Georgia's Composting Recipes
Poultry Mortality Facility

Planning considerations for poultry mortality composting facility.

1. Composting facility should be located as near to the source of poultry mortality as practical.

2. Reliable source of carbon and nitrogen material (poultry litter, straw, peanut hulls, etc.).

3. All runoff should be diverted from the facility.

4. The mortality composter will not be designed to process poultry from other farms.

Permit Requirements

Federal, State and Local laws:
All methods for the disposal of dead animal carcasses require permits from Georgia Department of Agriculture. The design of poultry mortality composting facility will adhere to all state and local laws, rules, and regulations. The producer/landowner will be responsible for securing necessary permits to install composting facility and for maintaining, operating and managing the composter.

A permit is required from the state veterinarian before construction of the composting facility. The following information must be submitted to obtain individual permits for the composter.
1) Owner's name and address
2) Exact location; longitude and latitude as well as map.
3) Size and type of poultry operation.
4) Construction plans (drawings) for composter.
5) Any existing disposal permit number(s).

Submit information to:
State Veterinarian
Asst. Commissioner of Animal Industry
Georgia Department of Agriculture
Capitol Square
19 Martin Luther King, Jr. Drive
Atlanta, Georgia, 30334-4201.

Carbon-Nitrogen Ratio.

For mortality composting to work, the two agents, a nitrogen source (poultry carcasses and poultry litter) and a carbon source (straw, wood shavings, or peanut hulls), must be present in the correct ratio. In addition, an aerobic environment must be maintained for optimum microorganism growth. When all agents are combined the temperature increases (greater than

140 degrees F.) and the poultry carcasses are decomposed to produce water vapor, carbon dioxide, nitrogen and carbon. The 140 degree F. plus temperatures of the composting system will destroy disease-causing organisms, thus making it a sanitary method of mortality disposal.

As a part of the two-stage mortality composting process, the recipe should be followed carefully until it has been determined the process is working will.

The "Original" Recipe

Carcass	1.0 Pound
Poultry Litter	1.2 Pounds
Straw	0.1 Pound
Water	0 to 0.5 Pound

(Water is added as needed
to maintain proper moisture content).

Alternative Recipes and mixes for mortality composting are being developed with varying degrees of success. It is recommended that the mortality composter be operated for one year using the original recipe and layering procedure.

Moisture Control

The moisture content of the compost mixture is extremely important. Too wet and the mixture will become anaerobic and produce undesirable odors. Being too dry will cause the carcasses to dehydrate and not decompose. The amount of water will need to be carefully monitored. The producer will have to adjust the water based on the wetness or dryness of the litter. The general procedure is to add a very small quantity of water initially for dry litter or none at all for "cake" or crusting litter. Then if the temperatures don't rise to the 140-160 degree range, water is added to the top layer in small quantities. As the mixture is turned into secondary treatment, the moisture content will need to be carefully evaluated. Again, add water in small quantities, if needed.

The conversion from weight to volume is 0.5 lbs. of water equals one cup or 1/2 pint.

Structural Design

Material and structural design of the mortality composting facility shall conform to the requirements of state and local building codes. Details of material requirements must be determined by the designer on a case by case basis.

Composters can vary considerably and perform well; however, all good composters have certain common features:

A. Roof: While composting of some materials may be done in the open, it does not work with mortality composts. A roof ensures year round operation, and controls rain water and percolation, which can be major problems. A roof overhang of two feet with guttering is recommended if compost bins are located on the sides of the building.

B. Concrete Floor and Apron: This is critical to all-weather operation, secures the composter against rodents, dogs, etc., and prevents contamination of the surrounding area. Apron length should correspond to the equipment used to handle the compost.

C. Rot-Resistant Building Materials: Pressure-treated lumber resists the biological activity of composting. Pressure treatment lumber, or a similar material, shall be specified.

Size Determination

Primary and secondary composting, as well as storage for the poultry litter, straw and finished composted material, require a roof cover and concrete floor. The area provided shall be adequate for all stages of composting as well as storage areas for straw and litter material used in the composting layers and the composted materials.

