



# Cornell Waste Management Institute

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## Horse Mortality: Carcass Disposal Alternatives

*Part I. Disposal Options • Part II. Composting: Natural Rendering*

### ***Being Prepared for the Worst: Develop a Health Care Plan for Your Horse “A Living Will For Your Horse”***

Anyone who has ever loved a horse understands the feelings of guilt and helplessness following injury or illness of an animal. When acquiring ownership, you assume responsibility for the health and welfare of your horse. In some cases you will be faced with making a life-or-death decision about your horse. After assessing the severity of the case, many times the kindest thing you can do for a horse that is so sick, injured, old, lame or dangerous is to have your veterinarian humanely induce death. You need to have a plan for your horse and yourself. This plan should be discussed with other family members and your veterinarian, trainer or friends. Before disaster hits evaluate each horse and logically decide how and what you want done. Assume you are leaving for a vacation far away and you are leaving explicit instructions on what to do in

case of emergencies. Economic, emotional, and space or skill limitations may force an owner to make difficult decisions. Work out a disaster plan for your horse(s), write it down and pull it out when disaster hits.

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### *Part I. Disposal Options*

## ***Sound Disposal of Equine Carcasses***

### **What are the Options?**

After your horse dies, disposal should be done in a manner that is most acceptable to the owner, protects public health and safety, prevents adverse effects on water and air quality, does not create a nuisance, and prevents the spread of disease. For horses, there are several options that can be carried out either on or off-site.



## On-site Options

**Composting** your horse on-site, is cost effective, environmentally sound, biosecure and easy to accomplish. Enveloping your animal right away in a properly built compost pile will deter domestic animals and wildlife from scavenging. It will also provide you with a soil-like material you can use to plant a tree in memorial to your horse. In many states, on-site composting is not only legal it is the preferred disposal method, providing certain guidelines are followed. It requires the use of carbon sources such as woodchips, which can be purchased or acquired from municipalities, road crews and utility companies, or carbon from on-farm. The composting site should be located in a well-drained area along field edges or other dry convenient areas away from wells and other water sources.

**Burial** on the owner's property is legal in most states, but must be done so that it will not contaminate or allow leachate to discharge into water supplies. Many states have prescribed setback distances from wells, adjacent property lines, other residences and streams, lakes or ponds. There may be a depth requirement, as well as a minimum amount of soil cover. Time restrictions may be in place, usually within 24 to 72 hours after death, especially when an animal is euthanized. It is important to keep domestic animals and wildlife from gaining access to the deceased animal. It may be necessary to hire a service or rent the proper equipment to perform on-site burial which can be expensive. In addition, even though it may be legal in your state, there may be local ordinances in place that restrict or limit burial, and some may require permission or a permit from an environmental agency, so it is best to check with your county or town prior to making plans for burial.

## Off-site Options

**Rendering**, if available in your area, is a great option for your horse. Renderers have served horse owners for over 100 years. Recent regulatory actions have changed the way horse products can be used by renderers, so the number of plants that are willing to

accept horses has decreased. Therefore, if rendering is an option you are considering, it is important to make sure that the facility you choose does in fact accept horses. There is a fee charged and there may be rules regarding drugs (the use of de-wormers, antibiotics and/or euthanasia agents).

**Burial and/or cremation.** There are cemeteries and crematories throughout the US that offer burial and/or cremation for horse owners. The crematories offer individual or communal cremation with the option of retrieval of the cremains. Many of these also offer pick-up service. Fees for these services will depend on location and services contracted. Incineration and also biologic digestion with or without return of the remains may be performed at some private veterinary practices, and at university veterinary schools and diagnostic laboratories.

**Fee for Services.** If there is an entity in your area that has created a business for carcass disposal, you may be able to contract for services. As the owner of the horse, you must know where and how it will be disposed and that it is a legal operation. If you pay someone to take a horse and it is disposed of illegally both parties are responsible and legal action can be taken. A business would have to have a permit and use proper composting techniques to accept your animal. For your protection, if you use such a service, you should have signed contracts in place with a statement of how and where your horse is being disposed.

**Landfilling** may be an option in some areas of the United States. There would be a fee involved and the owner would need to provide transportation or contract with a service to do so.

### A Note About Veterinary Pharmaceuticals:

In 2003, the Food and Drug Administration added an environmental warning to animal euthanasia products stating that "euthanized animals must be properly disposed by deep burial, incineration, or other method in compliance with state and local laws to prevent consumption of carcass material by scavenging wildlife." Properly built and managed compost piles are an "other method."

## Part II. Composting: Natural Rendering

### Natural Rendering of Horses Consider Composting

Over 900,000 horses have to be properly disposed of annually. The horse industry needs a convenient, socially, and environmentally acceptable, biosecure way of disposing of horses at the end of their lives.

