

Waste Management: Small Slaughter & Butcher Facilities

By Katie Hewitt (Graduate student), and Rhonda Miller, Ph.D.
Agriculture Environmental Quality Extension Specialist

Extension

UtahStateUniversity



Slaughter Waste

Small Slaughtering and butcher facilities are key to bringing local meat from farms and ranches to the table of our communities. Processing meat requires skilled labor, specialized equipment, and proper food safety protocols and permits.

Meat processors can be of three types:

1. USDA regulated, which require regular inspection and hazard analysis and critical control point (HACCP) plans
2. Custom, in which the meat can only be processed for personal use by those who own part or all an animal, and must be labeled as not for sale, or
3. Retail operations such as grocery store and market butchers, which are permitted by the state, not the USDA. Retail operations can sell the meat.

An important consideration for any slaughter or butcher facility is having a proper disposal procedure for the large quantity of unused materials. State and federal permits will require a plan of action for appropriate waste disposal, and the Department of Environmental Quality regulates the appropriate disposal of all meat processing waste.

There are two categories of slaughter waste – solid waste and liquid (wastewater).

Solid Waste

A large portion of solid waste is the intestines and stomach contents. Solid waste also includes offal, which is the organs, entrails, and other parts of an animal not typically harvested for use. Some offal may be edible, other portions are not. Bones, heads, and hides are also considered solid waste if not sold.

Wastewater

Food-safe slaughter requires repeat washing down of a facility, which creates a large volume of wastewater. Wastewaters can be categorized as those which contain, or do not contain blood, and should be captured and disposed of separately. Blood filled wastewater has a higher treatment standard, so separating these fluids reduces the volume which requires more costly processing.

Note that solids should be swept and sorted from the kill floor before washing down so particles entering the drain/liquid waste are reduced. Appropriate equipment and set up of a slaughter facility will help with sorting waste. For small facilities, waste is typically captured in barrels or tanks. Depending on the disposal method, additional pre-treatment may be necessary before transport and processing.

Calculating Waste

Livestock blood volumes vary by animal, breed, age, and size. Approximately 7-10 gallons of blood are disposed of per butchered cow. Slaughtered cattle generally yield 40% in retail cut, with 60% of the total animal weight amounting to residual refuse. A 1,200 lb. steer would produce approximately 720 lbs. of waste, equating to 1.5-2 barrels.

The amount of waste your facility accumulates per day will help you determine the frequency and cost of your disposal needs, as well as the size of containers you may want to acquire. This can be calculated by measuring the rough volume of each type of waste typically accrued per slaughter of a certain animal breed. Then facilities may multiply that by their average daily processing.

Importance of Proper Disposal

It is essential to dispose of slaughter waste properly for the following reasons:

- **Environmental impact** due to ground and surface water pollution, soil contamination, and greenhouse gas emissions.
- **Health concerns** from pathogens and to ensure biosecurity to prevent the spread of diseases, such as Bovine Spongiform Encephalopathy (BSE or Mad Cow Disease).
- **Economic** costs of certain disposal methods, and the potential benefit to operations of creating value-added products.
- **Ensure legal compliance** and prevent penalties.

This publication discusses multiple common options for waste disposal by small slaughter facilities. Permits and inspection will be required for most on-site storage, transport, and disposal options.

You must contact your local state Department of Environmental Quality and county sanitarian or municipal officials to determine which methods are allowed in your local area and to identify any required permits.

Options for Disposal

Landfill/Treatment Works

If you have a local public treatment works or landfill, they may offer certified disposal for meat processor's solid and liquid waste. This can be a low-hassle and relatively inexpensive method of disposal. Often, operations will have trash cans or tanks of material picked up by these organizations for a fee. You will want to ensure any containers you use provide sanitary holding of the waste at your facility until transport. An example of cost for landfill disposal is Logan City, which picks up animal waste for \$20/ton.

