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Cost Analysis of Regulatory Options to Reduce the Risk of an Outbreak of Transmissible Spongiform Encephalopathies (TSEs) in the United States

Addendum to the Final Report
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SECTION ONE

EXECUTIVE SUMMARY

This addendum extends the analysis presented in the Eastern Research Group final report *Cost Analysis of Regulatory Options to Reduce the Risk of an Outbreak of Transmissible Spongiform Encephalopathies (TSEs) in the United States* (ERG, 1996). It summarizes the regulatory impacts of the FDA final rule and provides further documentation on several topics relating to the costs and benefits of FDA regulation of the TSE hazard, as requested by FDA.

For its final rule, FDA is instituting a prohibition on the use of mammalian protein in ruminant feed, with exceptions for blood and blood products, gelatin, inspected and processed meat products which have been cooked and offered for human consumption, milk products, and mammalian protein that consists only of porcine or equine protein. (The discussion below refers to this as the mammalian prohibition, with exceptions.) This prohibition is quite similar in its economic impacts to the ruminant-to-ruminant prohibition proposed by FDA.

The FDA action restricts the marketing of meat and bonemeal (MBM) that contains mammalian protein (other than pure porcine or equine protein) and will cause its price to fall. (This MBM product is referred to below as mammalian or restricted MBM, a term that in this discussion excludes MBM consisting of pure porcine or equine protein only). The amount of the decline depends partly on the reaction, which is unpredictable, of agricultural industries and the general public to the FDA rulemaking. To capture the possible range of public reaction and the related market shifts, ERG estimated low and high market impact scenarios in which the price of the mammalian MBM falls by $25 per ton or $100 per ton. (The price decline is also forecast under the other regulatory alternatives, except for the sheep/mink and sheep and goat prohibitions, where the quantity of prohibited MBM is so small that impacts on the price of MBM will be negligible.) A report by Sparks Companies, Inc. (SCI) sponsored by the rendering industry also forecast market outcomes and estimated a $68 per ton decline in mammalian MBM. The decline in the commercial value of mammalian MBM is estimated at $62.9 million per year under the low market impact scenario and $251.5 million per year under

the high market impact scenario. The medium market impact scenario, based on the SCI forecast, generates a revenue decline of $171.0 million per year.

The affected industries will make expenditures to perform required compliance actions or to adjust to the change in market circumstances. Renderers and feedmills, for example, must maintain records describing the mammalian proteins they are handling and relabel restricted products with warning labels to prevent them from being fed to ruminants. Those ruminant producers now using mammalian MBM will have to substitute other proteins, incurring incremental feed costs. While not explicitly required by the FDA final rule, feedmills will be induced to expand their storage capacity to accommodate two types of MBM (mammalian and unrestricted) if mammalian MBM falls in price sufficiently. ERG estimated the annualized compliance costs under the final rule to be $17.2 million, $44.3 million, or $44.3 million for the low, medium, and high impact market scenarios, respectively.

Renderers will pass much of the economic impact of the FDA final rule upstream to meatpacking operations, which in turn will pass them on to animal producers. For example, small meatpackers are estimated to incur an increase in renderer charges (or a decline in renderer payments) equal to approximately 1 percent of revenues. Meatpackers will also pass through the revenue decline by reducing their payments for cattle. In the long run, a modest reduction in the size of the affected animal herds is forecast.

The small renderers will attempt to increase pickup charges to farmers and ranchers. To avoid these charges, some ranchers and farmers will dispose of more dead animals on their own land, thereby reducing the amount of dead stock going to rendering. The reduction in their raw material supply will make some small renderers vulnerable to failure.

SECTION TWO

REVISED REVENUE AND COMPLIANCE COST IMPACTS

ERG revised its economic impact estimates from those in the final report to encompass the FDA final rule and to incorporate various modifications in estimates and assumptions. This section presents the revised estimates, with quantitative findings summarized in a series of tables. The methodologies and calculations employed are the same as those presented in ERG's final report.

2.1 INTRODUCTION TO REGULATORY ALTERNATIVES

FDA considered seven regulatory alternatives, including the final rule. The alternatives are:

- A prohibition on the use of mammalian protein in ruminant feed (Referred to as the mammalian prohibition).
- A prohibition on the use of mammalian protein in ruminant feed, with exceptions for blood and blood products, gelatin, inspected and processed meat products which have been cooked and offered for human consumption, milk products, and mammalian protein that consists only of porcine or equine protein (the mammalian prohibition, with exceptions).
- A prohibition on the use of ruminant protein in ruminant feed (the ruminant prohibition).
- A prohibition on the use of designated tissues in ruminant feed. Under this prohibition, ruminant feed would not be recognized as safe if it included designated bovine tissues, including the brain, eyes, spinal cord, and distal ileum; any material from ovine, caprine, cervine, and mink; or any dead, dying, disabled, or diseased bovine (the partial ruminant prohibition).
- A prohibition on the use of protein from sheep, lamb, goat, deer, elk, or mink in ruminant feed. Thus, under this option, use of cattle protein is not restricted (the sheep/mink prohibition).