The size of the composter is dependent on the quantity of mortality to be composted. Farm mortality records can be used as a basis for mortality calculations. In lieu of actual mortality records, Table 1 can be used to size the composter.

Total primary bin volume is determined by using the following formula:

$Vol = B \times (M/T) \times W_B \times f$

Where:

Vol = Total primary bin volume (cub. ft)
B = Number of bird per flock
M = Loss rate (as a decimal)
T = Flock life (days)
W_B = Average market weight of bird (lb)
*f = Volume factor = 1.5 to 2.5

**volume factor is based on local conditions, experiences, and management skills of operator.*

The total primary bin volume is divided by the volume of each bin to determine the number of bins (rounded to the nearest whole number).

In all cases poultry mortality composting facilities shall have a minimum of two (2) primary bins regardless of the size of the operation.

Secondary bin volume will be 80 to 100% of the primary bin volume. The secondary volume may be one large bin or several smaller ones.

Storage capacity for compost that has gone through the secondary process, as well as storage for poultry litter, straw and other supplies, shall be designed into the poultry mortality composting facility. Required storage will vary greatly depending on how the compost will be utilized and removed from storage. It is recommended that the storage volume for the compost be equal to the volume generated by the mortality composter for a three to six month period. The volume for poultry litter storage should be equal to the volume needed to operate the mortality composter for 1) one year for an annual clean out cycle or; 2) the length of time between clean outs of the poultry house such that the stored litter is replenished 4 to 6 times per year.

Loading the primary composter

For the primary (first stage) composting, the material is placed in the bins in layers according to the following sequence (See figures 10-37 and 10-38 in Chapter 10 of the Agricultural Waste Management Field Handbook).

1. One foot of dry litter will be placed on the floor of the bin. This litter layer is not a part of the recipe. An extra thick (approximately 6 inches) layer of loose straw is placed on top of the litter to aid aeration under the carcass.

2. Place carcasses in a single layer on the litter mat, completely cover the carcasses with the correct amount of litter. (Do not leave any part of a carcass exposed even if extra litter must be added). Do not place carcasses or carcass parts within 6 inches of the bin sidewalls.

3. Water may not be needed in the primary bin. If water is needed, sprinkle lightly onto the carcasses at a rate of about 0.25 pounds (1/2 cup) per pound of carcass.

This completes the first batch.

4. The next batch starts with a layer of straw, then a single layer of carcasses, then a layer of poultry litter. Each layer is proportioned in accordance with the recipe.

5. Continue the layering until the bin is filled. Monitor the temperature in the bin as it is filling. Temperatures should continually exceed 125 to 130 degrees F. They may be as high as 160 degrees.

6. Partial layers shall be covered with litter that day. The remaining portion of the layer can be filled and covered the next day.

7. Cap off bin with a 4-inch thick layer of litter.

<u>Alternative recipe and layering procedure for primary composter</u>

Hot litter

The term"hot litter" was coined by Dr. Stan Savage, Extension Poultry Scientist, University of Georgia to describe a process of activicating (growing) bacteria in poultry litter. Litter freshly removed from a broiler house may have billions of bacteria per pound. Three weeks later the number can be reduced to millions per pound and possibly to hundreds per pound by 6 weeks following removal and storage.

To sustain a high number of bacteria a 6 to 10 day supply of litter to be used in the primary composting bins is stockpiled separate from the bulk of stored dry litter. Water is added to the "hot litter" stockpile until the moisture content is 40 to 60 percent. As "hot litter" is used in the composting process, dry litter is mixed into stockpile and water added as needed to maintain the moisture content. It is recommended that the dry litter be added and mixed on a daily basis to keep uniform moisture and adequate oxygen for maximum bacterial growth.

The temperature of the "hot litter" should be in the 120 degrees F. range.

All water needed in the entire composting process is added to the "hot litter" stockpile. The following is a empirical test to assess the moisture content of the "hot litter". Gloves or hand protection are recommended. A small ball (handfull) of "hot litter" is squeezed in the hand. 1) If liquid drips out, it is too wet. Dry litter is added to the "hot litter" stockpile, mixed thoroughly and tested again. 2) If the "hot litter" crumbles or breaks completely apart when the hand is opened, it is too dry. Water is added to the "hot litter" stockpile, mixed thoroughly and tested again. 3) If the "hot litter" remains in tact or breaks into 2 or 3 large pieces when the hand is opened, the moisture content is adequate.