Static-pile composting is being recommended as an easily managed carcass disposal method. By properly constructing the compost pile to allow for adequate natural aeration, mortality composting can be completed on intact animals without physically turning and mechanically aerating the pile. Degree and duration of temperatures achieved in static-pile composting are adequate to significantly reduce pathogen survival.

#### Why Compost Mortality?

- ◆ Pathogen kill occurs in thermophilic composts.
- ◆ Can be done any time of the year, even when the ground is frozen.
- ◆ Low cost and can be done with equipment available on most farms.
- ◆ Relatively odor free.
- ◆ All sizes of animals can be composted.

#### A Note About Euthanized Horses

If your horse has been euthanized with a drug such as sodium pentobarbital, care should be taken to dispose of the remains as quickly as possible. They will contain potentially harmful residues. Wildlife and domestic animals may be attracted by the carcass and become intoxicated or die if allowed to feed on it. Properly built compost piles will deter pets and wildlife from feeding on carcasses. Sodium pentobarbital has been shown to degrade during the composting process so that by the time composting is finished (within six months) very low levels of the drug remain.



*Horse being covered in woodchips.*

- ◆ Placental membranes and other tissue can be composted.
- ◆ Relatively low labor and management needed.
- ◆ It is environmentally safe to compost euthanized animals.

#### Composting in Static Piles

Static pile composting is pretty magical. The animal is enveloped in carbon-based material and left for months or years with no turning or work required. Static pile composting of dead, intact horses and livestock is a management practice that can fit into most livestock farms. The practice does require space on your land to construct the compost piles and takes from six to 12 months for the animal to decompose.

In this passively aerated system micro- and macro-organisms digest the animal and give off heat, which kills pathogens. The result is a coarse soil-like medium.

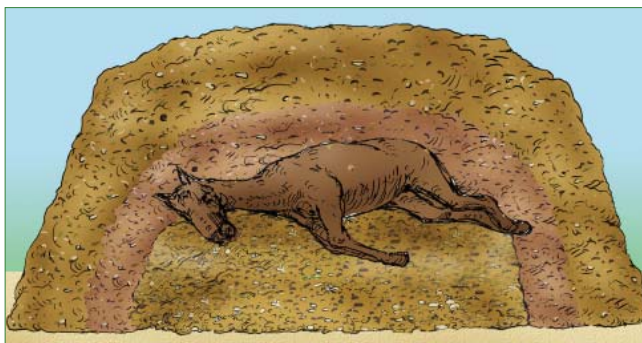
#### Make it Easier on Yourself and Plan Ahead

Secure coarse woodchips, shavings or other coarse carbon materials and stockpile them in a place you have determined is suitable for the procedure (away from wells, streams and other water sources). These can be stored for six to 12 months.

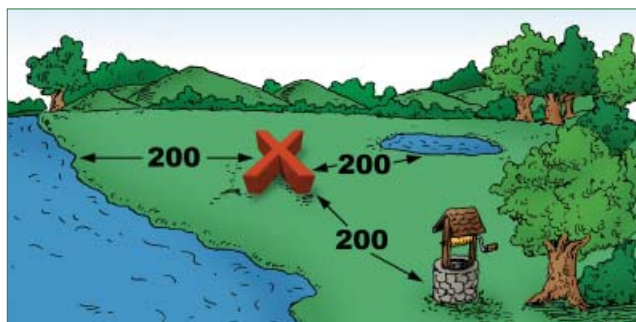


## Key Points of Static Pile Carcass Composting

- ◆ Select a site that is well drained, at least 200 feet from water courses, sinkholes, seasonal seeps, or other landscape features that indicate the area is hydrologically sensitive.
- ◆ Lay a 24-inch bed of bulky, absorbent carbonaceous material containing sizeable pieces 2-6 inches long. Utility and municipal wood chips work well. Ensure the base is large enough to allow for 2-foot clearance around the entire animal.
- ◆ Lay the animal in the center of the bed. If a horse needs to be euthanized and is able to walk, you may want to walk the animal onto the bed before the veterinarian administers the drugs. After it is determined that the animal is dead, lance the abdomen to avoid bloating. If skin is totally intact the animal will bloat and carbon, or cover material, may come off the pile and expose parts of the animal.
- ◆ Cover the animal with 24" of carbon material, making sure the whole animal is well covered. This will help to control odors, insulate heat generated by organisms in the pile and keep vermin or other unwanted animals out of the windrow.
- ◆ Leave the pile static for six months to one year; after that, the pile can be turned or combined with another pile. The full process will not be complete for about one year. In one year, you will still find large bones.
- ◆ The resulting soil-like material can be used on non-food crops, distributed in forested areas, to plant



Horse buried in a compost pile.



trees, etc. Note, this medium should not be used in vegetable gardens. Reuse the composted material for another carcass compost pile, or remove large bones and land apply (see Use of Finished Product and Bones, page 5).

