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Death and Disposal of Large Animals

A guide for Small Acreage Hobby Farmers

By Bill Winans – Clover Acres Hobby Farm

The cycle of life is defined; birth, life, death. The big question that a lot of animal owners have is now what? What do I do with the remains of a small or large animal once it has passed on?

There are a lot of opinions when it comes to this topic and a lot of discussion with regard to health and safety of humans and remaining animals on the property. Should I bury the animal, incinerate it; drag it out into the woods, or call a rendering plant for pick up? (Below my commentary are two compositions on the topic one produced by the University of Vermont, the other by Dr. Gary G. Pearl, DVM)

As a hobby farm owner, it is my opinion and choice to handle this topic on a situational basis and it greatly depends on what the size of the animal is, and how it died.

Small animals such as birds, dogs, goats and rabbits are handled much like we would if a pet died; we simply dig a grave site and bury the remains. There is no problem with this method and costs you nothing to do.

Large animals such as livestock or horses are a whole different situation. You can bury the remains, some put the remains in a manure pit, others will make a green wood shavings grave, some incinerate and bury and others will call a rendering plant and have the remains removed from the property.

As a small acreage hobby farmer, we choose to have the remains of large animals removed from the property. About six months ago we had to make this choice with a sick horse. We had the animal euthanized by a DVM and called a rendering plant to have the remains hauled away. I am not sure how far spread their service area is, however, Central Bi-Product is the company we used to handle the remains of our horse. The cost was \$150 at that time. Their phone number is: 1-800-767-2569. I found this process very easy and the operator on the other end was pleasant, non-judgmental, all business and able to answer questions. When using this option, the animal must be dead prior to pickup. In our case, the driver was very accommodating and coordinated the pickup time with when the DVM could be here to put the animal down. This was important to us as we didn't want to have the remains simply resting next to the holding paddock. We wanted this to be a process with finality.

The process itself is not the most graceful thing you have ever witnessed. Even knowing that chemical euthanization is the most humane method of putting a large animal down, if you have never been witness to the process it can be somewhat disturbing. The animal does not suffer at all, that is the good part. But the animal's size makes for a very dramatic scene when it collapses during the death process. Once the vet has determined the animal is dead the driver for the rendering plant hooks chains onto the animal and drags it into the semi trailer. It is a quick process, but I would encourage you to consider if your younger children should be a party to this particular event. It's a judgement call only you can make.

My advice to other animal owners is to do a little homework ahead of time, and have an idea that works best for your situation, so if and when the time comes that you need to make these decisions you will be educated and ready to make an informed decision about death and disposal of your large animal. Also check with your county of residence and see if they have ordinances governing this topic. Typically if you are considered and zoned Agricultural this shouldn't be a problem, but I

certainly would not want to have to dig up remains if forced to do so. Be smart, be educated, get advice from other farmers in your area, talk to your vet and ask the questions. You can get a great education while your vet is on your property. Ask a lot of questions of your vet and prosper from their many years of schooling. Most are very willing to share their knowledge. And if they aren't... find a new vet.

Disposal of Dead Animals – University of Vermont

[Composting Deadstock](#)²

[Resources on Deadstock Disposal](#)³

Carcasses can be a hazard to the environment and other animals so they require special handling. To minimize soil or water contamination and the risk of spreading disease, guidelines for proper carcass disposal must be followed. Disposal options include calling a licensed collector to remove deadstock or burial in an approved Animal Disposal Pit. Alternatives include incineration and composting. Composting avoids the air contamination associated with burning mortalities and is economical. Since the heat in the pile eliminates most pathogens, composting can also improve the biosecurity of your farming operation.

If death was caused by a highly infectious disease,

- Clean and disinfect the area after the carcass is removed.
- Wear protective clothing when handling deadstock and thoroughly disinfect or dispose of clothing before handling live animals.
- Properly dispose of contaminated bedding, milk, manure, or feed.
- Check with your State Veterinarian about disposal options. Burial may not be legal. Special methods of incineration or composting may be used in cases of highly infectious diseases.

If a licensed collector picks up your deadstock,

- Limit the access of the deadstock collector and his vehicle to areas well away from other animals, their feed and water supply, grazing areas, or walkways.