Loading of Primary Composter

For the primary (first stage) composting utilizing "hot litter", the material is placed in the bins in layers according to the following sequence:
1) A base layer of dry litter 8-12 inches is placed on the bin floor.
2) A single layer of carcasses is placed on the base layer, keeping them 6 inches from any wall.
3) Cover the layer of carcasses with a layer of "hot litter" 1.5 to 2 times the thickness of the carcass layer.
4) Repeat the single layer of carcasses and "hot litter" layer until the primary bin is filled.
5) Partial layers shall be covered with "hot litter" that day. The remaining portion of the layer can be filled and covered the next time carcasses are added to the bin.
6) Cap off the bin with a 4 inch thick layer of dry litter.

After the temperature rises and drops, as with the "original" recipe, the mixture is moved to a secondary treatment area for additional composting and decompostion.

Monitoring Temperatures

After a primary bin is capped off, temperatures should be monitored daily. A 30-36 inch probe-type thermometer is used for this purpose.

Temperatures will reach 140-160 degrees in 7 to 10 days after capping. If temperatures do not reach 140 degrees, small adjustments must be made in the process to achieve proper composting in the next batch. Adjusting the moisture content, more water or less water, or adjusting the carbon-nitrogen ratio are two of the more easily made adjustments that radically affect the process.

Temperatures should reach at least 140 degrees to kill fly larvae and kill most pathogens. If the temperature does not reach 140 degrees, the mixture needs to be recomposted. If the temperature exceeds 190 degrees and is rising, remove the material from the compost bin and cool it.

The material should be moved to the second stage after the appropriate time (10-14 days) and temperatures (140-160) have been achieved and begin dropping. Moving the material aerates the mixture and revives the bacteria, allowing them to begin another cycle of heating. Temperature should rise again and peak in 7 days.

Aeration and Moving Compost Mixture to Secondary Treatment

The purpose of moving the product from primary treatment to secondary is to mix and aerate the compost so that a more complete breakdown of the carcasses occurs. The compost mixture should “cascade” from the loader bucket to provide good turning and aeration as it is deposited in the secondary treatment area. Delayed movement, poor aeration, poor mixing or improper moisture will cause the compost not to re-heat properly.

When turning the mixture into the secondary bin, any large bones or other carcass parts found in the mix shall be removed and placed in a primary bin for recomposting.

Carefully analyze the need for water as the compost mixture is moved into secondary bin(s) for another heating cycle. After the temperature determined by daily monitoring drops about 20 degrees F. (10-14 days) the compost should be moved to a storage area to await its use as a fertilizer. Although the compost material can be land applied after secondary treatment, it should be stored under roof and allowed to “rest” and dry for at least 30 days. Drying of the compost in storage will facilitate handling and spreading. In moving from secondary treatment, any large bones shall be removed and placed in a primary bin for recomposing. Large bones may damage or clog the spreading equipment and result in complaints by the citizenry.

Recomposting of the mixture

When a bin fails to achieve proper temperatures, the entire mixture needs to be recomposted. Recomposting of an entire bin is best accomplished by correcting the cause of the low temperatures (drying the mixture, moistening the mixture, adding or changing carbon source, adjusting nitrogen source). The mixture should be placed in a primary bin for ease of monitoring temperatures. The temperature of recomposting should be monitored just as initial composting. When the 140 degrees or higher temperature is reached and drops, the mixture should be turned into a secondary bin for further treatment.

If carcass parts or bones are observed after primary or secondary treatment, they should be placed in a layered (first stage) primary bin with new carcasses for recomposting and decomposition.

Land Application of Mortality Compost

Land application of mortality compost shall be at recommended agronomic rates in accordance with NRCS Practice Standard 590 - Nutrient Management. The nutrient requirements for any particular crop should be based on a current soil test and realistic yield expectations.