- A prohibition on the use of protein from sheep, lamb, and goats in ruminant feed (the sheep and goat prohibition).

- No direct regulatory action, but continued monitoring of animal health.

The last alternative does not generate any economic impacts and is not discussed further.

2.2 SUMMARY OF IMPACTS

Table 2-1 calculates the quantities of restricted animal offal and dead stock that will be regulated under the final rule. Overall, the FDA final rule would directly restrict the sale of MBM made from nearly 4 billion lbs. of animal protein generated in the slaughtering and processing of nearly 50 million animals. Because of the mixing of animal offal by independent renderers, the FDA final rule also would indirectly restrict sales of over an additional 1 billion lbs. (The directly and indirectly restricted quantities of offal are included in the calculation of impacts in Table 2-6 below.) The coverage of the FDA final rule is not as broad as that of the mammalian-to-ruminant alternative, under which sales of MBM containing pure porcine or equine protein, as well as ruminant MBM, would be restricted. The final rule does not regulate MBM consisting of pure porcine or equine protein. The final rule has slightly broader coverage than the ruminant-to-ruminant prohibition that had been proposed by FDA; nevertheless, the offal from the additional species covered in the final rule is normally mixed during rendering with that from ruminant animals, so each alternative affects the same quantity of animal offal.

Table 2-2 describes the compliance costs and losses generated by each regulatory alternative. Due to the uncertainty of outcomes in the market for mammalian MBM, ERG forecast in its final report that the price of mammalian MBM could decline by $25 per ton (the low market impact scenario) to $100 per ton (the high market impact scenario). ERG also examined the study by Sparks Companies, Inc. (SCI) sponsored by the National Renderers Association and submitted to FDA as part of industry comments on the proposed rule. Based on interviews with executives in the affected agricultural industries, SCI also estimated the decline in ruminant MBM prices. While also noting the considerable uncertainty about regulatory impacts, SCI estimated that a ruminant-to-ruminant prohibition would generate a decline from

baseline MBM prices of $68 per ton. This estimate is very close to the midpoint of the range originally estimated by ERG ($62.50). Therefore, ERG has used all three estimates in calculating regulatory impacts: its own two market impact scenarios and the $68 per ton price decline forecast.

The FDA final rule is estimated to generate a decline in the aggregate value of mammalian MBM of $62.9 million per year under the low market impact scenario and $251.5 million per year under the high

Table 2-1

Estimated Annual Generation of Restricted Material
Under the Mammalian-to-Ruminant Prohibition (With Exceptions)

Type of Material	Heads of Animal	Live Weight (lb/head)	Percent Offal	Restricted Material (lb/head)	MBM Yield	Restricted Offal and 4-D Carcasses (million lb)	Restricted Rendered Protein (million lb)
Cattle	35,600,000 (a)	1,200	30%	360	25%	12,816.0	3,204.0
Calves	1,500,000 (a)	250	30%	75	25%	112.5	28.1
4-D cattle	854,157 (b)	900	NA	900	22%	768.7	169.1
4-D calves	1,477,039 (c)	200	NA	200	22%	295.4	65.0
Lambs - Eastern	772,300 (a)	125	30%	37.5	25%	29.0	0.1 (d)
Lambs - Western	3,341,500 (a)	125	30%	37.5	25%	125.3	0.3 (d)
Adult sheep	330,800 (e)	150	30%	45	25%	14.9	0.0 (d)
4-D adult sheep	439,000 (e)	150	NA	150	22%	65.9	0.1 (d)
Goats	81,667 (e)	150	30%	45	25%	3.7	0.0 (d)
Kids	143,037 (e)	70	30%	21	25%	3.0	0.0 (d)
4-D goats	104,785 (e)	150	NA	150	22%	15.7	0.0 (d)
Deer (f)	NA	100	NA	NA	25%	60.3	15.1 (d)
Bison	12,500 (g)	1,200	25%	300	25%	3.8	0.9
Mink	2,692,000 (h)	NA	NA	2.5	22%	6.7	1.2 (d)
Grocery wastes (i)	NA	NA	NA	NA	25%	43.0	10.8
4-D swine	1,888,921 (j)	225	NA	225	25%	425.0	106.3
Other /sludge	NA	NA	NA	NA	22%	1,615.7 (k)	355.4
Total (l)	49,237,707	NA	NA	NA	NA	16,404.5	3,956.5

(a) USDA, 1996a.
(b) Derived from the total dead stock rendering weight for cattle in Sparks Companies, Inc., 1997, the share of cattle and calf dead stock comprised by cattle from NASS, 1997, and the assumption of 900 lbs per animal.
(c) Derived from the total dead stock rendering weight for cattle in Sparks Companies, Inc., 1997, the share of cattle and calf dead stock comprised by calves from NASS, 1997, and the assumption of 200 lbs per animal.
(d) Most lamb and goat protein is marketed for pet food, a use that is not restricted. Thus most of this protein was excluded from the calculation of restricted protein. A large share of adult sheep offal and a portion of mink offal are currently being landfilled or buried on the farm and these quantities were excluded from the calculations of affected materials.
(e) CVM, 1996.
(f) ERG estimate. Deer offal is estimated to be generated at 1 percent of the rate for swine offal to capture commercial slaughter, recreational hunting, and roadkill.
(g) ERG estimate.
(h) USDA, 1996b.
(i) Fat trimmings are included in offal total for live slaughter categories. The out-of-date meats contribution is estimated at 0.1 percent of total meat consumption of approximately 43 billion lb.
(j) Derived from the total dead stock rendering weight reported in Sparks Companies, Inc., 1997 and the assumption of 225 lb per animal shown.
(k) Total sludge weight minus sludge from poultry operations reported in Sparks Companies, Inc., 1997.
(l) Estimates were not made for water buffalo and other ruminants.
NA = Not applicable.
NE = Not estimated.

