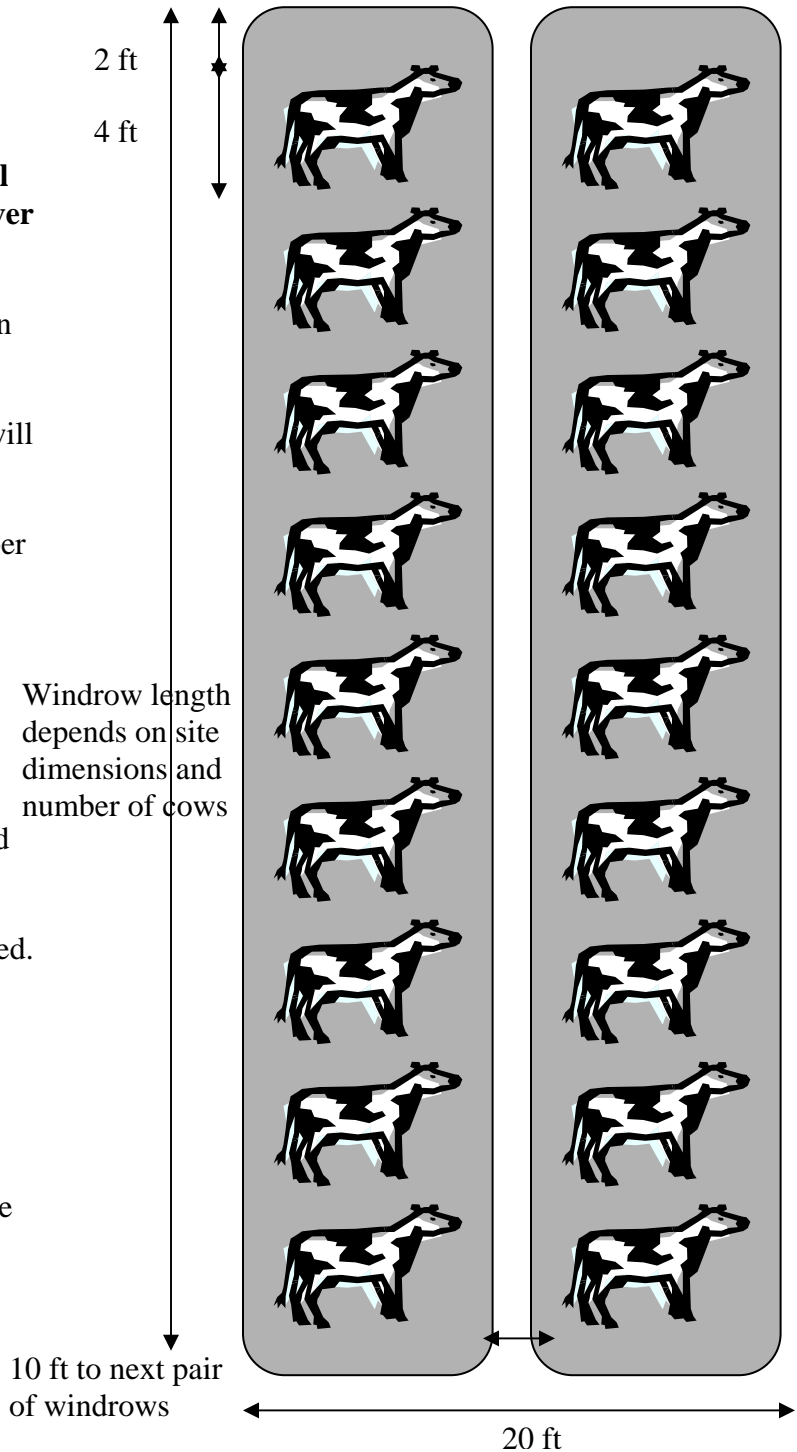
Example: for **one cow**

Length = $4 \times 1 + 4 = 8$ **ft.**

for **four cows**

Length = $4 \times 4 + 4 = 20$ **ft.**

6. Use pairs of windrows to save space on pad.



Developed by Dr. Bill Seekins, Maine Department of Agriculture, Food and Rural Resources, 2005.