Approximately 70 percent of the total nitrogen in poultry mortality compost is in organic form, the compost will act as a slow release fertilizer. This characteristic of compost allows better utilization of the nitrogen by the crop and also reduces the potential for movement to surface or ground waters.

Poultry mortality compost is relatively moist. The selection of application equipment will need to account for this condition of mortality compost. The application equipment will need to be calibrated frequently to insure proper application rate.

Application of the mortality compost will consider prevailing winds, neighboring dwellings, proximity to water courses and visual effects.

Maintaining the Structure

The compost structure should be inspected at least twice each year when the bins are empty. Wooden parts or hardware that has deteriorated should be replaced. Patch concrete floors, aprons, and curbs as necessary to assure water tightness. Roof structures should be examined for structural integrity and repair. Access to the composting facility should be maintained as an all-weather road for use during adverse weather periods. Roads should be free of potholes, crowned in the middle, and have drainage on each edge.

Trouble Shooting

The following list of problems and solutions was prepared by Dr. Stan Savage, Extension Poultry Scientist, University of Georgia.
Indications of composting improperly:

1) Temperature not rising to or above 135 degrees F.
   a) Moisture levels wrong
   b) Dead litter (low initial bacteria count)
   c) Lack of oxygen

2) Temperature rising above 160 degrees F.
   a) Everything correct **BUT** too much oxygen in the compost. Be careful: spontaneous combustion can occur at a temperature slightly above 160 degrees F.
   b) If temperature is excessive, you may have to move the mass out of the composting house to prevent a fire that will destroy your building.

3) Fly problems and possibly maggots.
   a) Composting too slow to start (temperature too low) 95-100 degrees F for fly production.
   b) Refer to number 1.

4) Weeping - moisture loss out the sides of the composter.
   a) Too much moisture
   b) Poor procedure for adding moisture (wet and dry spots)

5) Poor breakdown of carcasses.
   a) Refer to number 1.
   b) Carcasses closer to the cool walls or too many dead birds placed in a layer.

REFERENCES

NRCS Agricultural Waste Management Field Handbook, Chapter 10
NRCS Conservation Practice Standards
Code 312 - Waste Management System
Code 313 - Waste Storage Facility
Code 590 - Nutrient Management
Alabama Poultry Waste Utilization and Facility Design Workbook
Georgia Farm*A*Syst - Composting Poultry Mortality

Table 1. Poultry data for calculating primary bin volume, if producer or local data is not available.

Poultry Type	(M) Loss Rate	(T) Flock Life (Days)	Cycles Per Yr.	(W_B) Avg. Mkt. Wgt. (Lbs.)
Broiler	.045-.055	42-49	5.5-6	4.2
Roasters				
Females	.05	42	4	4.0
Males	.08	70	4	7.5
Laying Hens	.14	420-455	0.9	4.5
Breeding Hens	.2	280-315	0.9	10
Breeders Male	.2-.25	280-315	1.1	15
Turkey Female	.05-.06	91-98	3	14
Turkey Lgt. Tom	.09	112	3	24
Turkey Feather Production	.12	126	2.5	28-32

Primary Bin Volume (cubic feet) = Number of Birds x ($^{\text{Loss Rate}}/_{\text{Flock Life}}$) x Average Market Weight of Bird x Volume Factor.

Composting
Swine Mortality Facility

Planning considerations for swine mortality composting facility.

1. Composting facility should be located as near to the source of swine mortality as practical.

2. Reliable source of carbon and nitrogen material (poultry litter, straw, peanut hulls, etc.).

3. All runoff should be diverted from the facility.

4. The mortality composter will not be designed to process swine from other farms.

Permit Requirements

Federal, State and Local laws:
The design of swine mortality composting facility will adhere to all state and local laws, rules, and regulations. The producer/landowner will be responsible for securing necessary permits to install composting facility and for maintaining, operating and managing the composter.

A permit is required from the state veterinarian before construction of the composting facility. The following information must be submitted to obtain individual permits for the composter.

1) Owner's name and address
2) Exact location; longitude and latitude as well as map.
3) Size and type of swine operation.
4) Construction plans (drawings) for composter.

