Mortality Composting

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Carcass Disposal Options

**Render** – best option, where available but rules and regulations have made this more difficult resulting in insufficient capacity

**Compost** – uses resources found on-farm, cost effective, minimizes farm and public exposure, can be done on-site

**Alkaline digestion** – environmentally friendly, expensive, insufficient capacity

**Burial** – 6’ closer to water table, no leachate control

**Incineration** – costly, inefficient, air pollution

**Landfill** – expensive, insufficient capacity, worker trepidation, may not be available

**Carcass left outside** for scavengers to decay – disease transmission risk, illegal

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Goals of Carcass Disposal

- Fulfills regulations
- Creates positive public perception
- Reduces disease transmission
- Promotes environmental sustainability
- Produces beneficial by-product
- Economical
- Practical
Why Should Farms Compost?

Pathogen kill in thermophilic composts
Can be done with equipment available on most farms
Odor reduction
All sizes of animals can be composted
Relatively low labor and management needed
Placental membranes and other tissue can be composted
Doesn’t cost a lot of money
Neighbor relations
What is composting?

It is the aerobic, or oxygen requiring, decomposition of organic materials by microorganisms under controlled conditions.

Composting reduces both the volume and mass of the raw materials while transforming them into a valuable soil conditioner.
The Composting Process

Microorganisms consume oxygen while feeding on organic matter and as a result, give off heat.

Composting Process Variables:
- Micro- and macro-organisms
- Diet
- Air
- Moisture
- Shelter

By managing these factors you can speed up the otherwise slow natural decay process.
Aerobic composting and temperature

Active composting occurs in the temperature range of 90°F to 160°F.

Pile temperature may increase above 160°F but this is too hot for most bacteria and decomposition will slow until temperature decreases again.

Remember, Compost pile heat is the direct result of microbial metabolism!!!
Nitrogen comes from the wet material. Organisms use this as a source of protein to grow and reproduce.

Carbon comes from the dry material. Organisms use this as a source of energy.
The Composting Process Diet

What is C:N Ratio?

Supply of total carbon compared to total nitrogen in compost feedstock

If C:N is too high the compost process will slow

If C:N is too low, more likely to lose Nitrogen as ammonia gas or in leachate

Ideal initial C:N mixture range is 20 – 30:1.
The Composting Process
Air, Moisture and Shelter

FEEDSTOCKS

MANAGEMENT

METHOD
What Happens in Mortality Composting?

The Diet is all wrong (C:N about 80:1)

Air flow occurs passively

Moisture comes from the carcass as it decomposes
Mortality composting does not follow the rules of starting with a “mix” with the right moisture and C:N ratio. Instead, the envelope of carbon material simply allows the natural process of decomposition to occur in a manner that will absorb the moisture and odors emitted when carcasses decay.
Composting Methods

Static Pile – Passively Aerated OR Turned Windrow

In-Vessel – buildings, bags, cylinders
Carcass Composting Steps

- Select Site
- Prepare base
- Place animal and cover
- Layer young and/or small animals
- Let sit 4 to 6 months
- Use the composted material
- Reuse bones/un-composted material
Select a site

1. Water
2. Air
3. Slope, soil conditions
4. High and dry
5. Amount and storage of feedstock
6. Access to work on pile
7. Population density

Make sure you are not close to wells, streams, water bodies. Check depth to groundwater. Look for plants that indicate wet areas.
Carcass Composting Steps

2 Prepare a Base

Lay 24-in bed of bulky, absorbing organic material containing some sizeable pieces, preferably woodchips.
Carbon/Feedstocks

Not all carbon sources are created equal
Carbon/Feedstocks

- Fine Carbon
- Coarse Carbon
- Mixed Carbon
- Very Coarse Carbon
Carbon/Feedstock Characteristics

TEXTURE
MOISTURE
AMMONIA/ODOR POTENTIAL
BIOFILTER/ODOR CONTROL
Potential Farm Feedstocks for Cover*

