Planning Considerations for Dairy Cattle Disposal by On-farm Burial

By Tom Glanville, Department of Agricultural & Biosystems Engineering

While a major portion of livestock mortalities are handled by the rendering industry, the number of rendering plants has declined in recent years. Some dairy operators say they no longer can obtain rendering service in their area, others are faced with higher rendering fees or less frequent service, and renderers have stopped accepting cattle more than 30 of age since they require special processing before they can be used in animal feed. As a result, a growing number of producers are considering on-farm disposal. This article looks at some of the pros and cons of on-farm burial as an alternative to rendering.

One of the first questions that livestock producers often ask is how the costs of burial compare with those for rendering. Since there is no quarterly bill to pay for on-farm burial, the true costs — of the land for the burial site itself; for the time and labor needed to excavate and close trenches; and the capital and operating costs of the equipment needed for burial — can be difficult to assess. Since rendering service fees include all costs associated with that option, a fair cost comparison should include all costs associated with alternative disposal methods. When all costs associated with burial are carefully reported, some studies have actually shown that burial costs exceed those for rendering. A 2001 Iowa State University survey of mortality disposal costs reported by 300 Iowa swine producers, for example, showed that the average total cost of burial was more than twice that of rendering.

Beyond the initial concerns related to cost, are additional questions concerning convenience, operational flexibility, and special facilities or equipment that may not be a normal part of livestock production. When properly planned and managed, on-farm burial offers the flexibility of being able to handle mortalities of any size. Weather permitting, burial is reasonably convenient, and required facilities and equipment—a backhoe for trench or pit excavation and backfilling, and a sufficient amount of well-drained land area for a burial site—are often part of existing operations. Excavation and backfilling can be difficult when the ground is frozen, but this is typically overcome by opening a sufficient length of trench during warm weather to meet anticipated burial needs when the soil is frozen.

The primary disadvantage of burial is its potential to contaminate soil, shallow groundwater, or nearby streams that derive their dry weather flow from shallow groundwater. The burial-related pollutant of greatest concern is nitrogen which can be released as both ammonia, or nitrite and nitrate. Total ammonia-nitrogen concentrations of

only 1-2 milligrams per liter (mg/L) can create chronic toxicity problems for young fish, and drinking water containing nitrate-nitrogen concentrations greater than 10 mg/L poses health threats to human infants.

As every crop and livestock producer who has ever developed a nutrient management plan knows, when nitrogen application rates significantly exceed agronomic rates for crop production, the potential for groundwater pollution increases. Unless livestock burial rates are purposely limited, the amount of nitrogen contained in carcasses can easily exceed agronomic rates. A 1200 pound cow carcass contains about 24 pounds of nitrogen that will be released into the soil as the carcasses degrade. That's not a lot of N only if a single cow is buried occasionally, but if animals are buried frequently in the same area year-after-year on a continuing basis, can become equivalent to application of more than 30,000 lbs of N per acre. Stacking of carcasses in a deep pit or trench can cause even higher rates. Even if subsurface decomposition takes 10-20 years this equates to average N releases well in excess of typical agronomic rates. Since carcasses are often buried four or more feet below ground this puts the carcass nitrogen below the root zone for many crops, reducing the potential for beneficial uptake, and increasing the risk that the N will ultimately leach into shallow groundwater.

To avoid the nitrogen pollution potential described above, the weight of carcasses buried in a given area should be limited. To accomplish this Iowa DNR rules limit routine on-farm burial to seven cattle, 44 swine, 73 sheep or lambs, or 400 poultry carcasses **on any given acre per year**. All other species are limited to 2 carcasses per acre.

When catastrophes cause sudden loss of large numbers of animals, higher loading rates than those listed above are permitted by Iowa DNR on a case-by-case basis if local geology and other conditions are judged to be such that local water resources will not be seriously impaired. Be sure to contact Iowa DNR (emergency phone number is 515/281-8694) for a ruling on emergency burial sites before proceeding with disposal. Due to the potential long-term environmental consequences of a large burial site, Iowa DNR may require the land owner to file an affidavit with the county assessor documenting the existence of the site on the deed to your property.

For planning purposes, the Iowa DNR interactive *Livestock Burial Zones* map, which can be accessed on the World Wide Web at http://www.iowadnr.gov/mapping/maps/livestock_burial_zones.html is a useful tool for identifying areas on your property that are suitable for burial of large quantities of carcasses. Using the interactive map, you can view maps and aerial photos of your property that identify potential problem locations for mass burial based on Iowa DNR's geographic information system database.

To further limit the potential for damage to valuable water resources and property, IDNR rules also require that burial sites be located outside of wetlands, floodplains, and shoreline

areas. Maximum allowable burial depth is six feet, burial must be at least two feet above the highest seasonal groundwater elevation, and carcasses must be covered with at least 30 inches of soil. Required horizontal setbacks are **at least**: 100 feet from a private well, stream, lake, or pond; 200 feet from a public well; 50 feet from property lines; and 500 feet from a residence.

==========