Submit information to:

State Veterinarian
Asst. Commissioner of Animal Industry
Georgia Department of Agriculture
Capitol Square
19 Martin Luther King, Jr. Drive
Atlanta, Georgia, 30334-4201.

Carbon-Nitrogen Ratio.

For mortality composting to work, the two agents must be present in the correct ratio: a nitrogen source (swine carcasses and poultry litter) and a carbon source (straw or peanut hulls). In addition, an aerobic environment must be maintained for optimum microorganism growth. When all agents are combined the temperature increases (greater than 140 degrees F.) and the swine carcasses are decomposed to produce water vapor, carbon dioxide, nitrogen and carbon. The 140 degree F. plus temperatures of the composting system will destroy disease-causing organisms, thus making it a sanitary method of mortality disposal.

As a part of the two-stage mortality composting process, the recipe should be followed carefully until it has been determined the process is working will.

Table A

For Pigs or Hog Parts Weighing
50 pounds or less

Carcass	1.0 Pound
Poultry Litter	1.5 Pounds
Straw	0.1 Pound
Water	0.25 to 0.5 Pound

Table B

For Pigs or Hog Parts Weighing
More Than 50 Pounds and
Less Than 100 Pounds

Carcass	1.0 Pound
Poultry Litter	2.0 Pounds
Straw	0.1 Pound
Water	0.35 to 0.65Pound

Table C

For Hogs Weighing Over
100 Pounds

Carcass	1.0 Pound
Poultry Litter	2.5 Pounds
Straw	0.15 Pound
Water	0.4 to 0.65 Pound

Moisture Control

The moisture content of the compost mixture is extremely important. Too wet and the mixture will become anaerobic and produce undesirable odors. Being too dry will cause the carcasses to dehydrate and not decompose. The amount of water will need to be carefully monitored. The producer will have to adjust the water based on the wetness or dryness of the litter. The general procedure is -- add a very small quantity of water initially for dry litter or none at all for "cake" or crusting litter. Then if the temperatures don't rise to the 140-160 degree range, water is added to the top layer in small quantities. As the mixture is turned into secondary treatment, the moisture content will need to be carefully evaluated. Again, add water in small quantities, if needed.

The conversion from weight to volume is 0.5 lbs. of water equals one cup or 1/2 pint.

Structural Design

Material and structural design of the mortality composting facility shall conform to the requirements of state and local building codes. Details of material requirements must be determined by the designer on a case by case basis.

Composters can vary considerably and perform well; however, all good composters have certain common features:

A. Roof: While composting of some materials may be done in the open, it does not work with mortality composts. A roof insures year round operation, and controls rain water and percolation, which can be major problems. A roof overhang of two feet with guttering is recommended if compost bins are located on the sides of the building.

B. Concrete Floor and Apron: This is critical to all-weather operation, secures the composter against rodents, dogs, etc., and prevents contamination of the surrounding area. Apron length should correspond to the equipment used to handle the compost.

C. Rot-Resistant Building Materials: Pressure-treated lumber resists the biological activity of composting. Pressure treatment lumber, or a similar material, shall be specified.

Size Determination

Primary and secondary composting, as well as storage for the poultry litter, straw and finished composted material, require a roof cover and concrete floor. The area provided shall be adequate for all stages of composting as well as storage areas for straw and litter material used in the composting layers and the composted materials.

The size of the composter is dependent on the quantity of mortality to be composted. Farm mortality records can be used as a basis for mortality calculations. Heavy feeders, sows and boars should be loaded into the primary bins at a rate of five pounds per cubic foot. Nursery

pigs and small feeder pigs can be loaded into primary bins at a rate of eight pounds per cubic foot.

The following are average losses based on three percent mortality. Use farm records to verify mortality rate.

Farrow operation - average loss per year per 100 sows is 3000 pounds (1200 pounds of sows, boars, and gilts; 600 pounds of fetus; 800 pounds of pigs weighing less than 20 pounds) or one primary bin (6'x8'x5' or 240 cu.ft.) per 150 sow capacity.

Feeder operation - pigs weighing 10 pounds to 50 pounds - average loss per year per 100 head is 625 pounds or one primary bin (6'x8'x5' or 240 cu.ft.) per 800 head capacity.

