

Solutions to Crook County Disposal of Carcass and Butcher Waste

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Introduction

Closure of the last rendering facility in Oregon occurred October, 2006 as a result of regulatory and social pressure from the Department of Environmental Quality (DEQ) and residential areas. The rendering facility in Redmond, Oregon provided a valuable service to the communities of Crook, Deschutes, and Jefferson counties. The closure of the plant consequently deprived the local counties, livestock owners, veterinary hospitals and butchering companies a destination for disposal of carcasses and butcher waste. The Crook County Landfill agreed to accept these materials with a temporary permit from DEQ, expiring October, 2007. Upon expiration of permit, the landfill will no longer be in a position to accept these bio-wastes. At that point, livestock owners and related fields would have to dispose of the materials through alternate means.

Butcher waste is a byproduct of the local custom meat processing centers. This waste has historically been recycled through the rendering process and made into various useful, salable products. One local processing plant provides 300,000-400,000 lbs of butcher waste a year, all of which was rendered through the Redmond, Oregon rendering facility or transported to a rendering facility in Washington. The transport to Washington prior to October, 2006 was \$60.00 per week; the same service currently has been reported to be \$400.00 per week according to a local meat processing facility. This fee increase has the potential to dramatically alter the profitability of the meat processing facility and potentially put them out of business. In a county that prides itself on its entrepreneurialism and achievement, loss of a business, regardless of industry is unacceptable.

Carcass disposal should be of great concern to the public. Diseased carcasses can pose a serious health threat to human and environmental health. Diseases such as Bovine Spongiform Encephalitis (BSE), Foot and Mouth Disease (FMD), Scrapie, Avian Influenza, and Anthrax are examples of diseases that have the potential of large economic concern for the agriculture industry, but have low concern for human health. However, diseases that are bacterial, fungal or parasitic may pose a significant risk to human health. Humans are most likely to obtain disease or illness from carcasses by improper disposal of livestock/animals such as ground water contamination. Crook County is a rural county with considerable land dedicated to agriculture, both of large and small acreages. Of particular concern is improper disposal of animals on private property. Disposal is often accomplished by leaving a body exposed to the elements and to wildlife. Communicable disease has the potential to spread to neighboring properties and public lands if this method is utilized. Disposal is most likely to be accomplished by burial, particularly on smaller, more urbanized properties. This method does limit the risk of spreading disease to neighboring properties and wildlife, however, must be accomplished in the proper manner.

Disposal of carcasses on private property in the state of Oregon has very little regulation by government. However, regulation does require that any dead domestic animal within one-half mile of any dwelling or within one-fourth mile of any running stream of water must be disposed of within 15 hours (ORS 601.140). The owner may choose to bury it, burn it, or move it farther from the dwelling or stream, or have it hauled away by a commercial rendering company or pick-up service. If burial, quicklime shall immediately cover every portion of the body followed by a minimum of 4 feet of earth (ORS 601.090(7)). The physical dimensions of a pit to bury a horse or cow will require equipment such as a backhoe to dig a pit of 2'x7'x8'. There is no regulation for the maximum weight per pit nor is there state regulation on the minimum distance of burial to a well.

However, it is suggested that burial not be within 500 ft from a well and preferably down hill from a well. Other states have developed similar guidelines and regulation for property owners to abide by in order to minimize the risk of contaminating ground water. Iowa currently allows 7 cows, or 73 lambs, or 2 horses per acre of land to be buried (exceptions are if the animals are buried within 2 months of birth). Burial sites must be no less than 100 ft from a private well, 200 ft from public wells or 100 ft from surface water. Animals must be buried within 24 hours of death and have at least 30 inches of soil on top of the body.

One can easily see that restriction of burial within one-half mile of any dwelling limits the application of burial of carcasses on private properties that are few in acres and urban. Such properties are becoming more and more common in Crook County and the surrounding counties. If carcasses are disposed of incorrectly, drinking water for that property and potentially other neighboring residences are likely to be contaminated, particularly when multiple-family shared wells are common.