Upon pickup, your local treatment works may have anaerobic lagoons or wetlands to dispose of liquid waste safely and will likely have a multiple step protocol of primary particle removal, biological sanitation, and nutrient recycling. Information you may need about your

wastewaters before pickup include pH, TSS (total suspended solids), BOD (biological oxygen demand) and FOG (Fats, oils, and greases) levels.

Composting

Composting is an effective method to dispose of slaughter and butcher waste, including bones and blood. Whole carcasses can even be composted. When done correctly, this low-cost option will completely break down materials and recycle the nutrients into a useable form for crop production. When done correctly, composting neutralizes odors and pathogens.

A successful meat processor who composts their waste will source carbon rich materials such as straw, woodchips, or manure from local farmers, tree trimmers, landscape companies, dairies or municipal parks departments. It is necessary to add these to your pile to create the C:N ratio needed for composting. Coarse material is best as it will help a pile stay aerated and allow the compost process to continue. Compost piles will require turning of the pile and monitoring of temperatures to ensure the pile reaches the correct temperature. Compost piles should be located away from water sources, and not allow any run-on or run-off.

For details on how to compost butcher waste, see:

<https://datcp.wi.gov/Documents/cornellcompostguide.pdf> .

Many states or counties require permitting, or an approved plan, to compost butcher waste. Check with your local area agencies.

Offal Rendering

Rendering is the process of turning offal, and other waste meat products into other materials such as solidified fat that can be used in products, such as dog food, cosmetics, and other commercial applications. Rendering companies usually pick up or take offal for a fee. In the past rendering has been the primary method of disposal for slaughter and butcher facility offal. More recently this disposal option has become more expensive or no longer an option due to

rendering facility closures across the country. Rendering facilities will also not accept offal from certain species, ostrich, deer, goat, sheep, hog, roadkill, etc. Consider what breeds your option typically process and check your local area to see if there is a rendering facility near you. The USDA-APHIS has a list of establishments in each state on their website.

Onsite Treatment

Small meat processing operations may install their own on-site anaerobic or aerated lagoons, constructed wetlands, or specialized septic systems to dispose of their waste if located remotely and/or funds permit. Biogas digesters of covered lagoons are also an option which can be installed and produce energy, though they can be costly. Local dairies may have one of these disposal systems and be willing to arrange a deal. Those who are unable to connect to a public treatment works may consider installing onsite treatment.

Value Added Products

A wonderful way for butchering and slaughter operations to expand their business is by creating products out of what is typically waste material. This can boost profits while providing your community with access to specialized items that can be sold at a premium.

Consumables

Many parts of an animal not typically harvested in a large slaughter operation can be sold for high dollar as food when processed or marketed. These include organs, feet, bone marrow, bone broth, and tallow. Creating relationships with niche markets is key to successfully implementing value-added products as part of your business. Consumables may be marketed directly by a meat processor, or by setting up relationships with local restaurants, businesses, and international grocery stores.

Soil Amendments

Both blood and bones can be used as fantastic fertilizers for farms and gardens. Blood can be dried to create blood meal, a shelf stable natural fertilizer that is high in nitrogen. Bones can also

be ground into bone meal to be used as a phosphate fertilizer. These products are sold at high value per pound to farmers and gardeners than synthetic fertilizers. Creation of a soil amendment product can be registered for sale through the Utah Department of Agriculture and Food fertilizer program. Additionally, these products can also be certified as organic and sold at an even higher premium. Be aware, these products cannot be exported.

Blood may also be directly applied to fields for fertilization if local regulations permit. Field application of blood often requires permitting. Applied blood should be factored into a field's nutrient management plan. Excess blood may still need to be disposed of once a field's nutrient needs have been met.

Incineration

Incineration can be used to dispose of both solid animal waste and blood. This equipment is often located on site and provides a quick way to reduce large volumes of waste material without sorting. Incineration provides sanitation of pathogens and odor control. Some incinerators can produce electrical power. The initial input cost for incineration equipment may be high.

Incinerator ash from biological materials such as meat processing may be able to be applied to fields as fertilizer. If so, a farmer should factor this into their nutrient management plan.