If you bury deadstock on your own property, minimum site requirements in Vermont, according to the Agency of Natural Resources Procedure Addressing Disposal of Dead Animals (2001), are:

- 6 feet above bedrock, 4 feet above seasonal high ground water
- 2 feet of soil on top, final cover
- greater than 100 feet from property lines
- greater than 300 feet from water supplies

Animals that were exhibiting neurologic signs prior to death will need to have samples collected by your veterinarian for testing. Special disposal regulations may apply.

Composting Deadstock

If you compost your deadstock, follow the steps listed below:

1. Decide what method you will use.

Composting methods include static piles, turned windrows, turned bins, and contained systems. Information on the first three methods is available on several Websites listed under "Resources on deadstock disposal."

- Static piles with minimum dimensions of 4 feet long, by 4 feet wide, by 4 feet deep are by far the simplest to use.
- Turned windrows may be an option for farmers already composting manure in windrows.
- Turned bin systems are more common for handling swine and poultry mortalities.
- The eco-pod is a contained system developed by Ag-Bag, which has been used to compost swine and poultry mortalities. (Information is available through Ag-Bag, 800-334-7432 or compost@ag-bag.com.)

2. Select an appropriate site.

- Well-drained with all-season accessibility.
- At least 3 feet above seasonal high ground water levels.
- At least 100 (preferably 200) feet from surface waterways, sinkholes, seasonal seeps, or ponds.
- At least 150 feet from roads or property lines--think about which way the wind blows.
- Outside any Class I groundwater, wetland or buffer, or Source Protection Area – contact NRCS for verification.

3. Select and use effective carbon sources.

- Use materials such as wood chips, wood shavings, coarse sawdust, chopped straw or dry heavily bedded horse or heifer manure as bulking materials. Co-compost materials for the base and cover must allow air to enter the pile.
- If the bulking materials are not very absorbent, cover them with a 6-inch layer of sawdust to prevent fluids from leaching from the pile.
- Cover the carcass 2 feet deep with high-carbon materials such as old silage, dry bedding (other than paper), sawdust, or compost from an old pile.
- Plan on a 12' x 12' base for an adult dairy or beef animal. The base should be at least 2 feet deep and should allow 2 feet on all sides around the carcass.
- When composting smaller carcasses, place them in layers separated by 2 feet of material.

4. Prepare the carcass.

- After placing the carcass on the base, lance the rumen of adult cattle. Forget this once and you'll never forget again! Explosive release of gasses may uncover the pile releasing odors and attracting scavengers.

5. Protect the site from scavengers.

- Adequate depth of materials on top of the carcass should minimize odors and the risk of scavengers disturbing the pile.
- Scavengers may be deterred by the temperatures within the pile, but, if not, an inexpensive fence of upside down hog wire may be adequate to avoid problems.

6. Monitor the process.

- Keep a log of temperature, carcass weight, and co-compost materials when each pile is started. Weather and starting materials will affect the process.

- Measure pile temperature with a compost thermometer 6 to 8 inches from the top of the pile and deep within to check for proper heating. Check daily for the first week or two. Pile temperature should reach 131°F for 3 consecutive days to eliminate common pathogens.
- Record events or problems such as scavenging, odors, or liquid leaking from the pile.
- Wait. Most large carcasses will be fully degraded within 4-6 months. Smaller carcasses take less time. Turning the pile after 3 months can accelerate the process.

7. Use the finished materials carefully.

- Use as the base for a new pile. Bones add structure and will continue to decompose.
- Spread on fields growing animal feedstuffs.
- Avoid spreading material with large bones on fields as they may fragment and puncture tires.
- Do not spread skulls. They're bad for public relations!

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Resources on Deadstock Disposal

Procedure Addressing Disposal of Dead Animals, Solid Waste Management Division, Department of Environmental Conservation, State of Vermont Agency of Natural Resources, 802-241-3888.

Natural Rendering Fact Sheet 2002, Cornell Waste Management Institute, available at <http://www.cfe.cornell.edu/wmi/Composting.html>⁵ or through the Natural Resource, Agriculture, and Engineering Service (NRAES), 607-255-7654.

Natural Rendering Video. Cornell Waste Management Institute. NRAES #163. This video describes mortality and butcher residual composting featuring eight operations. Available through NRAES, 607-255-7654.