Crook county has considerable amount of public lands (52%) owned by USFS and BLM. These lands provide recreation, wildlife preserves and livestock grazing. Since the closure of the rendering facility in Redmond, illegal dumping of carcasses, both domestic and wild, has increased on both public and private property. One can speculate that closure of the landfill to disposal of carcasses and limited other options will increase the occurrence of such illegal dumps. Hence aesthetic value of public lands will be diminished and the risk of spreading disease to wildlife and cattle increased. Finding a solution in which carcass disposal is financially reasonable should lower the incidence of dumping.

Governor Kulongoski designated the Oregon Solutions Animal By-Product project in December, 2006. It is *“exploring economically viable, environmentally benign and socially acceptable options for processing the organic residues of on-farm animal mortalities, slaughtering offal and other meat-based residues in to marketable products. The project pursues options that capture by-product value through energy production and nutrient recycling in addition to traditional products of rendering. This team as two major activities: 1.A pilot demonstration of the commercial viability of composting on-farm animal mortalities. 2. Conduct an assessment of current and emerging technologies and a market analysis for potential products.”* The Crook County Court believes human and environmental health and economic impact are at risk if disposal of carcasses and butcher waste can not be accommodated. It was the opinion of the court that although Governor Kulongoski designated a working group, a solution to the disposal issue would not be found prior to expiration of the special DEQ permit. Judge Scott Cooper has said “we are pursuing other alternatives with a primary purpose of being able to serve Crook county residents and a secondary goal, if economically feasible and practical, of being able to help our neighbors, Deschutes and Jefferson counties, resolve their issues at the same time”. The court has whole heartedly pursued a solution that can be accomplished prior to October, 2007. The following report will discuss options for disposal.

Current Practice and Planning

The Crook County Landfill is accepting both carcasses and butcher waste indiscriminant of origination (Crook, Deschutes, or Jefferson Counties). Average monthly intake of these materials is 87,000 lbs but ranging from 47,100 to 118,340 lbs. Butcher waste accounts for approximately 2/3 of total material. The landfill charges \$5.00 per animal and \$25.00 per ton of waste. DEQ has mandated that the landfill bury the bio-waste in a trench at a depth of 8ft. DEQ requires that both woodchips and lime be added to the bio-waste material prior to covering with soil. Once a trench is filled, the site must go undisturbed. Over the last seven months, landfill

space dedicated to this process has been 19,200 cubic feet (12ft x 200ft x 8 ft), resulting in a trend of 32,914 cubic feet a year. This is equivalent to dedicating an area the size of a football field (at a depth of 8ft) roughly every year and a half. Should the landfill choose to pursue an extended, long-term permit to continue to accept carcasses and butcher waste, DEQ would require modification of the burial process including purchasing additional cell lining material and modification of leachate capture at considerable cost. Dedication of land area for disposal of these bio-wastes is also of great concern should this be the long-term solution for carcass disposal.

Rendering

Rendering is a means of recycling bio-waste (dead, disease, dying or disabled livestock or pets, slaughter offals, cooking grease, and retail meat waste) into usable products of worth for the feed and oleo chemical industries. The Food and Drug Administration (FDA) banned the use of most mammalian protein in feeds for ruminant animals, August 4, 1997. This contributed to a structure shift of the rendering industry, from small plants to larger facilities capable of rendering several thousand pounds daily. Thirty years ago, most rendering plants were independent from large livestock processors. Currently, 70% of all products are rendered at integrated facilities. Many independent companies no longer exist, being acquired by larger independent renderers, or simply going out of business.

Rendering is by far the most attractive solution to the county disposal issue in regards to disease control, recycling of waste product and possible economic development. However, constructing a rendering facility within the timeline would not be feasible. Furthermore, private sector would need to own and operate the plant in an area that would be appropriately zoned for operation and away from residential areas so as to avoid public disruption or disapproval due to social perception of rendering. The county may be able to accommodate such a location; however, private sector has yet to produce persons willing to make the financial investment of purchasing and constructing a rendering facility. Capital investment of such a facility has not been firmly quoted. Individuals from private sector have reported investment anywhere from \$500,000.00 to \$7,000,000.00. Also of concern is the amount of bio-waste material required to sustain a rendering facility. The Oregon Solutions group has estimated that a plant would require 5,000 tons per week to remain profitable. Oregon as a state only produces around 41,000 ton per year. However, Crook County has been skeptical of these numbers as they were obtained by a current operating rendering company that would compete for bio-waste stock and rendered product. These numbers may be indicative of a large scale plant but further investigation would need to be conducted to evaluate the opportunity of a small scale rendering facility in which neighboring counties would contribute bio-waste for rendering.