Some incinerators may have options to filter out air pollutants. Due to EPA air quality regulations and public sentiment, incineration may be regulated or prohibited in some states.

Issues with Dumping

Though some states allow the pouring of wastewaters and blood down a drain or on personal land, this is not best practice. Solid and liquid waste should also not be dumped in pits, trenches, or openly burned. Doing this can cause biosecurity problems, pollute ground and surface waters, create insanitary conditions, and attract animals. Improper disposal of slaughter waste has been shown to increase the organic pollution load by 35-50%.

Mobile Operations

A common form of slaughter business is the mobile operation, where the processor travels on site to the farmer. In these situations, waste disposal still essential, and has additional considerations. Some farmers may volunteer to add waste to their personal compost piles or apply to their fields. Other farmers may desire to dig a pit to dispose of the waste, but this is not appropriate for many environments. It is the slaughter operator's responsibility to follow regulations that ensure human and environmental safety regardless of location.

Mobile slaughter businesses may offer a composter on their truck, an incinerator, or provide tanks and take the waste with them for disposal. Consider what permitting might be required for waste transport.

In some states, on farm processing is not allowed for certain types of meat. Mobile operations and those watching to butcher their own farm animals for retail sale will want to check the regulations in their local area.

Potentially Infected and Diseased Waste

Monitoring for Bovine spongiform encephalopathy (BSE or mad cow disease) is essential at every stage of the supply chain. This is a primary disease that meat processors will monitor for. Animals over 30 months of age need to dispose of skull, brain, eyes, spinal cord, vertebral column, and certain nerves separately. These are known as specified risk materials (SRMs). This will be part of the HACCP plans for all USDA-FSIS regulated facilities which slaughter or package and sell for public consumption.

Cattle suspected of having BSE before slaughter and exhibiting neurological disease symptoms should be completely disposed of to prevent spread of this highly infectious disease to humans.

If a cow is suspected to have BSE after slaughter, additional sanitation protocols should be followed to ensure brain and other tissues, which pose a potential hazard, are cleaned properly and enter the waste disposal systems. Contact Environmental Health and Safety for assistance.

Additionally, it should be noted that cattle which are in a hurt condition such as a broken leg cannot be harvested at a USDA inspected facility, and if brought to one will be scrapped.

Culling and disposal of large numbers of poultry is also a challenge some meat processors face. Appropriate disposal will depend on the disease the population is infected with, but common methods include composting and incineration.

Other Considerations for New Operations

Operations opening new facilities will also need to check for any zoning requirements, and address the stormwater for wastewater from pens, parking lots, trucks and trailer docking or washing areas both during and after construction.

References/Additional Resource

- Ashcroft, M. (2024, December 12). *Fertilizer Program*. Utah Department of Agriculture and Food. <https://ag.utah.gov/plant-industry/fertilizer-program/>
- Bonhotal J, Schwarz M, Brown N. *Natural Rendering: Composting Poultry Mortality*. Emergency Response to Disease Control. Ithaca: Cornell Waste Management Institute. 2008. Revised 2016. 14 p.
- Bonhotal J, Telega L, Petzen J. *Natural Rendering: Composting Livestock Mortality and Butcher Waste*. Ithaca: Cornell Waste Management Institute. 2002, updated 2019. 12 p.
- Butcher Waste Disposal Options for Small Meat Plants Operating in ND*. (2024). North Dakota Department of Agriculture. <https://www.ndda.nd.gov/sites/www/files/documents/files/Butcher%20Waste-%20Final%20Document.pdf>
- Carr, C., Eubanks, L., & Dijkhuis, R. (2008). Custom and retail exempt meat processing. *EDIS*, 2008(7). <https://doi.org/10.32473/edis-an204-2008>
- Code of Federal Regulations, Title 9, Chapter I Animal and Plant Health Inspection Service, Department of Agriculture, Subchapter D part 95. (1963, June 13). 9 *CFR § 95.25 - Blood Meal, Tankage, Meat Meal, and Similar Products, for Use as Fertilizer or Animal feed*.
- Cornell Law School: Legal Information Institute. <https://www.law.cornell.edu/cfr/text/9/95.25>