Farm Based Composting: Manure and More Video, NRAES #150. Video highlights 14 farm operations and six different composting technologies. Available through NRAES, 607-255-7654.

Field Guide to On-Farm Composting, NRAES #114. Guide provides practical information applicable to manure and mortality composting. Available through NRAES, 607-255-7654.

Minnesota Department of Agriculture, <http://www.mda.state.mn.us/composting/default.htm>⁶. Provides basic information on methods. Also describes legalities of composting mortalities in Minnesota.

Composting Animal Mortalities, Agricultural Development Division, Minnesota Department of Agriculture, available at [MNMortalitycomposting.pdf](#)⁷.

Natural Rendering Website. Penn State College of Agricultural Sciences, <http://composting.cas.psu.edu/NatRendering.htm>⁸. Provides links to resources and shows pictures of the mortality composting process.

Emergency Livestock Mortality Composting
<http://www.abe.iastate.edu/cattlecomposting>

Industry is Gate Keeper for Livestock Mortalities and Non-Ambulatory Animals

By Gary G. Pearl, DVM
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Animal deaths, injuries, and numerous other causes for animals to become incapacitated, now commonly called non-ambulatory, are common occurrences associated with all food animal production systems. In fact, this unfortunate reality of life accompanies all animal species with physical death, the destiny of birth. Veterinarians, as well as all medical professionals, are trained with this reality. The health and welfare care of animals is the primary husbandry objective of farmers and veterinarians – to preserve and extend their productive lives. Prominently displayed on my office wall since 1963 is the veterinarian's oath:

“Being admitted to the profession of veterinary medicine, I solemnly dedicate myself and the knowledge I possess to the benefit of society, to the conservation of our livestock resources, and the relief of suffering of all animals. I will practice my profession consciously with dignity. The health of my patients, the best interest of their owners, and the welfare of my fellow man will be my primary consideration. I will, at all times, be human and temper pain with anesthesia where indicated. I will not use my knowledge contrary to the laws of humanity, nor in contravention to the ethical code of my profession. I will uphold and strive to advance the honor and noble traditions of the veterinary profession. These pledges I make freely in the eyes of God and upon my honor.” (American Veterinary Medical Association (AVMA) August 1954)

The oath has since been reformatted slightly and re-adopted by the AVMA in November 1999, but the message remains the same. This oath, though specific to the veterinary profession, speaks for the commitment and responsibility assumed by all entities of the animal food production chain to produce the safest, most economical, consumer acceptable meat, milk, eggs, and fiber consistent with optimal husbandry, care, welfare, and nutrition for each animal species.

Despite all of the advanced husbandry and animal health preventative and treatment programs, animals experience death loss prior to slaughter or become physically incapacitated as the result of a variety of causes. Mortality rates among animal population segments are somewhat predictable. Certainly disease and infectious causes are major contributions to both livestock and poultry mortality. As the traditional role of healer of individual sick animals by veterinarians has gradually transitioned into total integrated health management programs, mortality rates for all species have gradually been lowered. Mortality and morbidity records are routinely maintained for all animal lifecycle stages on the modern, highly productive farms and ranches.

Pneumonia and intestinal disease account for a significant percentage of mammalian food animal death loss. This is particularly evident in pre-weaned animals. Any one of or a combination of several pathogens and predisposing factors can cause these conditions. Numerous uncontrollable risk factors that include prolonged rain, snowstorms, wind, lightning, and predator animals are all natural disasters that herdsman fear. Similarly, numerous production and management practices have alleviated or minimized many of these risks. But these risks and their contribution to animal mortality still occur.

Death among the animal species results in a variety of responses to care for the corpse. Various ceremonial traditions follow the death of a human, with most concluding with interment controlled by numerous state and federal regulations. Companion animals and those having special human bonds commonly have their bodies handled in special distribution. As the need and demand for handling dead and disabled animals resulting from food animal production, the rendering industry was founded. Although rendering as an organized and cohesive industry has been around for over 160 years, the reliance on animal co-products dates to the advent of Homo sapiens cooking meat over a campfire and collecting the drippings for other uses. The rendering industry has performed the primary function of removing the death loss and non-ambulatory animals from their source for processing into protein, fat, and other products by safe, biosecure, and environmental friendly procedures.