5.0 BIN SYSTEM¹⁰

Carcass composting of smaller animals can be done in bins that can either be under cover or uncovered. These bins are usually sized to allow the use of a front-end loader for moving and mixing the bin contents. Structures should be located and situated so as to protect the pile from predators, pests, and runoff. Bins may or may not be covered by a roof. A roof is advantageous, especially in high rainfall areas (more than 40 inches annual average), as it results in reduced potential for leaching from the pile and better working conditions for the operator during inclement weather.

Bins can be constructed of any material structurally adequate to confine the compost pile, such as concrete, wood, hay bales, etc. Walls and panels can also be constructed with pressure-treated lumber (e.g., 1-in treated plywood backed with 2 x 6 studs). The wall height for primary and secondary bins should be 5-6 feet, and the bin width should be adequate for the material-handling equipment, but generally should not exceed 8 feet. The minimum front dimension should be at least 2 feet greater than the loading bucket width.

5.1 Calculate the Number and Size of Bins

Table 3 below lists small animals and their average weight. This information can be used in conjunction with volume conversions in Table 4. Multiply the estimated pounds of dead animals by the cubic feet per pound listed in Table 4 for the average size of the animals to be composted. This is the required volume for the primary composting area. It may be that several bins are needed for the primary bin area. Add an equal number of bins for the secondary composting area.



¹⁰ Carcass Disposal: A Comprehensive Review. Chapter 3 Composting. Kansas State University. 2004 and Composting Animal Mortalities, Minnesota Department of Agriculture, July 2006.

5.2 Bin Methodology¹³

Follow these step-by-step instructions for preparing the bins and layering the carcasses;

1. Place a mixture of bulking agent, such as wood chips, and carbon source, such as sawdust, on the floor of the bin to a depth of 12 inches.
2. Place the carcasses in a single layer on top of the bulking agent one foot from the walls of the bin and 6-8 inches apart from each other. Build the pile from the back, building it up and forward simultaneously.
3. Cover the carcasses with another mixture of bulking agent and carbon sources to 2 feet thick.
4. Add water as needed to maintain the proper moisture level. Caution: If the pile dries out (25% to 45% moisture) and if piles are too large, spontaneous combustion can occur.
5. On a daily basis, monitor the temperature in the bin. It should reach 130°F for up to 7 days. When the temperature drops, move the entire pile to the secondary bin.
6. Place at least 12 inches of bulking agent and carbon source on the floor of the secondary bin. Move the pile from the primary bin into the secondary bin.
7. Cover the pile with at least 12 inches of fresh bulking agent and carbon source.
8. Monitor the temperature daily. When the temperature decreases consistently, the finished compost is ready to be screened for reuse.

6.0 AG BAG COMPOSTING

Ag Bag composting is an “in-vessel” system that uses an EcoPod[®], a low-density polyethylene plastic bag, to contain the carcasses and bulking agents. This system is most ideal for small animals such as poultry but can be used for larger animals with grinding. The system requires special equipment to feed the 20 foot long bag. The EcoPod[®] comes with aeration piping with all fittings, seal strip sealing equipment with tools, controllable vents, temperature probes and starter inoculant. This system should be considered when leachate needs to be contained or when the site is not suitable for windrows or bin composting.

An important consideration is that the carcasses must be properly mixed with the bulking agent and carbon source in order for the system to work properly. If this system is used, professional assistance from the manufacturer should be attained. The system is manufactured by Ag Bag Environmental, 1-800-334-7432, www.ag-bagfs.com.

¹³ *Ibid.*

7.0 TROUBLE SHOOTING

In an ideal situation, animal carcasses can be composted in a short time and produce a usable end product. However, in reality composting is a finely tuned process that requires the correct mixture of materials and regularly monitoring. Most problems can be fixed by either adding more carbon, adjusting the moisture content, or aerating the pile. Table 5 below identifies the most common problems that might be faced and offers solutions.