- ◆ Site cleanliness is the most important aspect of composting; it deters scavengers, helps control odors, and keeps good neighbor relations.

## Monitoring

It is a good idea to keep a log of temperature, odor, unwanted animals, leachate (liquid that may come out of the pile), spills and other unexpected events. This will allow the composteer to see if sufficiently high temperatures were reached and adjust the process if there is a problem. In addition, odor can be an issue and compost piles are an easy target for complaints. When there is an odor problem, a pile may be blamed and may not be the cause. Monitoring of the pile is done mostly by checking temperatures. Internal compost pile temperatures affect the rate of decomposition as well as the destruction of pathogenic bacteria, fungi, and some seeds. The most efficient temperature range for composting is between 104°F and 140°F (40°C and 60°C). Compost pile temperatures depend on how much of the heat produced by the microorganisms is lost through aeration or surface cooling. During periods of extremely cold weather, piles may need to be larger than usual to minimize surface cooling. As decomposition slows, temperatures will gradually drop and remain within a few degrees of ambient air temperature. Temperature monitoring is crucial for managing the compost process. Thermometers with a 3-4 foot probe are available (see Temperature Probe Suppliers, page 6).



*Planting a tree with compost in memory of the horse.*

## Large Farm/Stable Operations

For large livestock farms/stables with the potential for multiple deaths annually, place animals enveloped in carbon in windrows. A windrow is a long narrow pile, 8-12' wide x 5-7' high x as long as you need or there is space.

## Disasters and Disease

Unfortunately, in addition to routine mortality, every year we face animal related disasters including barn collapses, fires, lightning strikes, floods, and winter storms. Occasionally, there may be mass casualty due to disease as well. When many animals die in one incident it is important to contact agriculture support agencies to get guidance on which is the best course of action for disposal. Being prepared ahead of time and considering the “what if’s” are important.

If plans are not well thought out, disease and nutrient concentration in one area can lead to biosecurity problems and soil and water pollution for many years. The farmer,

or animal owner, is responsible for ultimate disposal, so it is important that best management practices are followed.

## Use of Finished Product and Bones

The composted material can be used to plant a tree or flower garden in memorial for your horse, on hay and corn, winter wheat or tree plantations and forestland. Applying this compost to “table-top” crops directly consumed by people is not

recommended.

Large bones do not completely break down. Bones from immature animals degrade very quickly, but bones from mature animals take several seasons to breakdown. Bones can be buried or disposed of in bone piles.

When using or spreading the composted material, the bones can be removed and put in a hedgerow or forested land. Because they contain phosphorus and calcium, rodents will eat them; the smaller bones can be incorporated or land spread and will disappear quickly.



*Prepared 24” wood chip compost bed.*



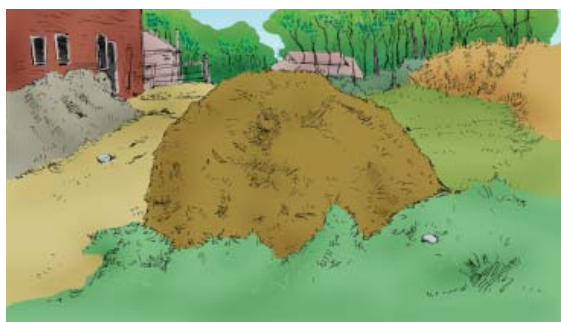
## Economics of Composting

The amount of carbon material (i.e., wood chips, sawdust, etc.) required to compost a 1200 pound horse is approximately 10 cubic yards. Presently, wood mulch is selling for between \$14 and \$33 per cubic yard, plus freight if it is delivered. The total cost for 10 cubic yards of wood mulch would be \$140 to \$330. If we estimate 30 minutes for

preparation and covering, the cost for labor would be \$7.50. Fuel for a 100-HP tractor using 0.4 gallons at \$4.00/gallon is \$1.60. Tractor and loader rental is between \$22 and \$45 per hour. The total cost for the material, equipment, fuel and labor would be \$170 to \$380 per horse. Keep in mind that much of the time you can get good wood chips from utility companies for free.

