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REDUCTION
RECYCLING
COMPOSTING
DISPOSAL
Franklin County
Solid Waste Management District

ANIMAL CARCASS ON-FARM 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

MARCH 2009

Funded through a grant by the United States Department of Agriculture Rural Utilities Program

ACKNOWLEDGEMENTS AND CREDITS

This plan was developed by the Franklin County Solid Waste Management District and the Franklin Regional Council of Governments. This project is funded through a USDA Rural Utilities Program Solid Waste Management grant.

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.

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.

Cover photo credits: VA Department of Environmental Quality and Minnesota Department of Agriculture

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1.0 INTRODUCTION

On-farm composting of animal carcasses is the preferred disposal option available following an emergency situation. Prior to implementing on-farm composting, it is imperative to complete the associated composting checklist (in the Response Action Plan section), review the town 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-farm 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.

2.0 METHODOLOGY[1]

On-farm 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-farm 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 bulky 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 litter is usually available to be used as a carbon source and the process is contained inside

[1] NAHEMS, Operational Guidelines: Disposal. April 2005.

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 Sources[3]

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 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, below C:N=20 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.

[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.

[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

2.5 Water Source [4,6]

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 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/ft^3 of water can be added to each unit volume of sawdust.

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

2.6 Equipment

The type of equipment needed for on-farm 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.

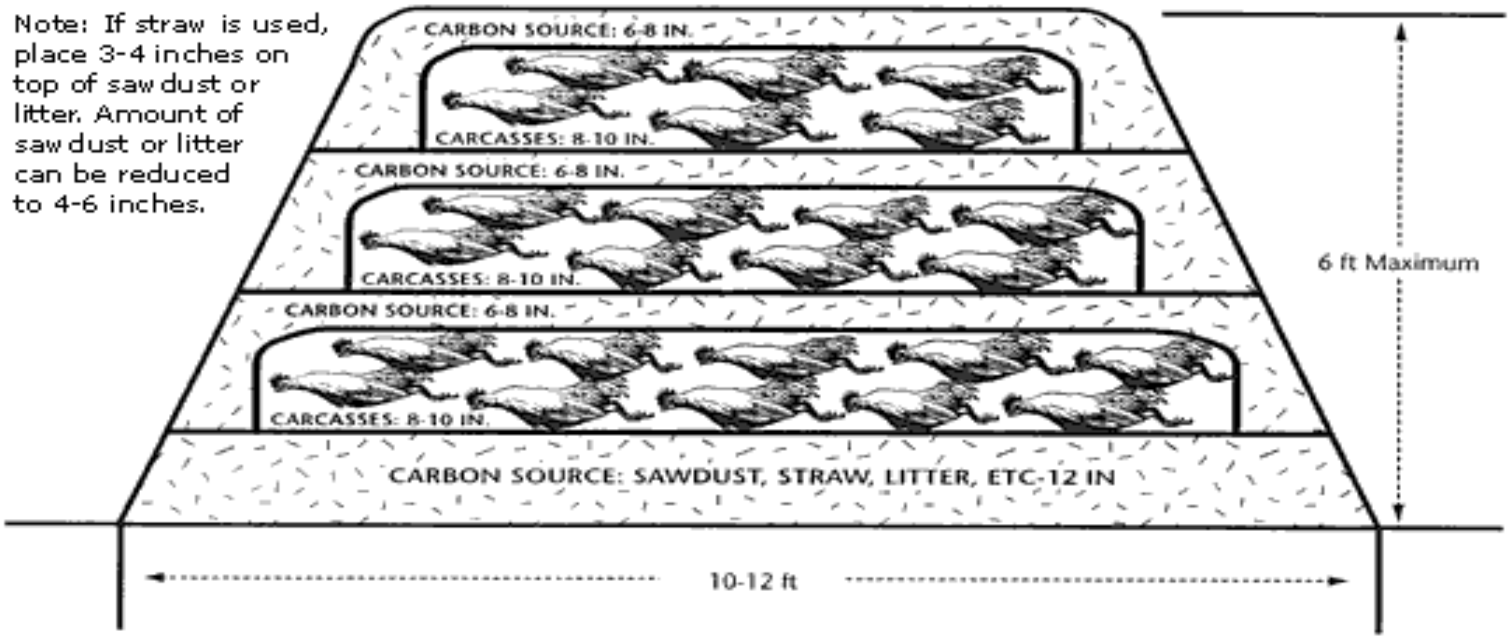
Follow these step-by-step instructions for layering poultry carcasses.

