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Animal Rendering: Economics and Policy

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Summary

Renderers convert dead animals and animal byproducts into ingredients for a wide range of industrial and consumer goods, such as animal feed, soaps, candles, pharmaceuticals, and personal care products. U.S. regulatory actions to bolster safeguards against bovine spongiform encephalopathy (BSE or mad cow disease) could portend significant changes in renderers' business practices, the value of their products, and, consequently, the balance sheets of animal producers and processors. Also, if animal byproducts have fewer market outlets, questions arise about how to dispose of them safely. This report, which will not be updated, describes the industry and discusses several industry-related issues that have arisen in the 108th Congress.[1]

Introduction

Renderers convert dead animals and animal parts that otherwise would require disposal into a variety of materials, including edible and inedible tallow and lard and proteins such as meat and bone meal (MBM).[2] These materials in turn are exported or sold to domestic manufacturers of a wide range of industrial and consumer goods such as livestock feed and pet food, soaps, pharmaceuticals, lubricants, plastics, personal care products, and even crayons (also see **Table 1** on page 6).

Although rendering provides an essential service to the increasingly intensive and cost-competitive U.S. animal and meat industries (and is subject to certain government food safety and environmental regulations), the industry has largely operated outside of public view. However, rendering has attracted greater public attention since the discovery

[1] For periodic updates on issues affecting the industry, see CRS Issue Brief IB10127, *Mad Cow Disease: Agricultural Issues for Congress*.

[2] Among other sources for this report are Sparks Companies Inc., *The Rendering Industry: Economic Impact of Future Feeding Regulations*, June 2001, and *Livestock Mortalities: Methods of Disposal and Their Costs*, March 2002, both prepared for the National Renderers Association (NRA); Don A. Franco and Winfield Swanson, eds., *The Originial Recyclers*, 1996, published by the Animal Protein Producers Industry, the Fats & Proteins Research Foundation, and NRA; and February 2004 interviews with officials of NRA and the American Meat Institute (AMI).

of bovine spongiform encephalopathy (BSE or mad cow disease) in two North American cows in 2003. U.S. officials have announced or are considering new regulatory actions intended to reassure foreign and domestic customers that BSE will not threaten food safety or U.S. cattle herds. These actions are likely to cause changes in renderers' business practices, costs, and product values. Any changes in the economics of rendering likely will affect the economics of animal and meat producers too.

Industry Overview

Renderers annually convert 47 billion pounds or more of raw animal materials into approximately 18 billion pounds of products. Sources for these materials include meat slaughtering and processing plants (the primary one); dead animals from farms, ranches, feedlots, marketing barns, animal shelters, and other facilities; and fats, grease, and other food waste from restaurants and stores.

In meat animal slaughtering and processing plants, the amount of usable material from each animal depends largely upon the species. For example, at slaughter, a 1,200-pound steer can yield anywhere from 55% to 60% of human edible product, including meat for retail sale, edible fat, and variety meats (organs, tongue, tail, etc.), according to various estimates. Subtracting another 5%-8% for the weight of the hide, which goes into leather, leaves 32%-40% of material for rendering. If this range were applied consistently to all 35.5 million U.S. cattle slaughtered in 2003, the equivalent would represent the weight of approximately 11 million to 14 million live cattle.[3]

Elsewhere, independent renderers collect and process about half of all livestock and poultry that die from diseases or accidents before reaching slaughter plants (Sparks 2002). U.S. farm animal mortalities in 2000 included approximately 4.1 million cattle and calves (totaling 1.9 billion pounds); 18 million hogs (1 billion pounds); 833,000 sheep, lambs, and goats (64 million pounds); and 82 million chickens and turkeys (347 million pounds), according to Sparks, which examined USDA data.

"Disposing of these mortalities is complicated because of the need to minimize adverse environmental consequences, such as the spread of human and animal disease or the pollution of ground or surface water," Sparks (2002) observed. "For many producers, paying a modest fee to have a renderer remove dead carcasses is likely preferred to finding alternative on-farm disposal methods" (i.e., burial, incineration, or composting).