### Temperature Probe Suppliers

• Gempler's	Madison, WI	800-382-8473
• Meriden Cooper Corp	Meriden, CT	800-466-8448
• Omega Engineering	Stanford, CT	888-826-6342
• Reotemp Instruments	Strong, ME	800-648-7737
• Spectrum Technologies	Plainfield, IL	800-248-8873
• Trend Instruments	King of Prussia, PA	800-573-4243



*Composting  
can be  
done in any  
season!*



## A Whale of a Tale!

In 1999, a Northern Right Whale in the North Atlantic became severely entangled in fishing equipment. About six months later the whale was found dead off the coast of New Jersey. The US Coast Guard hauled the 30,000 pound whale to shore. Since there are only approximately 300 Northern Right Whales left, a call went out to museums to see if there was interest to preserve this whale in some way. The Paleontological Research Institute (PRI) in Ithaca, NY, said they would take it. They cut some of the flesh and blubber off the carcass and hauled it on a flat bed truck to Ithaca. Behind PRI, next to the Cayuga Medical Center, the whale was laid in a large bed of horse manure and completely covered and left to compost in a large pile. The pile was left for six months (October-April) and gently uncovered so the bones could be tagged and turned by hand. The bones, bits of flesh and skin were again covered and left until October. With many volunteers, the bones were cleaned and weighed and ready to be assembled. If you are ever in Ithaca, come to PRI and visit the whale skeleton that was composted on their site.



*Source: Jean Bonhotal, Cornell Waste Management Institute.*

## Troubleshooting Table For Static Pile Carcass Composting

Symptoms	Problems	Recommendations
Pile fails to reach temperature.	<p>Material is dense. Not enough air circulation.</p> <p>Pile too small.</p> <p>Frozen carcasses placed in pile.</p>	<p>Add more chunky carbon on top. *If it is in an odor sensitive area and the pile can not be moved, let process run its course and turn in 4-6 months.</p> <p>To heat, pile needs to be greater than 4'x4'x4'.</p> <p>May need to wait until warmer weather to reach temperature.</p>
Insects and other animals attracted to pile.	<p>Carcasses not covered well.</p> <p>Leachate puddling on pad surface.</p>	<p>Cover carcass well with carbon.</p> <p>Pad should have 1-2% slope and holes should be filled to avoid standing water.</p>
Carcass uncovered.	<p>May not have lanced the abdomen resulting in carbon cover material being thrown off the pile.</p> <p>May have insufficient cover.</p>	<p>Lance abdomen of bloated carcasses before animal is covered with carbon.</p> <p>Use plenty of wood chip cover material.</p>
Standing water/surface ponding.	<p>Inadequate slope.</p> <p>Improper windrow/pile alignment.</p> <p>Depressions in high traffic areas.</p>	<p>Establish 1-2% slope with proper grading.</p> <p>Cover standing water with wood chips.</p> <p>Improve drainage, add an absorbent material such as wood chips. Run windrows/piles down slope, not across.</p> <p>Fill and grade.</p>
Odors	<p>Ponded water.</p> <p>Insufficient cover.</p> <p>Anaerobic conditions.</p>	<p>Regrade the site to make sure there is no standing water.</p> <p>Make sure piles are covered with at least 2 feet of wood chips.</p> <p>Add a cover blanket of fresh chips or finished compost.</p> <p>Build piles that are not too wide or too dense so that air flow can keep the piles aerobic. DO NOT turn or disturb piles for 4 months (depending on the size of the animals). Turning can release odors, especially early in the process.</p>

## Horse Composting Resources

**Cornell Waste Management Institute** - <http://cwmi.css.cornell.edu/mortality.htm>

**eXtension** - <http://www.extension.org/pages/20164/horse-disposal-options>

**Oklahoma Cooperative Extension Service** - <http://www.poultrywaste.okstate.edu/files/BAE1749%20On-Farm%20Mortality.pdf>

**Penn State Extension** - <http://extension.psu.edu/animal-composting>

**University of Kentucky College of Agriculture** - <http://www.ca.uky.edu/news/?c=n&d=487> and  
**Bluegrass Equine Digest**: (article: Composting: A viable alternative for mortality disposal) <http://www.ca.uky.edu/gluck/images/BED/BED-Dec09.pdf>

**University of Tennessee** - <https://utextension.tennessee.edu/publications/Documents/W257.pdf>

**Unwanted Horse Coalition** - <http://www.unwantedhorsecoalition.org/?id=5&s=4&story=78>

**USDA NRCS Animal Mortality Facility #316** - [http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/discipline/?&cid=nrcs143\\_026849](http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/discipline/?&cid=nrcs143_026849)

**Virginia Tech - Cooperative Extension** - [http://pubs.ext.vt.edu/2909/2909-1412/2909-1412\\_pdf.pdf](http://pubs.ext.vt.edu/2909/2909-1412/2909-1412_pdf.pdf)

**Virginia Tech - MARE Center** - <http://www.avec.vaes.vt.edu/middleburg/index.html>

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## Other Resources

Schwarz, M. and Bonhotal, J. 2012. Fate of barbiturates and non-steroidal anti-inflammatory drugs during carcass composting.

Food and Drug Administration. 2003. Environmental warning added to animal euthanasia products. FDA Veterinarian Newsletter. September/October 18(5)

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