Table 5. Troubleshooting Guide for Carcass Composting

Adapted from the National Pork Producers Council Swine Mortality Composting Module

Problem/Symptom	Probable Cause	Solution
Improper Temperature	<ul style="list-style-type: none"> • Too dry • Too wet • Improper C:N ratio or bulking agent is too porous 	<ul style="list-style-type: none"> • Add water • Add bulking agent and turn pile • Evaluate bulking agent and adjust amount
Odor	<ul style="list-style-type: none"> • Too wet • Too low C:N ratio • Air flow restricted • Inadequate cover over carcasses • Long periods of low temps 	<ul style="list-style-type: none"> • Add bulking agent/aerate • Evaluate carbon source • Turn pile • Cover with 1' of bulking agent or carbon source • See temperature section
Flies/Scavengers	<ul style="list-style-type: none"> • Inadequate cover over carcasses • Too wet • Low temperature 	<ul style="list-style-type: none"> • Cover with 1' of bulking agent or carbon source • Add bulking agent/aerate • See temperature section
Failure to Decompose	<ul style="list-style-type: none"> • Improper C:N ratio • Carcasses layered too thickly • Carcasses too close to edge of pile 	<ul style="list-style-type: none"> • Turn pile and adjust the amount of bulking agent/carbon • Remove carcasses and reduce layering • Maintain 1' of space between carcasses and edge of pile

8.0 USE OF FINISHED COMPOST

In most situations, the finished compost from animal carcasses will need to be screened to remove bones and other animal parts that do not decompose. It is recommended that compost produced from animal carcasses be used exclusively on a farm where it can be

used as a soil amendment, and not be made available to the public or used commercially for off-farm use. Agricultural composting operations that use materials obtained from a source other than their own farm are required to be registered with the MA Department of Agricultural Resources (DAR). Agricultural composting that occurs with materials limited to farm-generated materials is exempt from licensing and registration. Under emergency circumstances exceptions may be made if suitable plans and controls are in place. Close coordination with regulatory personnel is needed. For a more detailed explanation of the regulatory requirements, see the attached document titled, “On-Site Carcass Composting Regulatory Requirements.”

The finished product has an organic matter content of approximately 35-70%, a pH of about 5.5 to 8.0, and a bulk density of about 29.6- 40 lb/ft.¹⁴ Compost nutrient estimates are 15 pounds of nitrogen, 5 pounds of phosphorus and 10 pounds of potassium per ton of compost. Nutrients would be higher if manure or turkey litter were used in the compost.¹⁵

9.0 DOCUMENTATION

It is imperative to use appropriate documentation for all activities that require labor, equipment, supplies, and trucking services. Logs and written documentation will be required for reimbursement from FEMA. See the Procurement and Record Keeping section for copies of FEMA forms.

¹⁴ Carcass Disposal: A Comprehensive Review. Chapter 3 Composting. Kansas State University. 2004

¹⁵ Composting Animal Mortalities, Minnesota Department of Agriculture. July 2006.

ATTACHMENTS

- ❖ Regulatory Requirements for On-Site Composting Operations
- ❖ Sawmills In or Near Franklin County
- ❖ Other Forestry Resources
- ❖ Animal Carcass Compost Monitoring Table

Regulatory Requirements for On-Site Composting Operations

Permitting Requirements

Composting operations that are considered to be part of an agricultural or farming operation, as defined by MGL c. 128 sec. 1A, and that follow the MA DAR Agricultural Waste Composting Guidelines are exempt from the permitting requirements of the DEP Solid Waste Regulations for Determination of Need for Site Assignment as set forth in 310 CMR 16.05(4). On-farm agricultural composting operations that handle materials obtained from a source other than their own agricultural production are required to be registered with the Massachusetts Department of Agricultural Resources. Farms that compost only materials generated on the farm, including mortalities, do not need to be registered, as long as the compost being produced is being used entirely on-site in the farming operation and is not being sold or taken off of the farm for other uses. See the following MA DAR guidelines and contact information for the Agricultural Waste Composting program. Also attached are excerpts from the DEP Solid Waste Regulations that apply to composting operations.