Finish operation - pigs weighing 50 pounds to 220 pounds average loss per year per 100 head is 1177 pounds or one primary bin (6'x8'x5' or 240 cu.ft.) per 625 head capacity.

In all cases swine mortality composting facilities shall have a minimum of two (2) primary bins regardless of the size of the operation.

Secondary bin volume will be 80 to 100% of the primary bin volume. The secondary volume may be one large bin or several smaller ones.

Storage capacity for compost that has gone through the secondary process, as well as storage for poultry litter, straw and other supplies, shall be designed into the swine mortality composting facility. Required storage will vary greatly depending on how the compost will be utilized and removed from storage. It is recommended that the storage volume for the compost be equal to the volume generated by the mortality composter for a three to six month period. The volume for poultry litter storage should be equal to the volume need to operate the mortality composter for 1) one year or 2) the length of time between poultry house cleanouts such that the litter is replenished periodically throughout the year.

For the primary (first stage) composting, the material is placed in the bins in layers according to the following sequence (See figure 1).

1. Prepare a mat of litter and straw in the bottom of a bin about two days before adding carcasses. The mat should be about 15 inches deep, with alternating layers of litter and straw (2 layers each). This should begin to preheat before adding swine carcasses.

2. Place carcasses in a single layer on the preheated litter mat, completely cover the carcasses with the correct amount of litter. (Do not leave any part of a carcass exposed even if extra litter must be added). Do not place carcasses or carcass parts within 12 inches of the bin sidewalls.

3. Water may not be needed in the primary bin. If water is needed, sprinkle lightly onto the carcasses at a rate of about 0.25 pounds (1/2 cup) per pound of carcass.

This completes the first batch.

4. The next batch starts with a layer of straw, then a single layer of carcasses, then a layer of poultry litter. Each layer is proportioned in accordance with the appropriate recipe for the size of swine.

5. Continue the layering until the bin is filled. Monitor the temperature in the bin as it is filling. Temperatures should continually exceed 125 to 130 degrees F. They may be as high as 160 degrees.

6. Partial layers hall be covered with litter that day. The remaining portion of the layer can be filled and covered the next day.

7. Cap off bin with a 4-inch thick layer of litter.

Operation of Swine Mortality Compost System

Because of the difference in size of carcasses and the longer time needed to compost the big carcasses, the primary bins should be designated for large hogs or for pigs.

Properly managed primary bins loaded with small pigs and light weight (< 100 pounds) hog carcasses can be turned into the secondary bin in about 60 days after the primary bin is capped off.

Heavy feeders (>100 pounds), sows, gilts and boars should stay in the primary bins at least 90 days after the bin is capped off.

When turning the mixture into the secondary bin, any large bones or other carcass parts found in the mix shall be removed and placed in a primary bin for recomposting.

Carefully analyze the need for water as the compost mixture is moved into secondary bin(s) for another heating cycle. After 90 to 120 days in the secondary bin, the compost should be moved to the storage area for another 60 days. In moving from secondary to storage any large bones shall be removed and placed in a primary bin for recomposing.

