Mortality as Part of a Comprehensive Nutrient Management Plan (CNMP)

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NRCS Practice Standard
Animal Mortality Facility (Code 316)

- Reduce impacts to surface and groundwater resources;
- Reduce the impacts of odors;
- Decrease the spread of pathogens.
Carcass Composing

In General

• Practical for all sizes of carcasses, including whole cattle.
• “Farming Microorganisms”
  • Providing optimum conditions for microbes to do the real work.
  • Temperature Management is critical
• Takes 2-12 months, depending on mortality size & conditions.
• Converting organic matter into fine-particle humus-like material.
• Nutrients & organic matter in finished product can benefit crop, hayland, pasture and forest.

Composting Process

Conservation Plan for Animal Mortality Facility

• Site Plan Map of livestock operation, including the planned facility location
  • Practice Unit Estimates
  • Structural Details of All Components
• Soils map & soils description; Topography Map
  • Sensitive Areas & Setbacks
• Number and Capacity of Facility (estimated mortality) – Show Calculations
• Nutrient Management for Final Compost
• Operation and Management Requirements
• Record Keeping
• Odor Management or minimization requirement
Site Guidelines
Resource Concerns & Regulatory Requirements

• Surface Water Quality
  • Leachate Control (DEQ)
  • Runoff Control
• Ground Water Protection
  • 3 Feet above Ground Water
  • Seepage Control
    • Concrete, compacted clay liner
• Biosecurity
• Public Perception
• Traffic
• Regulatory Requirements maintain applicable setbacks as designated by
  • NE Dept. of Ag (NDA).
  • NE Dept. of Environmental Quality (NDEQ)

Area Requirements
Footprint & Sizing

Bins and Bunkers
• Made from hay bales, treated wood, metal and/or concrete
• Roofed or open – may be influenced by U.S. location.
• Smaller footprint
• Bales may absorb runoff – if any
• Less Visual Nuisance

Windrows & Piles
• Generally require more land space
• Largest physical footprint
• If composting is not properly managed, then prone to:
  • Scavengers
  • Visually Unattractive
• Lowest Capital Costs

Invessel
• Requires less space than Windrows & Piles, a little less than bins/bunkers.
• Good process control because of Self Containment
• Covered Structure
• Higher Capitol Costs
• Careful management required.
### Nutrient Management (Code 590)

- Nutrient Value of Compost
- Cropping History – Crop Rotation, Tillage, Yields, Soil Test Reports
- Budget - Estimate Cropland Requirements & Application Rates
- Land Application Sites
  - Control/Ownership
  - Site Aerial Site Maps, Soils Maps, Location of Sensitive Areas
- Risk Assessments – N & P
- Equipment – Loaders/Spreaders
  - Annual Calibration of Spreaders
- Sampling Protocols
  - Soil
  - Compost – final Product

### Nutrient Value

<table>
<thead>
<tr>
<th></th>
<th>General - Mortality Composting</th>
<th>Poultry Composting (with poultry litter)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lb./Ton</td>
<td>%/Ton</td>
</tr>
<tr>
<td>Total nitrogen (N)</td>
<td>20 lbs./T</td>
<td>1.0%</td>
</tr>
<tr>
<td>Ammonium-N</td>
<td>4 lb./T</td>
<td>0.2%</td>
</tr>
<tr>
<td>Organic-N</td>
<td>16 lb./T</td>
<td>0.8%</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>2 lb./T</td>
<td>0.1%</td>
</tr>
<tr>
<td>Potassium</td>
<td>6 lb./T</td>
<td>0.3%</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>In General</th>
<th>N%,-P%,-K%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lbs. / Ton</td>
<td>16-2-6</td>
</tr>
<tr>
<td>Poultry Litter</td>
<td>2%-1%-1%</td>
</tr>
<tr>
<td>Lbs. / Ton</td>
<td>28-20-25</td>
</tr>
</tbody>
</table>

If Broadcasting, No Incorporation
ESTIMATING QUANTITIES

BEEF - 12 cu ft per 1200 lbs of dead or 1 cu ft of carbon source for each per 100 lbs. of carcass. (Remember 1 cu yard = 27 cu ft)

Calculate pounds of startup = (Annual pounds of deads divide by 1000) multiple by 12.0 cu yards. To convert to cubic feet, multiply by 27.

<table>
<thead>
<tr>
<th>Annual pounds of dead</th>
<th>1,200</th>
<th>× 1000 x 12.0 cu yd =</th>
<th>12.0 cu yd of compost over</th>
<th>324.0 cu ft of compost over</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round bales of corn stover needed (1 bale = 140 cu ft)</td>
<td>2.3</td>
<td>Round bales average 1200 lb</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1200# beef + 2.3 bales (at 1200#) = 3690# - Assume 50% degradation = 1845 lb. compost to apply at 16-2-6 lbs N-P-K (or a bit less).

Record Keeping

- Mortality
  - Mortality Date, Cause of Death, Type of Animal & Weight, Date entered into Facility.
- Composting Process (with dates)
  - Composting Recipe – Bed layer depth, cover depth, etc.
  - Carbon source
  - Temps (if taken)
  - Turning
  - Moisture content
- Sampling Finished Compost
  - Ammonium-N, Organic-N, Total N, P, K, moisture
  - Pathogens – not required ($$$)
- Nutrient Budget & Actual Crop/Yield
  - Soil Sampling
- Actual Application
  - Date, Amount Applied and/or Application Rate, Application Method, Location, and Nutrient Value Applied
Definitions

- **Livestock Carcasses** means dead bodies of cattle, swine, sheep, horses, mules, goats, domesticated cervine animals, ratite birds and poultry, or the parts of.

- **Completely Composted** means to have a carcass or carcass parting in a composting facility until there is no visual sign of soft tissue or bones which have not demineralized before spreading on land.

**Composting Facility Operations – O&Ms**

- Ensure that the livestock carcasses are not visible from public roads or habitable structures;
- Begin processing with 24 hours of death;
- Keep livestock carcasses in the composting facility until completely composted before spreading on land;
- Remove all “finished compost” within 12 months of the completion of the compost process.

State LWCF Permits

How will this affect my NDEQ permit?

- Minor Modification of NDEQ permit
  - Submit Addendum to NDEQ & include:
    - Use NDEQ Normal Morality Form or equivalent,
    - Include Map indicating location of compost facility,
    - Provide Nutrient Value of Estimated Compost Volume and land requirements.

- NO FEE REQUIRED for Addendum
The End – Questions???