Local Oversight

Local review of the composting operation and site by the Board of Health and Conservation Commission is important to establish a minimum level of regulatory oversight. Even though agricultural operations are exempt from many statutes and regulations, the local town boards will often have the best knowledge of the local conditions and their involvement can help to reduce the perceived need to bring in outside experts or state and federal agencies.

Transportation of Off-Site Carcasses

The transportation of off-site carcasses may need to be approved by the appropriate regulatory authorities, depending on the specific conditions. Returning the carcasses of animals that escaped or were washed, blown, or floated from the agricultural property would be exempt from some regulations, as explained above, but in other cases the transportation of carcasses would have to comply with DEP, DAR, and possibly DPH requirements.

MA Department of Agricultural Resources Agricultural Composting Program

All persons engaged in agricultural pursuits and who are interested in composting organic materials obtained from a source other than their own agricultural operation are required to be registered with the Massachusetts Department of Agricultural Resources. Persons composting organic materials without a registration are subject to the Department of Environmental Protection's site assignment requirements. The registration application should be completed and mailed to The Department of Agricultural Resources. Yearly Annual Reports will be required in order for a composter to remain registered with the Department.

The Department may register agricultural composting operations if the Department determines that:

- 1) the compost operation is located on agricultural unit;
- 2) the applicant has submitted a completed application;
- 3) the applicant agrees to a site visit;
- 4) the applicant demonstrates knowledge and capability to conduct the agricultural composting operation to produce a stabilized compost product.

If the department finds that any portion of the Agricultural Composting Registration application includes false or misleading information, or the operation of a registered composting facility is in violation of the regulations or guidelines, or is acting not in the best interest of Massachusetts agriculture, the Department may suspend or revoke the registration which will also revoke the exemption status and thereby the operator must comply with DEP Regulations for Determination of Need for Site Assignment as set forth 310 CMR 16.05(4)(c) Agricultural Waste Composting. A composting operation for agricultural wastes, when located on a farm engaged in "agriculture" or "farming" as defined in M.G.L. c. 128, § 1A. Such composting operation may, in addition to agricultural wastes, utilize the following compostable materials, provided the operation is registered and complies with policies of the Department of Agricultural Resources:

1. leaf and yard waste;
2. wood wastes;
3. clean newspaper or cardboard;
4. clean, compostable (i.e. thin) shells, and clean bones;
5. non-agricultural sources of manures and animal bedding materials;
6. less than 20 cubic yards or less than ten tons per day of vegetative material; and
7. less than ten cubic yards or less than five tons per day of food material.

Contact: William Blanchard at William.Blanchard@state.ma.us or 617-626-1709.

Excerpts from MA Department of Environmental Protection Solid Waste Regulations applicable to agricultural composting operations:

DEPARTMENT OF ENVIRONMENTAL PROTECTION

310 CMR 16.00: SITE ASSIGNMENT REGULATIONS FOR SOLID WASTE FACILITIES

PART 1: PROCEDURES FOR SUBMISSION AND REVIEW OF SITE ASSIGNMENT APPLICATIONS

16.01: Purpose

(1) Purpose. 310 CMR 16.00 is composed of four Parts pertaining to the process for deciding whether a parcel of land is suitable to serve as the site for a solid waste management facility. The first Part describes the procedures for submitting an application to the Department and the board of health for site assignment and sets forth the review process used by the Department in determining whether a site is suitable. Part I is intended to provide for the complete submission of information necessary for determining site suitability and for extensive opportunity for public comment within a relatively short review period. The second Part sets forth rules governing the Public Hearings to be held by the board of health for the purpose of assigning a site. The third Part sets forth the process by which the board of health assesses the Application Fee and the allowed expenditures of those funds for reviewing the application and conducting the public hearings. The final Part establishes the site suitability criteria that are to be applied by the Department and the board of health in determining whether a site is suitable. Part IV is intended to make the siting of facilities subject to consistent standards and provide for the protection of public health and safety and the environment. Protection of public health, safety and the environment is primarily the prevention of pollution from the site, but also encompasses the function of the site within an integrated solid waste management system which maximizes material reuse and conservation of natural resources.