Given the volatility, unclear amount of capital investment required for purchase, and lack of serious persons from private sector, rendering carcasses and butcher waste is not recommended as a solution. Should any individual wish to invest in a rendering facility, Crook County would support such a project.

Composting

There are three types of composting methods commonly used for large animal bio-waste disposal, multiple bins, windrowing/piling, and "in-vessel" composting. Bin composting is achieved by placing a layer of absorbent material, such as sawdust, on the bottom of the first bin followed by a layer of carcass or body material and then covered with a moistened layer of high carbon material (wood waste). This process is repeated until the bin has been filled to capacity. The bin is left undisturbed for 30-90 days until heating of the material begins and

microbial population begins to break down the carcass. The material in the first bin is then turned and rotated into a second bin. This process is repeated through usually 3 bins until the carcass is fully decomposed, usually 120-180 days. Excess moisture may need to be added to the bin to maintain adequate moisture content for microbial growth, as would be likely for Central Oregon. Likewise, moisture may need to be avoided, thus covering the bins is recommended. Limitations to this process in regards to Crook County is that large animals (>300 lbs) should be pretreated by either chopping or exposing the inner organs in order to expedite the composting process. A majority of our carcasses are cows and horses and would fall into this category.

Windrow composting should be established on a base of low permeability such as concrete. As with the above, all leachate must be contained. Carcasses are placed in the pile and covered with a mound of carbon rich material (e.g. wood waste). Piles are continuously lengthened as new carcasses are added. After an acceptable time period for heating and microbial action, the windrows are turned. As with the previous method of composting the piles or bins are exposed to the elements. Moisture management would be critical. Furthermore, odor flies, and birds may be issues that would have to be managed appropriately. Both the previous method of composting and windrow composting would be a very cost efficient method of disposal of bio-waste.

In-vessel composting is a relatively new process for carcass composting in which all materials are composted within a permeable bag. All waste is chopped prior to being loaded into a bag, including carcasses and butcher waste. Within each bag a pipe would run the length of the bag and blow air through the composting material. No turning of the material would be required. Odor is minimal to nonexistent, all leachate is contained within the vessel and the composting materials are not exposed to the environment. For these reasons, Crook County thoroughly investigated this method. However, capital investment for the equipment would be over \$1,000,000.00. Further concerns, addressed below, for this process also apply to all other methods of composting.

Composting of animals on a private farm requires Oregon Department of Agriculture to approve a site plan, and a description on how the compost will be used. Commercial composting of animals is not regulated by ODA; however, a Department of Environmental Quality (DEQ) permit is required. In both instances leachate from the compost piles must be contained. Once the compost leaves the site, no rule or regulation by DEQ governs application of the compost. However, DEQ officials strongly urge people not to market this compost for yard use and even discourage land application if the animal compost did not originate from that property. The reasoning behind this suggestion is that we do not know enough about the spread of prions (BSE, SWD, Scrapie) to be sure we are not endangering people and or other animals by land applying. Composting is efficient at destroying most pathogens, but it is unclear whether composting will destroy the prion.

Crook County Landfill has implemented composting of other bio-materials and markets the compost to the public. The landfill generates more compost than they can sell. The landfill manager has concerns with composting as the process would require considerable landscape, require heavy equipment, and produce more product than would be salable. It has been considered that the composting material created at the landfill could be used as cover. However, the wood waste that would be dedicated to compost is currently marketed for private sector use at a profit. Therefore, by adopting compost as an option for carcass disposal and butcher waste disposal, landfill materials that would typically generate income would not be available. Furthermore, the issue of the prion is of great concern. The chance of a prion being present in compost is very minimal, however, public perception of compost that contains animal mortalities and body parts would speculatively be unattractive and without a doubt, the issue of the prion would be raised by media and potential buyers. Public