ANIMAL BEDDING
WASTE FEED
MANURE
STRAW
SPENT FEED

*Base material should be chunky (i.e. woodchips)
# Carbon Sources

Contact List for Sources of Carbon and Bulking Materials

<table>
<thead>
<tr>
<th>Entity</th>
<th>Information</th>
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<tbody>
<tr>
<td>Tree Service Company (such as Asplundh)</td>
<td>Contact: ____________________</td>
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<tr>
<td></td>
<td>Phone: ______________________</td>
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<td></td>
<td>Fax: ________________________</td>
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<td></td>
<td>E-Mail: ____________________</td>
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<tr>
<td>Local (Town/Village) Highway Department</td>
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<td>County Highway Department</td>
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<tr>
<td>State Highway Department</td>
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<tr>
<td>Utility Company (Telephone, Electric, Cable)</td>
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<tr>
<td>Landscapers</td>
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<tr>
<td>Logging Companies</td>
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<tr>
<td>Arborists</td>
<td></td>
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<tr>
<td>Sawmill/Lumber yard (non-pressure treated only)</td>
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<tr>
<td>Local Parks Department</td>
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</tbody>
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Carcass Composting Steps

3. Place Animal and Cover

- Lance the rumen
- Place the animal
- Cover with dry, high-carbon material
Carcass Composting Steps

Layer young or small animals

Base Layer (24” woodchips/carbon)

Two feet of carbon all the way around the birds. Additional base material at the end to extend the windrow

Cover the layer with 12” carbon

2-3 layers depending on the height. Cover with a 2-foot cap of carbon
Thermal air movement and diffusion in a well-built passively aerated static pile
Some Best Management Practices

Incorporate dead stock in a timely fashion
Some Best Management Practices

Keep piles/windrows about 10-16 feet wide and 5-8 feet tall. Large, poorly shaped piles restrict air flow and are not efficient.
Troubleshooting

- Not enough cover
- Forgetting to lance the rumen
- Avoid driving on the pile/base
Carcass Composting Steps

4. Let sit 4 – 6 months

Well stacked piles should heat up in 12 – 24 hours

Month 1 – Cooked Meat

Month 2 – Meat is Digested

Month 3-4 – Clean Bones

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5 Use the Composted Material

Reuse Bones and Un-composted Material
Research on Mortality Composting

- Pathogens are deactivated via high temperatures, microbial degradation, pH and other factors.
- Using a static pile method reduces the volume of leachate and soil filtration reduces concentrations of contaminants, limiting the risk of groundwater contamination.
- When managed properly, composting will deter domestic and wild animals from scavenging on treated carcasses while they contain the highest drug concentrations providing an effective means of disposal of euthanized livestock.
- On-farm composting reduces the potential for farm-to-farm disease transmission with the benefit of a usable product.
Mortality Composting

Materials address composting as a method to manage livestock mortalities (including mass mortalities resulting from avian influenzas), butcher wastes and road killed animals. Also developed is a searchable map of US Mortality and Butcher Waste Disposal Laws.

Horse Mortality: Carcass Disposal

- Go illustrated fact sheet "Horse Mortality: Carcass Disposal Alternatives" addressing disposal options for your horse. 2012.
- 6-minute video "Natural Rendering for Horses: Composting Horse Mortality" shows how to properly compost a dead horse. Download or view on YouTube. 2012.

Natural Rendering: Composting Livestock Mortality & Butcher Waste

- 12p illustrated fact sheet describing the process, cautions, problems, biosecurity issues, economics and more. 2002.
- 20-minute video describes mortality and butcher residual composting featuring eight operations. Download in English or Spanish, 2002.
- A set of 3 posters (English and Spanish) has been developed for educators:
  - Key Points of Static Pile Butcher Residual Composting. (English PowerPoint or PDF and Spanish PowerPoint or PDF) 2002.
  - Key Points of Static Pile Carcass Composting. (English PowerPoint or PDF and Spanish PowerPoint or PDF) 2002.
  - Potential Environmental and Biosecurity Risk of Dead Animal Disposal. (English PowerPoint or PDF and Spanish PowerPoint or PDF) 2002.
- On-Site Composting of Meat By-Products. 15p final report of a project exploring the economic viability and technical obstacles to on-site composting of meat by-products. 2004.

Composting Road Kill

- 12p illustrated fact sheet (PDF) on the "how to" of composting road kill deer. 2007.
Questions?

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