16.02: Definitions

Agricultural Waste means discarded organic materials produced from the raising of plants and animals as part of agronomic, horticultural or silvicultural operations, including, but not limited to, animal manure, bedding materials, plant stalks, leaves, other vegetative matter and discarded by-products from the on-farm processing of fruits and vegetables.

Compostable Material means an organic material, excluding waste water treatment residuals, that has the potential to be composted, which is pre-sorted and not contaminated by significant amounts of toxic substances.

Composting means a process of accelerated biodegradation and stabilization of organic material under controlled conditions yielding a product which can safely be used.

Land Actively Devoted to Agricultural or Horticultural Uses means that land as defined at M.G.L. c. 61A, § 3.

Processing means the use of any method, technique or process to reduce the volume or alter the physical characteristics of solid waste or recyclable or compostable materials through any means, including, without limitation, separating, baling, shredding, crushing or reworking.

Residue means all solid waste remaining after treatment or processing and includes, without limitation, ash, material which is processed for recycling or composting but is unmarketable or speculatively accumulated due to its inferior quality and other solid waste which is not recovered. Non-recyclable material which is integral to a pre-sorted recyclable product shall not constitute residue for the purpose of calculating residue generation rates.

Solid Waste or Waste means useless, unwanted or discarded solid, liquid or contained gaseous material resulting from industrial, commercial, mining, agricultural, municipal or household activities that is abandoned by being disposed or incinerated or is stored, treated or transferred pending such disposal, incineration or other treatment, but does not include:

(i) compostable or recyclable materials when composted or recycled in an operation not required to be assigned pursuant to 310 CMR 16.05(2) through (6).

16.05: Applicability

(1) General. 310 CMR 16.00 shall govern the process of application, review, public hearing and decision for a site assignment to expand a solid waste management facility or establish a new solid waste management facility at an unassigned site.

(2) Facilities and Operations to Which 310 CMR 16.00 Does Not Apply. 310 CMR 16.00 does not apply to the following facilities or operations:

(d) Farming Operations. The use or application of agricultural manures in normal farming operations.

(4) Conditionally Exempt Composting Operations. The following composting operations and activities do not require a site assignment provided the operation incorporates good management practice, is carried out in a manner that prevents an unpermitted discharge of pollutants to air, water or other natural resources of the Commonwealth, and results in no public nuisance:

(a) Backyard Composting. Backyard composting.

(b) Leaf Composting Operations. Operations which transfer or compost clean leaves and yard waste containing no greater than 25% grass clippings by volume provided that less than 50,000 cubic yards or less than 10,000 tons total are on site at any one time, with a maximum volume per unit area of 5,000 cubic yards per acre, and either:

1. the operation is registered with the Department; or
2. the operation is located within the property boundaries of the site where all the leaf and yard waste is generated;

(c) Agricultural Waste Composting. A composting operation for agricultural wastes,

when located on a farm engaged in "agriculture" or "farming" as defined in M.G.L. c. 128, § 1A. Such composting operation may, in addition to agricultural wastes, utilize the following compostable materials generated off-site, provided the operation is registered and complies with policies of the

Department of Food and Agriculture:

1. leaf and yard waste;
2. wood waste;
3. clean newspaper or cardboard;
4. clean compostable (*i.e.* thin) shells, and clean bones;
5. non-agricultural sources of manures and animal bedding materials.
6. less than 20 cubic yards or less than ten tons per day of vegetative material; and
7. less than ten cubic yards or less than five tons per day of food material.