perception should be considered for any method, particularly to protect the image of the livestock industry. Unfortunately, if there is no sound scientific proof that humans, wildlife, pets and livestock are safe without a doubt, public opinion of use of this compost could be ruined beyond repair, even if future studies document proof to support the use of animal compost. Financial decisions should not be based on assumptions that the landfill could sell a product that could quickly become unacceptable to the public. An option to curb poor perception would be to implement guidelines for composting that would resemble the proposed rule for importing cattle to the United States. A cow that was born prior to March 1, 1999 would not be eligible for composting. Furthermore, to ensure (to the best of our ability) that no prion would be present in composted materials would include a restriction on cervid (deer, antelope, elk) tissue for composting. Likewise, an animal that has tested positive for BSE, Scrapie, or CWD would also not be eligible. However, this leaves Crook County with a population of animals that still need to be disposed of in some manner.

Air Curtain Burning

The principle of the air curtain within an incineration device is that air is forced across a burning pit at high velocity. The curtain of air traps unburned particles under the curtain in the high temperature zone where increased combustion time and turbulence results in a re-burn and more complete combustion of the waste within a pit or combustion chamber. This technology has typically been used in the construction industry to support land clearing operations and demolition debris removal, for forest fire mitigation efforts and at landfill sites. It has most recently been used in disaster relief efforts for clearing aftermath from storm or flood damage and to dispose of diseased animal carcasses. Crook County has an abundant supply of wood waste to accommodate this technology.

Animal mortalities and byproducts incineration is regulated by DEQ Air Quality. However, this process would not be categorized as incineration; it would be considered open burning. Open burning of carcasses of animals is only allowed in response to a disease emergency or when authorized by ODA (ORS 596.393 and OAR 340-264-0040(10)). It is unlikely that any special permit would be awarded to Crook County for the operation of this machine on a regular basis by either ODA or DEQ.

Tissue Digestion via Alkaline Hydrolysis

This technology uses alkaline hydrolysis at an elevated temperature to digest animal tissues and infectious materials into a sterile, aqueous solution that is suitable for disposal into a sanitary system. The advantages of this system include the absence of air pollution, no adverse affect on the operation of a wastewater treatment facility, neutralization of unwanted acidic conditions that are normally created during the sewage biodegradation process, relatively inexpensive operating cost, and destruction of infectious agents including the prion.

The equipment for this process is very expensive with an estimated capital expense of around \$700,000.00. The equipment must be housed inside a building with temperature control (must not fall below 50 degrees F), which would require further investment. The machine would have the ability to degrade 4,000 lbs of carcasses and/or butcher waste every 5-8 hours. Access to propane, electricity, and water are necessary. Carcasses as large as a horse or cow can be loaded into a unit without dismemberment. Bio-waste can be processed regardless of any rancid tissue that may be present. A unit can be operated without constant supervision, a worker would have the responsibility to load and unload the machine upon start and stop of the process.

The capital expense to purchase the machine would be difficult to justify. However, if this technology were affordable, it would be of great use. This machine would ensure that any disease outbreak within the county could be combated with an effective way of destroying any pathogen, including any prion. This machine could become a pivotal factor for disease control should there be an outbreak of serious disease or a case in which bio-terrorism threatened the United States.

Other than the expense, there are other concerns. Disposal of the effluent can be accomplished in various methods. Of interest to Crook County would be to possibly apply the effluent to the area in and around the landfill site for dust control, land application for fertilizer or it could be treated as waste water and processed through the local waste water treatment center. Bones do not degrade completely in the alkaline hydrolysis until. Bone shadows remain inside a basket after the process is complete. These bone shadows easily turn to dust when touched. This by-product could be disposed of through the landfill. Any application of the byproducts must be authorized by DEQ. Special permits from DEQ may be required. The permitting process could take as long as 6 months. Because the effluent is in liquid form, concern of freezing would also have to be addressed.

There are two different pieces of equipment that have significantly different operation costs. One brand of machine suggests operating cost of around \$0.07/lb of bio-waste and the other machine suggests around \$0.14/lb of bio-waste. Further investigation would need to be completed prior to implementation.