Number and Types of Rendering Plants. One study estimated that 137 firms operated 240 plants in 1997, with a total payroll of nearly 10,000 employees.[4] More recently, the National Renderers Association (NRA) estimated that Canada and the United States have a combined 250-260 rendering plants. Rendering facilities may be either integrated or independent operations.

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[3] Yield estimates vary, however. For example, the World Health Organization (WHO) has estimated that half of every cow and a third of every pig is not consumed by humans. WHO, *Understanding the BSE Threat*, October 2002.

[4] PL 107-9 Federal Inter-agency Working Group, *Animal Disease Risk Assessment, Prevention, and Control Act of 2001(PL 107-9), Final Report*, January 2003, Appendix 6.

Integrated plants operate in conjunction with animal slaughter and meat processing plants and handle 65%-70% of all rendered material. The estimated 95 U.S. and Canadian facilities (NRA) render most edible animal byproducts (i.e., fatty animal tissue), mainly into edible fats (tallow and lard) for human consumption. Edible rendering is subject to the inspection and safety standards of USDA's Food Safety and Inspection Service (FSIS) or its state counterparts, which by law already are present in the meat slaughter and processing plants. These plants also render inedible byproducts (including slaughter floor waste) into fats and proteins for animal feeds and for other ingredients. Because a meat plant typically processes only one animal species (such as cattle, hogs, or poultry), its associated rendering operations likewise handle only the byproducts of that species. The inedible and edible rendering processes are segregated.

Independent operations handle the other 30%-35% of rendered material. These plants (estimated by NRA at 165 in the United States and Canada) usually collect material from other sites using specially designed trucks. They pick up and process fat and bone trimmings, inedible meat scraps, blood, feathers, and dead animals from meat and poultry slaughterhouses and processors (usually smaller ones without their own rendering operations), farms, ranches, feedlots, animal shelters, restaurants, butchers, and markets. As a result, the majority of independents are likely to be handling "mixed species." Almost all of the resulting ingredients are destined for nonhuman consumption (e.g., animal feeds, industrial products). The U.S. Food and Drug Administration (FDA) regulates animal feed ingredients, but its continuous presence in rendering plants, or in feed mills that buy rendered ingredients, is not a legal requirement.

The Rendering Process. In most systems, raw materials are ground to a uniform size and placed in continuous cookers or in batch cookers, which evaporate moisture and free fat from protein and bone. A series of conveyers, presses, and a centrifuge continue the process of separating fat from solids. The finished fat (e.g., tallow, lard, yellow grease) goes into separate tanks, and the solid protein (e.g., MBM, bone meal, poultry meal) is pressed into cake for processing into feed.[5] Other rendering systems are used, including those that recover protein solids from slaughterhouse blood or that process used restaurant grease. This restaurant grease generally is recovered (often in 55-gallon drums) for use as yellow grease in non-human food products like animal feeds.

Value and Use of Rendered Products. The 18 billion pounds of ingredients that renderers produce each year have been valued at more than $3 billion, of which $870 million is exported. Of the 18 billion pound total, 10 billion pounds were feed ingredients with a value of approximately $1 billion (Sparks 2001). MBM accounted for 6.6 billion pounds of this, poultry byproducts 4 billion pounds, and blood meal 226 million pounds (Sparks).[6] Such ingredients are valued for their nutrients — high protein content, digestible amino acids, and minerals — and their relatively low cost. Poultry operations and pet food manufacturers accounted for 66% of the domestic MBM market of nearly 5.7 billion pounds in 2000, while hog and cattle operations took most of the rest.

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[5] A more detailed description and flowchart is on the NRA website, [http://www.renderers.org/].

[6] Sparks 2001. However, MBM as a proportion of *total* animal feed consumed is relatively low, at less than 1% each for ruminants and swine, about 2% for poultry, and 7% for pet food, Sparks said. Seventy percent of all blood meal has gone for ruminants, mainly dairy. (Otherwise, federal rules prohibit the feeding of most mammalian proteins back to ruminants.)