Fact Sheet: Bovine Spongiform Encephalopathy. Iowa Department of Agriculture and Land Stewardship. (2004, January 9). <https://iowaagriculture.gov/animal-industry-bureau/bovine-spongiform-encephalopathy>

Harris, L. J., & Tan, H. L. (2004). *Selling Meat and Meat Products (Publication 8146)*. University of California Division of Agriculture and Natural Resources. <https://doi.org/10.3733/ucanr.8146>

How Much Waste Is Produced When Butchering a Cow? Inciner8. (2024, July 2). <https://www.inciner8.com/blog/animal-incineration/how-much-waste-is-produced-when-butcher-a-cow>

Listed Slaughter and Rendering Establishments. United States Department of Agriculture: Animal and Plant Health Inspection Service. (2024, March 16). <https://www.aphis.usda.gov/livestock-poultry-disease/epidemiology/listed-slaughter-rendering-establishments>

Livestock, Poultry and Grain Feedstuffs Terms. Livestock, Poultry and Grain Feedstuffs Terms | Agricultural Marketing Service. (n.d.). <https://www.ams.usda.gov/market-news/livestock-poultry-and-grain-feedstuffs-terms>

MacKinney, R. E., Dornbush, J. N., & Vennes, J. W. (1971). *Waste Treatment Lagoons - State of the Art*. U.S. Government Printing Office.

Nazifa, T. H., Saady, N. M. C., Bazan, C., Zendejboudi, S., Aftab, A., & Albayati, T. M. (2021). Anaerobic Digestion of Blood from Slaughtered Livestock: A Review. *Energies*, 14(18), 5666. <https://doi.org/10.3390/en14185666>

Retail Food Establishment Permit. Florida Department of Agriculture and Consumer Services. (n.d.). <https://www.fdacs.gov/Business-Services/Food/Food-Establishments/Retail-Food-Establishment-Permit>

Satak, W. (n.d.). *Custom Meat*. Custom Meat | Washington State Department of Agriculture. <https://agr.wa.gov/departments/food-safety/food-safety/custom-meat>

Slaughter, Processing and Labeling. Iowa Department of Agriculture and Land Stewardship. (n.d.). <https://iowaagriculture.gov/meat-poultry-inspection-bureau/slaughter-processing-and-labeling>

Slaughterhouse Waste - Covered Lagoon Biogas Digester for Energy Production. Aqualimpia. (2020, January 9). <https://www.en-aqualimpia.com/biogasplant/slaughterhouse/>

Speer, B. (2023, December 21). *Solid Waste Permitting*. Utah Department of Environmental Quality. <https://deq.utah.gov/waste-management-and-radiation-control/solid-waste-permitting>

Speer, B. (2024, December 3). *Solid Waste Facilities Permits and Permitting*. Utah Department of Environmental Quality. <https://deq.utah.gov/waste-management-and-radiation-control/solid-waste-facilities-permits-and-permitting>

U.S. Department of Agriculture. (2016, February 22). *Blood Meal*. NAL Agricultural Thesaurus. <https://lod.nal.usda.gov/nalt/en/page/9043>

University of Wisconsin La Crosse. (n.d.). *Part H: Animal Tissue Disposal*. Environmental Health and Safety. <https://www.uwlax.edu/globalassets/offices-services/ehs/part-h.pdf>

University of Wyoming. (n.d.). *How do I dispose of animal blood & tissues?*. Risk Management and Safety Office. https://www.uwyo.edu/safety/_files/Docs/Procedures/HowDoIDisposeAnimalBlood.pdf

VanDriel, L. (2024, April 30). *Creating Value-Added Products from Processing Waste*. Friesla. <https://friesla.com/blog/creating-value-added-products-meat-processing-waste/>

VanDriel, L. (2024, December 18). *Waste Management Options for Small Meat Processing Facilities*. Friesla. <https://friesla.com/blog/waste-management-options-small-meat-processing-facilities/>