Alkaline hydrolysis is an attractive solution to the disposal issue, however, the expense alone can not be overcome and it is therefore to a practice that shall not be recommended.

Transporting to Out of County Location

The county has the option to remove all carcasses and butcher waste from the county. This could be accomplished by transporting the bio-waste to a rendering facility. Railroad transportation is not an option as the local railroad companies will not transport these materials. Trucking the bio-waste could be accomplished in one of three manners: 1.) Hire the trucking 2.) County own and Operate a trucking service 3.) Contract with an existing rendering company to collect these materials from the landfill.

Transportation of material poses some problems to the quality of the carcasses/butcher waste and thus the acceptance of the waste upon arrival to a rendering facility. Most rendering facilities prefer carcasses that can be processed within 48-72 hours post mortem and have minimal decomposition. Rendering sites closest to Prineville include Chico, CA, Tacoma, WA, and a transfer station in Portland, OR. The landfill would rely on livestock owners to deliver a carcass within 48-72 hours postmortem. This in itself may be difficult to achieve. Once the landfill obtained the carcass, transportation would require at least 4-6 hours to deliver to a rendering facility, provided there was no storage time required. However, trucking material out of the county would require a truck to be loaded to capacity in order to maintain economic and efficiently dilute fuel costs. Thus, there would have to be a time period of storage. Storage of such materials will likely result in rancid, unacceptable bio-waste to the rendering companies as well as odor, flies, and leachate. These concerns are intensified during summer months when high temperatures speed the natural degradation process with both carcasses and butcher waste.

Carcasses and butcher waste could be preserved by keeping the material cool. Refrigerated trucks and/or holding units could be employed for such a task. A refrigeration trailer could be purchased for approximately

\$10,000.00. If the county choose to hire the trucking or truck the material themselves, at least 2 trailers would need to be used; one for travel, the other for storage. Special consideration for how the carcasses and butcher waste is to be loaded and unloaded need to be addressed.

Darling International, the largest rendering company in the United States has agreed to set up a transfer station at the Crook County Landfill. This option would require the landfill to purchase holding equipment to keep the bio-waste cool. Darling International would make arrangements to remove such waste twice a week or as needed. This option of disposal would require the least amount of capital expenditure and is also competitive in the cost/lb of material disposed. See Table 1. for a summary of economic analysis.

Economic Analysis

Economic analysis of trucking and alkaline hydrolysis was analyzed. Alkaline Hydrolysis is a technology that has many benefits in regards to disease. However, the expense alone can not be justified. The fee for adaptation of this technology would require the landfill charge around \$0.15 per pound of waste. This would mean that the carcass of a horse would be \$150.00 to dispose of. This large fee would speculatively result in increased illegal dumping of carcasses on private and public lands.

Trucking the material out of the county is the most economical solution to the disposal issue. If the county hired an independent company to truck the material to a rendering collection site or facility, the estimated cost per pound of bio-waste would be \$0.06-0.07/lb dependent upon where the waste was delivered. That fee would need to be passed on to the livestock owners and butcher companies. These fees would require that the landfill charge \$60.00-70.00 for a 1000 lb horse. This fee is around \$30.00 more than the current fee. The butcher companies will be affected more than livestock owners. Butcher companies can expect to see a price increase of about \$342.00 for a 6,000 lb delivery to the landfill. This cost will likely be passed on to their customers. However, you may notice that regardless of how transportation out of the county is structured, the fees are similar. Therefore it is recommended that Darling International establish a transfer station in Crook County. This alleviates the need for the county to hire additional employees and take on additional responsibilities.

Conclusion

The issue of carcass and butcher waste disposal is not an appealing topic to discuss at the dinner table. None-the-less it is an issue that is of utmost importance to livestock owners, municipalities, meat processing businesses and every citizen in the county. It is our responsibility to make sure our waste does not create environmental hazards to humans nor wildlife. Yet, disposal needs to be accomplished in a manner that is economic. Although it was a desire to create a solution within the county it is evident that implementing a technology within the county is not feasible. It is recommended that all carcasses and butcher waste be transported out of the county via Darling International transfer station located at the landfill.