(d) Composting on Industrial, Commercial or Institutional Sites or Zoos. A composting operation located at an industrial, commercial or institutional site or zoo which composts less than four cubic yards or less than two tons per week of vegetative materials, food materials or animal manures that are generated on-site, and where, at least 30 days prior to commencement of operations, the operator notifies the Department and the board of health, using a form as may be supplied by the Department.

(5) Other Conditionally Exempted Operations. The following operations do not require a site assignment or a Solid Waste Management Facility Permit pursuant to 310 CMR 19.000, provided the operation incorporates good management practice, is carried out in a manner that prevents an unpermitted discharge of pollutants to air, water or other natural resources of the Commonwealth and results in no public nuisance:

(a) Temporary Storage by Public Works Departments. Dumpsters, roll-offs, or other temporary storage containers or temporary storage areas at a location controlled by a public works department such as a municipal department of public works, the Massachusetts Highway

Department, Massachusetts Turnpike Authority, Metropolitan District Commission or similar government agency, when used exclusively for solid waste generated and collected by the public works department and when storage is appropriate for the type of waste (e.g., materials such as trash from roadside trash barrels are stored in dumpsters or roll-offs while materials such as street sweepings may be stored without containers);

(7) Determination Process.

(e) Determinations of Need.

1. All Department decisions regarding determinations of need for site assignment for recycling or composting facilities shall be made in writing.
2. The Department shall issue a draft determination and send a copy to the applicant and board of health.
3. The Department shall accept written comments up to 21 days from the date of issuance of the draft determination. Commentors may, in their comments, request the Department to revise with conditions a draft determination or show why the facility should be required to obtain site assignment as a solid waste management facility.
4. The Department shall issue a final determination following the 21 day comment

period.

5. The Department may make a determination that no site assignment is needed subject to the applicant's compliance with conditions. These conditions may include, but are not limited to:

- a. requirements to ensure that only exempt recycling or composting operations are conducted on the site;
- b. weighing and operational reporting requirements, including maintenance of a daily log of the quantity of materials received and shipped, estimation or weighing of materials, depending on facility size, and regular certified reports detailing operating conditions and material disposition;
- c. the authority of the Department or the board of health without prior notice to periodically enter upon and inspect the site, the facility and relevant operating records to determine and compel compliance with applicable regulations and the conditions of the determination;
- d. payment of penalties in accordance with the provisions of M.G.L. c. 21A, § 16 for violation of a condition or other requirement; and
- e. a termination date.

(10) Demonstration Projects for Recycling or Composting Pre-Sorted Material.

The Department may approve projects to demonstrate innovative recycling or composting techniques at unassigned sites as provided below.

(a) General Conditions. The following conditions shall apply to all demonstration projects approved under 310 CMR 16.05(10):

1. The materials to be processed shall be limited to the pre-sorted recyclable or compostable materials permitted to be processed by operations set forth at 310 CMR 16.05(3) and (4); and
2. projects shall be limited to a specified time period not to exceed one year, after which time they shall terminate unless appropriate approvals are obtained.

(b) Application. An application to conduct a recycling or composting demonstration project shall be submitted to the Department, the board of health and, in the case of agricultural composting, to the Department of Food and Agriculture. The application shall contain:

1. the information described at 310 CMR 16.05(7)(b) and (c) as required by the Department;
2. the proposed duration of the demonstration project; and
3. a description and schedule of interim and final reports to be submitted to the Department describing and evaluating the project.

(c) Criteria for Department Determination. The Department shall consider the following criteria when determining whether to allow the demonstration project:

1. the potential for adverse impacts taking into account the recyclable and compostable materials, project location, design and operating controls, management practices and operator experience;
2. the likelihood of obtaining useful, new information in the time frame proposed for the demonstration project; and
3. the ability of the applicant to appropriately use or dispose of all project materials.

(d) Department Decision. The Department shall follow the procedure described at 310 CMR 16.05(7)(e)1. through 4. when issuing its decision on whether to allow the demonstration project.

Sawmills In or Near Franklin County

Businesses listed may be approached to procure carbon and bulking agents. Data accurate as of June 2009.