Animal Mortality Figures

The U.S. Department of Agriculture (USDA) estimates 1.7103 million cattle and 2.3656 million calves died prior to slaughter in 2002, for a total of just under 4.1 million deaths.⁽¹⁾ This replicates very closely to the 4.2 million deaths reported by USDA for 2001. Death loss, however, fluctuates as cattle numbers expand and retract and as natural disasters such as blizzards or periods of severe weather occur. Fortunately, major disease epidemics have not plagued the U.S. beef or dairy herds in the past recent years. Ruminants (cattle, sheep, lamb, and goat) combine to account for

about 22 percent of all mammalian livestock numbers that die prior to slaughter each year. Cattle, however, with their heavier body weights, comprise approximately 67 percent of the total weight of all mammalian livestock mortalities. In 2002, the total weight for cattle was 2.7 billion pounds. Beef cattle account for the largest proportion of farm, ranch, and feedlot mortality, in respect to weight.

There are nearly 18 million head of swine that die on U.S. farms annually. In addition, poultry mortalities have been estimated at 350 million pounds for both chickens and turkeys. It is estimated that a 100 sow farrow-to-finish swine operation will experience over 10,800 pounds of deadstock annually. Recent data that profiles the U.S. swine industry indicates that in 2003, less than one percent of total swine operations are of this relative small size. Nearly 60 percent of current swine operations in the United States now market over 50,000-plus hogs per year.(3) Past studies have likewise shown that the incidence of death loss does not directly correlate to size of operation. Thus, extrapolating data emphasizes the increased volume (numbers and weight) of mortalities that the larger, more concentrated livestock and poultry operations generate as compared to the traditional "family farm." This observation can be made across all food animal production segments: beef cow, feedlot, dairy, swine, broiler, layer, and turkey.

This observation becomes of practical importance with human and animal health significance when addressing the handling of this material. Rendering, as a regulated industry, collects, transports, and processes raw animal tissue material from slaughter and processing facilities, but as previously referenced, was founded as a primary handler of animal mortality or "fallen animals" at the farm level. As a safeguard of human and animal health, this function is undoubtedly its most important function.

The industry processes annually over 54 billion pounds of animal raw tissues of which a rather small percentage is composed of animal mortalities and non-ambulatory animals. The article "Rendering 101" describes the process and the biosecurity attributes that are not provided by any other current alternative disposal method.(4) There are data to support animal pathogen and food borne microorganism inactivation by the rendering process. One of the more resistant microbes, *Bacillus anthracis*, is known to be inactivated by temperatures of 212 to 296 degrees Fahrenheit (F) in 10 to 60 minutes. These are conditions only provided by rendering or incineration. Animals transported to rendering facilities are done so by regulated personnel in regulated vessels not currently a component of the incineration process. The rendering industry is estimated to transport and process over 50 percent of all livestock and poultry mortalities. Clearly, the rendering industry continues to play a most important role in disposing and safely utilizing what otherwise are an environmental, human, and animal health menacing material.

Focus on Non-Ambulatory Cattle

Non-ambulatory cattle have been estimated by USDA to be approximately 200,000 head per year based on a 1999 American Association of Bovine Practitioners survey.(2) It is proposed that this estimate understates the condition by not fully accounting for feedlot cattle of younger ages commonly affected with metabolic and or respiratory disorders that often present neurological-like clinical symptoms and thus described as non-ambulatory. It is impossible to give accurate figures on incidence because of variations in nomenclature and the accuracy of diagnosis. Because it is a syndrome until an accurate diagnosis is confirmed, the exact incidence is speculative.

It is the non-ambulatory cattle segment that has received recent attention as the result of USDA's prohibition for meat derived thereof from the food chain and the Food and Drug Administration's (FDA's) proposed rule of prohibiting their rendered protein from the feed chain. Non-ambulatory cattle have been defined by USDA as a condition in which an animal cannot rise and walk. Non-ambulatory swine have not been defined in either numbers or weight of animals so affected. The non-ambulatory state, often referred to as "downers" or medically as neuromuscular paresis, occurs as the result of multiple etiologies. Injuries, birth paralysis, infectious diseases, genetic, and metabolic disorders account for a significant number. Animals near slaughter weight, breeding, and females at birthing are at greater risk when compared to the animal population at large.