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. Monitor the temperature daily 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



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).

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

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

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 ft for small carcasses
   - 1 ft 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. <u>This layering process can be repeated until the windrow reaches a height of 6 feet.</u>

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. Monitor the temperature daily 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 x 1 + 6 = **12 cu. yds**.

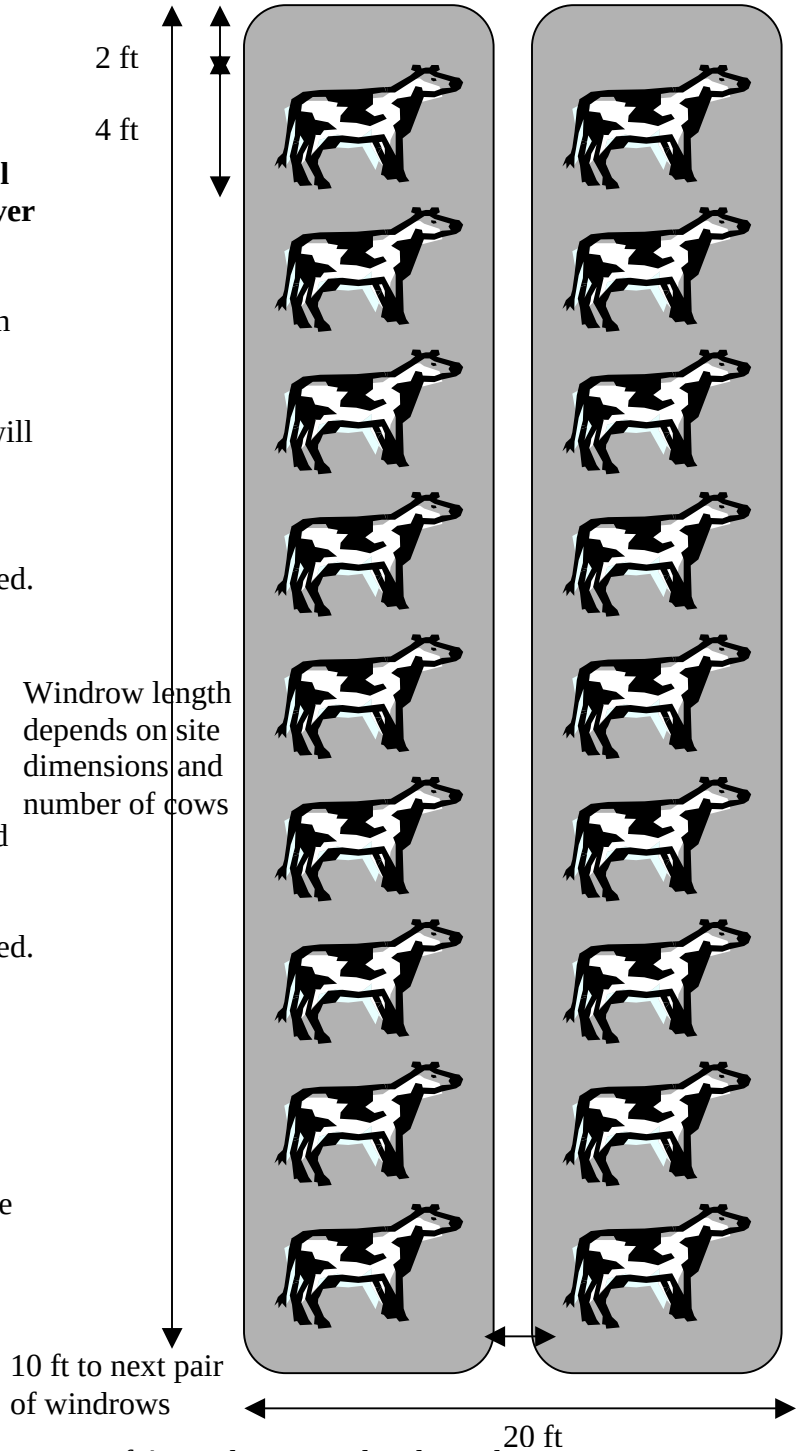
   for **four cows**,
   Vol. = 6 x 4 + 6 = **30 cu. yds**.