Policy Discussion

So long as animals are raised and processed for food, vast amounts of inedible materials will be generated, the result of premature deaths, herd culls, and slaughter byproducts. "Regardless of quantity, byproducts and rendered products from the slaughter process must be sold at whatever price will clear the market or the industry (and the environment) incurs a cost for disposal."[7] As government rules and industry practices evolve to address food safety and animal disease concerns like BSE, options for using these byproducts may become more limited. If animal byproducts have fewer market outlets, new questions may arise about how to dispose of them safely and who should pay.

"Feed Ban" Impacts. Scientists currently maintain that infected animal feed is the primary source of BSE transmission (although research continues into other potential sources). Therefore, U.S. officials believe that regulation of feed ingredients is the single most effective method for controlling BSE. Following the widespread outbreaks of BSE in Great Britain and Europe, the FDA in August 1997 imposed a ban on feeding most mammalian proteins to cattle and other ruminants. Prohibited proteins still can be fed to other animals such as pigs, poultry and pets. (FDA in late January 2004 announced plans to expand the list of prohibited proteins.)

Estimates vary on the economic impact of the feed ban. According to a 1997 report prepared for the FDA on compliance costs and market impacts, the FDA feed ban could reduce MBM values by between $63 million and $252 million, or $25 to $100 per ton.[8] Sparks (June 2001) estimated that the average MBM value loss since the 1997 rule was $18 per ton, for a total of $288 million during the period 1996 to 2000. Sparks added that these losses likely were highly concentrated among renderers that produce MBM exclusively, and among those handling mixed species. The FDA-commissioned report predicted that renderers would pass much of the lost value to packers by paying less for raw materials; packers in turn were expected to reduce their payments for cattle.

The 2001 Sparks study examined potential cost impacts of several options for more extensive feed restrictions. It estimated that a total animal protein feed ban to ruminants would cost $100 million yearly; a total ban on all ruminant proteins to all farm animals, $636 million yearly; and a total animal protein ban to all farm animals, $1.5 billion yearly.

Downers and Dead Animals. Another recent regulatory action with an impact on the rendering industry was USDA's December 30, 2003, ban on all "downer" (nonambulatory) cattle from the human food supply. U.S. officials consider downers, or animals unable to rise or walk, to be one of the higher-risk cattle groups for BSE (although industry officials note that most animals become nonambulatory from injuries or non-BSE diseases). Before the ban, USDA estimated that 150,000-200,000 downers were entering slaughter plants. One issue is whether the downer ban has removed an economic incentive to market downers and thus made it more difficult for USDA to obtain such animals for BSE (and other disease) surveillance.

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[7] PL 107-9 Federal Inter-agency Working Group, *Animal Disease Risk Assessment, Prevention, and Control Act of 2001 (PL 107-9), Final Report*, January 2003.

[8] Eastern Research Group, *Cost Analysis of Regulatory Options to Reduce the Risk of an Outbreak of Transmissible Spongiform Encephalopathies in the United States*, Addendum to the Final Report, April 30, 1997.

On March 15, 2004, USDA announced a major expansion of its BSE surveillance program that will sample many more downers and dead animals, adding that it is looking to renderers (among other sites) to make these animals available. Numerous practical problems — such as how to recover and store carcasses, who will sample, the costs, etc. — now confront both government and industry officials.[9]

Disposal Questions. If renderers earn less money from rendered byproducts and dead animals, they will pay less for such materials. In the past, renderers paid for dead animals. Now most charge a fee to pick them up.[10] In its 2002 study on the cost of livestock mortalities, Sparks assumed that so long as MBM could be sold for feed, the average per-head cost of disposing of dead cattle and calves might be $8.25 per head; if MBM is banned from animal feed, the cost could rise to $24.11 per head. Sparks estimated the per-head costs for other disposal methods at $9.33 for incineration, $10.63 for burial, and $30.34 for composting.