Cattle have received the greatest attention as the condition has been a persistent problem in dairy cattle and a most perplexing condition to treat. The most recent concern has surfaced in reference to distinguishing this rather common syndrome from any possible bovine spongiform encephalopathy (BSE) infection. The past and current BSE surveillance programs have concentrated on this segment of the cattle population.

The recent regulatory changes regarding non-ambulatory cattle have brought a new dimension to the diagnostic process as well as the disposal process. The agencies are in the regulatory process of evaluating advanced notices for perhaps additional regulations. As with animal mortalities, the rendering infrastructure provides the safest processing alternative available. With the current restriction on the use of ruminant-derived animal protein ingredients in ruminant feed already in place, and documented to be understood and practiced at an unprecedented compliance rate by the producer, feed, and

rendering industries, the need for alternative disposal methods should not be permitted. Many of these alternative practices have received considerable recent publicity but none currently provides the infrastructure nor the human/animal health biosecurity, environmental security, and economic benefits to sustain animal agriculture when compared to rendering.

Alternative Disposal Method Limitations

Without the rendering industry, it would be necessary to discard or dispose of animal by-products and mortalities in community landfills, compost piles, burial sites, incinerators, or, worse, left in illegal dumping places, causing a potential public health hazard. Each of these alternative methods has several limitations with respect to animal by-product and mortality disposal, with limited space being the most obvious. Typically, these alternative disposal methods are only loosely regulated at the state and/or local levels, if at all, and only occasionally include restrictions on their use in certain jurisdictions or where groundwater pollution is a concern. However, enforcement is often neglected, especially on farms and fields that are geographically remote. Documentations are available to illustrate the abuses. There is no known scientific study that assesses the environmental impact of alternative methods of disposing of such significant volumes of potentially infectious (with various animal diseases) and highly unstable material. Logic dictates that environmental consequences could be severe, and these need to be carefully considered when imposing regulations that could lead to such significant disposal challenges.

When unprocessed animal by-products derived from ruminant animals are disposed of by methods other than rendering, not only is their disposition not uniformly regulated, but the potential exists for cattle and other ruminant animals to be exposed to materials prohibited by the current FDA ruminant feed restriction. Domestic and wild ruminant animals may have direct exposure to unprocessed raw materials that have been improperly buried, composted, or placed in landfills. As a result, these non-rendering practices could contribute to the amplification of BSE. For example, spreading composted animal by-products of ruminant animal origin on land used for grazing and/or hay production is permissible under the current regulations. The concern is not only directed at BSE, but, more importantly, for numerous animal and human diseases that include emerging foreign diseases.

Landfilling

While rendering reduces volume, amendments (such as sawdust) must be added (one part amendment to three parts by-product) to compensate for the high moisture content of animal by-products and mortalities when preparing these raw materials for disposal in a landfill. As a result, the total volume would be increased by approximately 25 percent. Decomposition proceeds slowly and at relatively low temperatures (130 to 150 degrees F) in landfills, which limits pathogen destruction. Landfilling animal by-products also contributes to methane gas production and odors, attracts vectors (such as rats, cats, dogs, birds, flies, etc.) by which disease can be spread to the livestock and human population, and creates contact and/or inhalation exposures to humans. Furthermore, the potential for increased disease among landfill workers and the transfer of pathogens to off-site locations may be increased when landfills are used for large animal disposal.(5)

Composting

Composting is an approved method of disposal in most states, although local and state regulations often guide construction of the composting structure and the type, size, and amount of livestock that can be composted at a single location. However, contrary to popular belief and practice, simply covering mortalities in manure is not considered composting.(6) At a recent state training school for proper composting procedures, an Environmental Protection Agency officer reported that he had personally inspected 1,500 livestock and poultry composting sites. Only 150 met the required procedures. The proper use of composting is a labor and management intensive activity, which, if done improperly, will generate significant risk to the environment as well as human and livestock health. Although many aspects of composting are not exact, there are several factors that affect the success of the composting process, including the carbon and nitrogen ratios, the moisture content, particle size, oxygen concentrations, and temperature.