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 x 1 + 4 = **8 ft**

   for **four cows**
   Length = 4 x 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 SYSTEM[10]

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.

Table 3. Estimated Animal Weights [11]

Species	Average Weight (lbs.)
Goats and Sheep: pre-wean	8
lambs	50
mature	170
Poultry: broiler	3
layer	3
turkey hens	10
turkey toms	17
Swine: wean to nursery	10
nursery	30
grow finish	150
sows	300

Table 4. Multiplier Factor to Estimate Bin Volume by Animal Size[12]

Carcass Size (lb)	Multiply By	Volume of Primary and Secondary Bins
1-10 lbs.	3 ft^3/lb.	
11-25 lbs.	5 ft^3/lb.	
26-300 lbs.	10 ft^3/lb.	

Example: The average size of the animal carcass to be composted is about 150 pounds. The table lists the bin volume of 14 ft^3/lb for animals of that size. (150 lb.) x (10 ft^3/lb) = 1500 cubic feet of primary bin space and an equal amount of secondary bin space.

[11] Composting Animal Mortalities, Minnesota Department of Agriculture, July 2006.
[12] *Ibid.*

5.2 Bin Methodology[13]

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. Monitor the temperature daily 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 if 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 suited 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	• Too dry • Too wet • Improper C:N ratio or bulking agent is too porous	• Add water • Add bulking agent and turn pile • Evaluate bulking agent and adjust amount
Odor	• Too wet • Too low C:N ratio • Air flow restricted • Inadequate cover over carcasses • Long periods of low temps	• Add bulking agent/aerate • Evaluate carbon source • Turn pile • Cover with 1’ of bulking agent or carbon source • See temperature section
Flies/Scavengers	• Inadequate cover over carcasses • Too wet • Low temperature	• Cover with 1’ of bulking agent or carbon source • Add bulking agent/aerate • See temperature section
Failure to Decompose	• Improper C:N ratio • Carcasses layered too thickly • Carcasses too close to edge of pile	• 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 the farm where it is produced, 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 Legal 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^3.[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

- Sawmills In or Near Franklin County
- Other Forestry Resources
- Animal Carcass Compost Monitoring Table

Sawmills In or Near Franklin County

Businesses listed may be approached to procure carbon and bulking agents. Data accurate as of March 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@heyesforest.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	/ /			
12	/ /			
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32	/ /			
33	/ /			
34	/ /			
35	/ /			

Animal Carcass Compost Monitoring
Monitoring Table for Single Windrow or Pile

Monitored by:_____

Pile No:		*Moisture Criteria:	(A,B,C)	A=just right (60%), B= too dry, C=too wet
Start Day:	**Pile Location:**	**Carcass type & other pile ingredients:**		
Day	**Pile Temperatures**	**Original Volume:**		
36	-from 3 places at least 24" deep	**Moisture (A,B,C)***	**Air Temp**	**Notes; odor, leaking, insects, etc.**
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End Date:	/ /			
		End Volume:		