The 2002 World Health Organization (WHO) report observed that rendering, because it "sanitizes" animal wastes, "performs an essential public service: the environmental clean-up of wastes too hazardous for disposal in conventional ways. For example, animal wastes provide ideal conditions for the growth of pathogens that infect humans as well as animals. Incineration would cause major air pollution. Landfill could lead to disease transmission."[11]

A USDA advisory committee in February 2004 said that along with an enhanced BSE surveillance program, "a comprehensive system must be implemented to facilitate adequate pathways for dead and non-ambulatory cattle to allow for collection of samples, and for proper, safe disposal of carcasses; this must be done to ensure protection of public health, animal health, and the environment; such a system will require expending federal resources to assist with costs for sampling, transport and safe disposal."[12]

Others temper this view of rendering by observing that the nation's clean air and water laws are in place to address possible adverse environmental impacts. These responsibilities are enforced under the purview of the U.S. Environmental Protection Agency (EPA) and generally through states and localities, which often impose their own environmental and health standards as well. While rendering (which also must abide by such standards) certainly is one option for handling dead stock and animal byproducts, it has been argued, this option does not relieve the animal and meat industries of their environmental responsibilities. Because these industries created this material, they should bear the costs, not the public, particularly at a time when budget deficits are forcing difficult spending choices, the argument goes.

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[9] About 75-85 rendering plants currently accept nonambulatory livestock, Tom Cook, NRA president, said in early 2004. About 85-90 plants could handle dead animals, he also has said. Information on the BSE surveillance plan is available through USDA at: [http://www.usda.gov/].

[10] Tom Cook, NRA President, personal communication, January 19, 2004.

[11] *Understanding the BSE Threat*, p. 7. WHO also notes that BSE is "the notable exception" to rendering's ability to kill most infectious agents.

[12] Secretary's Advisory Committee on Foreign Animal and Poultry Diseases, *Measures Relating to Bovine Spongiform Encephalopathy in the United States*, February 13, 2004.

Table 1. U.S. Production, Consumption, and Export of Rendered Products, 1999-2003(p)

	1999	2000	2001	2002	2003(p)
PRODUCTION	(in thousand metric tons)				
Inedible tallow & greases	3,209.5	3,242.9	3,116.2	2,927.1	2,826.4
Edible tallow	784.4	834.8	836.9	894.3	890.1
Lard	243.1	234.9	182.9	118.6	113.2
Meat meal & tankage	2,748.2	2,612.4	2,508.7	2,256.3	2,482.9
Feather meal	379.2	367.6	353.6	357.2	354.1
All other inedible [a]	1,148.2	1,235.4	1,257.7	1,911.6	1,386.7
Total Production	8,518.6	8,534.1	8,262.0	8,471.1	8,478.9
DOMESTIC CONSUMPTION					
Soap	104.0	67.1	[b]	[b]	[b]
Inedible tallow for feed	435.5	412.0	424.4	400.2	549.2
Greases for feed	812.2	837.9	859.6	648.2	622.8
Lubricants	45.6	46.5	[b]	[b]	[b]
Fatty acids	262.1	265.0	262.0	[b]	[b]
Edible tallow (edible/inedible uses)	194.4	206.9	241.7	232.3	200.8
Lard (edible/ inedible uses)	176.2	156.0	136.0	136.2	122.7
Meat meal & tankage; feather meal	3,873.1	3,755.7	3,626.4	3,920.6	2,276.5
Total Domestic Consumption	5,934.5	5,779.6	5,664.3	5,707.6	4,068.7
EXPORTS					
Inedible tallow	875.8	789.4	605.4	792.3	713.1
Yellow grease	183.4	182.6	184.3	287.8	259.0
Other inedible fats & oils	247.6	229.7	190.3	206.7	223.9
Edible tallow	143.8	110.8	165.3	232.0	204.2
Lard	66.9	78.9	46.9	38.2	53.6
Meat & bone meal	381.5	434.9	451.6	565.5	520.3
Feather meal	21.0	24.9	42.0	39.0	40.2
Bone & bone products	26.4	35.1	36.9	23.8	25.6
Total Exports	1,946.5	1,886.2	1,722.7	2,184.5	2,039.9

Source: NRA; 2003 data preliminary (p).

a. Includes poultry fat and by-product meal and raw products for pet food.

b. Withheld to avoid disclosing individual firm data.