Given the complicated nature of managing a compost facility, the potential for improper management of on-farm composting facilities and resulting environmental risk is high. Failure to properly manage the composting process can result in excessive odors and a high possibility for the spread of disease, and runoff from composting facilities can endanger ground and surface water. Large animals such as mature cattle and swine will often need to be cut into smaller pieces to facilitate the composting process, and the thick hides of mature animals can be difficult to compost, often requiring additional cycles to completely decompose. The rendering process for non-ambulatory and on-farm mortalities, in most cases, allows for the utilization of cattle hides. Hides are an important contribution of the overall value of the cattle industry.

Also, large bones are seldom found to entirely decompose. The anthrax organism has been isolated from bone entombed for several decades. And even under the best circumstances, composting facilities are vulnerable to rodent and predator activity, as well as to insects and other pests, which can easily spread disease to other livestock or to humans. Given the potential for adverse environmental consequences, composting often requires additional time and equipment compared to the other disposal methods.

Furthermore, composting typically generates internal temperatures of only between 110 to 150 degrees F, which could be sufficient to kill most pathogens, but if compost piles are not properly turned, pathogen destruction cannot be guaranteed, especially for heat resistant and spore forming bacteria, such as *Bacillus anthracis*. And there is no evidence that the composting process is capable of inactivating the prion believed responsible for BSE. This has very important implications since composted material is often disposed of by spreading it on fields where cattle might graze or where livestock feed is produced, which could potentially expose cattle to the very compound that current and proposed FDA feed regulations are intended to prevent.

Burial

Burial of livestock is, along with rendering, one of the most widely used methods of carcass disposal. However, it is also the method that creates the largest risks to human health and the environment because of the potential for ground and surface water pollution if proper techniques are not rigorously followed. Ideally, livestock carcasses must be buried at least four feet below the ground within 36 hours and not within 200 feet of a waterbody, well, or spring. The burial pit should also be at least 100 feet away from production facilities to lessen risk of disease transmission by rodents.

Regulations concerning on-farm burial vary considerably by state, sometimes requiring detailed knowledge of the local geology to determine the maximum number of burials on a given area of land, or to ensure that the mortality is buried some specified distance above the water table. Despite these regulatory guidelines, there is little assurance that "proper" burial techniques are routinely or uniformly applied.

There are also practical challenges to this disposal technique. Burial is not a viable option in many states because of population density and/or the potential for ground and surface water contamination. Where it is permitted, a common practice is to dig a trench and then, starting at one end, fill the trench in over time with carcasses and soil. However, maintaining an open trench poses a serious occupational hazard as well as a hazard to people and livestock simply walking through the area. During winter months in some areas, despite the use of earth-moving equipment, it can be difficult, if not impossible, to bury the carcasses in frozen soil. And, especially if proper techniques are not followed, rodent and predator activity is a concern that can lead to significant health risks to livestock and humans.

Incineration

Incineration can be a biologically safe method of carcass disposal, but only if done properly in an approved mortality incinerator. Incinerators usually operate on diesel, natural gas, or propane. A diesel-fueled incinerator will require from one to three gallons of fuel per 100 pounds of carcass. However, large carcasses are more difficult to burn in most farm-operated incinerators; most tend to work best for carcasses smaller than 500 pounds. Therefore, carcasses from mature cattle and swine typically need to be cut into smaller pieces prior to incineration, increasing the labor requirement and the potential for worker injury. The significant capital costs associated with purchasing or constructing an environmentally benign on-farm incineration facility can be a barrier to adoption, and incineration by other means can generate significant environmental contamination to the air and water. For instance, burning carcasses in open pits typically does not comply with Department of Environmental Quality air quality standards and is not recognized as an approved method.

Furthermore, incineration capacity in the United States is currently inadequate to dispose of all animal by-products and mortalities produced annually. A primary potential source of disease transmission from animal carcasses is the transport process to an incineration or other disposal site. Again, the rendering industry has the only infrastructure currently in place to provide the required biosecurity function.(7)

Summary

Animal production systems are a focus of public scrutiny in terms of their impact on the environment. All agricultural production systems are in fact "under the microscope" of the 99 percent of the current population not categorized as farmers. It is also a fact that animal production is accompanied with waste sources, two of which are manure and mortalities. Efforts to improve the image of agriculture must begin on the farm, whether large or small. The heretofore invisible rendering industry has served as the "gate keeper" for farm mortalities for over a century. It is a time and temperature proven concept. It is an infrastructure and process that no other current alternative can provide.

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