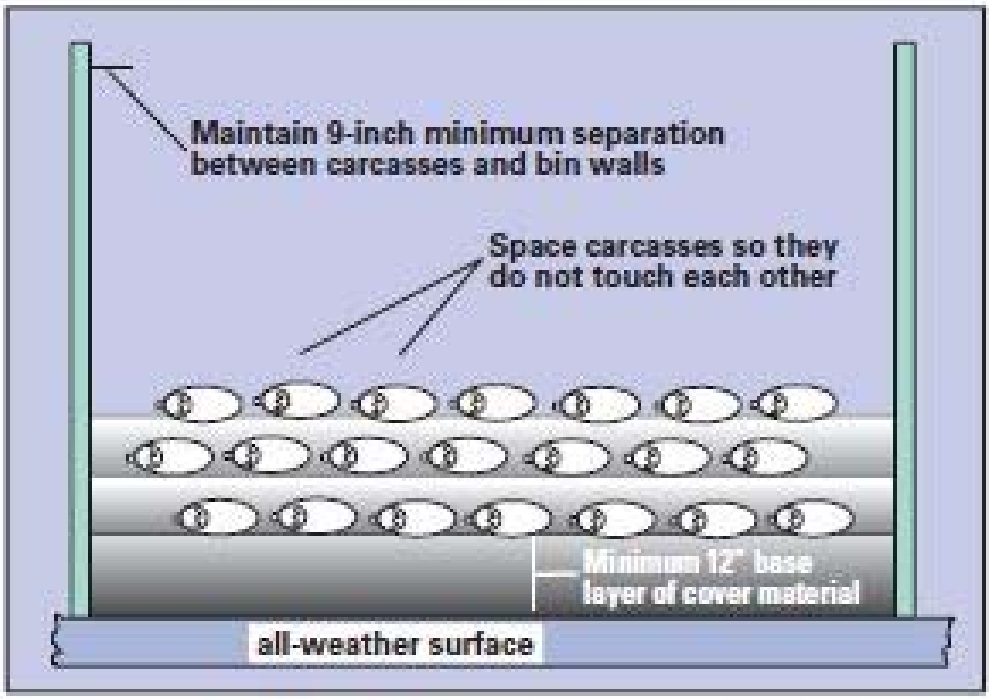

Figure 1 -- Typical layering of swine primary compost bin.

Monitoring Temperatures

After a primary bin is capped off, temperatures should be monitored daily. A 30-36 inch probe-type thermometer is used for this purpose.

Temperatures will reach 140-160 degrees in 7 to 10 days after capping. If temperatures do not reach 140 degrees, small adjustments must be made in the process to achieve proper composting in the next batch. Adjusting the moisture content, more water or less water, or adjusting the carbon-nitrogen ratio are two of the more easily made adjustments that radically affect the process.

Temperatures should reach at least 140 degrees to kill fly larvae and kill most pathogens. If the temperature does not reach 140 degrees, the mixture needs to be re-composted. If the temperature exceeds 190 degrees and is rising, remove the material from the compost bin and cool it.

The material should be moved to the second stage after the appropriate time (60-90 days) and temperatures (140-160) have been achieved and begin dropping. Moving the material aerates the mixture and revives the bacteria, allowing them to begin another cycle of heating. Temperature should rise again and peak in 7 days.

Re-composting of the mixture

When a bin fails to achieve proper temperatures, the entire mixture needs to be re-composted. Re-composting of an entire bin is best accomplished by correcting the cause of the low temperatures (drying the mixture, moistening the mixture, adding or changing carbon source, adjusting nitrogen source). The mixture should be placed in a primary bin for ease of monitoring temperatures. The temperature of re-composting should be monitored just as initial composting. When the 140 degrees or higher temperature is reached and drops, the mixture should be turned into a secondary bin for further treatment.

If carcass parts or bones are observed after primary or secondary treatment, they should be placed in a layered (first stage) primary bin with new carcasses for r-composting and decomposition.

Land Application of Mortality Compost

Land application of mortality compost shall be at recommended agronomic rates in accordance with NRCS Practice Standard 590 - Nutrient Management. The nutrient requirements for any particular crop should be based on a current soil test.

Approximately 70 percent of the total nitrogen in swine mortality compost is in organic form, the compost will act as a slow release fertilizer. This characteristic of compost allows better utilization of the nitrogen by the crop and also reduces the potential for movement to surface on ground waters.

Swine mortality compost is relatively moist. The selection of application equipment will need to account for this condition of mortality compost. The application equipment will be needed to be calibrated frequently to insure proper application rate.

Application of the mortality compost will consider prevailing winds, neighboring dwellings, proximity to water courses and visual effects.

Maintaining the Structure

The compost structure should be inspected at least twice each year when the bins are empty. Wooden parts or hardware that has deteriorated should be replaced. Patch concrete floors, aprons, and curbs as necessary to assure water tightness. Roof structures should be examined for structural integrity and repair. Access to the composting facility should be maintained as an all-weather road for use during adverse weather periods. Roads should be free of potholes, crowned in the middle, and have drainage on each edge.