C and M Rough Cut Lumber

Jim Conkey
94 Old North Dana Rd
New Salem, MA 01355
978-575-0475

Hall Tavern Farm
Jay Healy
136 Burnt Hill Rd
Shelburne Falls, MA 01370
413-625-9008
jhealy6387@aol.com

Heyes Forest Products, Inc
Fred Heyes
34 Daniel Shays Hwy
Orange, MA 01364
978-544-8801
fred@heyeforest.com

Hicks Farm
Norman A. Hicks
15 Harmony Lane
Charlemont, MA 01339
413-339-4414

Northwoods Forest Products
Cory Norwood
675 Gulf Rd
Northfield, MA 01360
413-498-5335
NorthwoodsFP@hotmail.com

Roberts Brothers Lumber
Lenny Roberts
1450 Spruce Corner Rd
Ashfield, MA 01330
413-628-3333
robtlbr@mtdata.net

Berkshire Hardwoods
Jeff Poirier
73 East St. POB #270
Chesterfield MA 01012
413-296-4546
jeff@berkshirehardwoods.com

Colrain Tree Services
Blue Sky
326 W. Leyden Road
Colrain, MA 01340
413-624-3645

Quist Road Lumber
Michael Idoine
Quist Road
Wendell MA 01379
978-544-2623
mikar65@earthlink.net

Cowls Sawmill
125 Sunderland Road
N. Amherst, MA
www.cowls.com
413-549-0001

Cersosimo Lumber
Vernon Road
Brattleboro VT 05301
802-254-4508

Allard Lumber
Old Ferry Road
Brattleboro VT 053011
802-254-493

Other Forestry Resources

Massachusetts Forest Stewardship Program
433 West St. Suite 5
Amherst, MA 01002
413-256-1201

Extension Forester
Holdsworth Natural Resource Center
University of Massachusetts
Amherst, MA 01003

Massachusetts Forest Products Association
433 West St. Suite 5
Amherst MA 01002
413-256-6795

Massachusetts Wood Producers Association
P.O. Box 455
Northampton MA 01061
413-339-5526

Massachusetts Association of Professional Foresters
P.O. Box 9509
North Amherst, MA 01059

American Forest and Paper Association
1111 19th St. NW Suite 800
Washington DC 20036
202-463-5161

**Animal Carcass Compost Monitoring
 Monitoring Table for Single Windrow or Pile**

Monitored by: _____

page 1 of 2

Pile No:	Pile Location:	Carcass type & other pile ingredients:		
Start Date:	Pile Temperatures	Original Volume:		
Day	-from 3 places at least 24" deep	Moisture (A,B,C)*	Air Temp	Notes; odor, leaking, insects, etc.
1	/ /			
2	/ /			
3	/ /			
4	/ /			
5	/ /			
6	/ /			
7	/ /			
8	/ /			
9	/ /			
10	/ /			
11	/ /			
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32	/ /			
33	/ /			
34	/ /			
35	/ /			

Moisture content: A=just right (60%), B= too dry, C=too wet

**Animal Carcass Compost Monitoring
Monitoring Table for Single Windrow or Pile**

Monitored by: _____

page 2 of 2

Pile No:	Pile Location:	Carcass type & other pile ingredients:		
Start Day:	Pile Temperatures	Original Volume:		
Day	-from 3 places at least 24" deep	Moisture (A,B,C)*	Air Temp	Notes; odor, leaking, insects, etc.
36	/ /			
37	/ /			
38	/ /			
39	/ /			
40	/ /			
41	/ /			
42	/ /			
43	/ /			
44	/ /			
45	/ /			
46	/ /			
47	/ /			
48	/ /			
49	/ /			
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59	/ /			
60	/ /			
61	/ /			
62	/ /			
63	/ /			
64	/ /			
65	/ /			
66	/ /			
67	/ /			
End Date:	/ /			
		End Volume:		

Moisture content: A=just right (60%), B= too dry, C=too wet