Table 2-2
Estimated Costs and Losses of
Alternative Regulatory Prohibitions

Annualized Impacts	Mammalian-to-Ruminant	Mammalian-to-Rum. With Exceptions (final rule)	Ruminant-to-Ruminant	Partial Ruminant-to-Ruminant	Sheep/Mink-to-Ruminant	Sheep/Goat-to-Ruminant
Quantity of restricted MBM (million lbs)	6,086.4	5,030.5	5,030.5	2,282.6	16.9	0.6
Low Market Impact Scenario ($25/Ton) (a)						
Compliance Costs						
Capital costs	$7,115,000	NA	NA	$3,144,474	NA	NA
Plant operating costs	$20,000,000	NA	NA	$14,423,875	NA	NA
Transportation costs	$10,651,116	$7,545,744	$7,545,744	$5,302,150	NA	NA
Documentation costs	$315,920	$315,920	$315,920	$243,908	$948	$948
Reformulation, reregistration, and relabeling costs	$2,117,491	$1,341,806	$1,341,806	$46,825	NA	NA
Feed substitution costs	$9,662,084	$7,985,912	$7,985,912	$3,623,561	NA	NA
Disposal costs	NA	NA	NA	NA	$5,121,949	$193,050
Total compliance costs	$49,861,611	$17,189,382	$17,189,382	$26,784,793	$5,122,897	$193,998
Other Societal Losses						
Industry Losses From Decline in Value of MBM	$76,079,402	$62,881,196	$62,881,196	$28,531,977	$4,221,794	$154,757
Gains from feed cost reductions for other sectors	($72,275,432)	($59,737,136)	($59,737,136)	($27,105,378)	NA	NA
Net other social losses	$3,803,970	$3,144,060	$3,144,060	$1,426,599	$4,221,794	$154,757
Net costs and losses	$53,665,582	$20,333,442	$20,333,442	$28,211,392	$9,344,691	$348,755

Table 2-2 (cont.)
Estimated Costs of
Alternative Regulatory Prohibitions

Annualized Impacts	Mammalian-to-Ruminant	Mammalian-to-Rum. With Exceptions (final rule)	Ruminant-to-Ruminant	Partial Ruminant-to-Ruminant	Sheep/Mink-to-Ruminant	Sheep/Goat-to-Ruminant
			Medium Market Impact Scenario ($68/Ton) (a)			
Compliance Costs						
Capital costs	$7,115,000	$7,115,000	$7,115,000	$4,923,224	NA	NA
Plant operating costs	$20,000,000	$20,000,000	$20,000,000	$26,923,875	NA	NA
Transportation costs	$10,651,116	$7,545,744	$7,545,744	$5,302,150	NA	NA
Documentation costs	$315,920	$315,920	$315,920	$243,908	$948	$948
Reformulation, reregistration, and relabeling costs	$2,117,491	$1,341,806	$1,341,806	$46,825	NA	NA
Feed substitution costs	$9,662,084	$7,985,912	$7,985,912	$3,623,561	NA	NA
Disposal costs	NA	NA	NA	NA	$5,121,949	$193,050
Total compliance costs	$49,861,611	$44,304,382	$44,304,382	$41,063,543	$5,122,897	$193,998
Other Societal Losses						
Industry Losses From Decline in Value of MBM	$206,935,975	$171,036,853	$171,036,853	$77,606,978	$4,221,794	$154,757
Gains from feed cost reductions for other sectors	($196,589,176)	($162,485,010)	($162,485,010)	($73,726,629)	NA	NA
Net other social losses	$10,346,799	$8,551,843	$8,551,843	$3,880,349	$4,221,794	$154,757
Net costs and losses	$60,208,410	$52,856,225	$52,856,225	$44,943,892	$9,344,691	$348,755

Table 2-2 (cont.)
Estimated Costs of
Alternative Regulatory Prohibitions

Annualized Impacts	Mammalian-to-Ruminant	Mammalian-to-Rum. With Exceptions (final rule)	Ruminant-to-Ruminant	Ruminant-to-Ruminant	Partial Sheep/Mink-to-Ruminant	Sheep/Goat-to-Ruminant
			High Market Impact Scenario ($100/Ton) (a)			
Compliance Costs						
Capital costs	$7,115,000	$7,115,000	$7,115,000	$4,923,224	NA	NA
Plant operating costs	$20,000,000	$20,000,000	$20,000,000	$26,923,875	NA	NA
Transportation costs	$10,651,116	$7,545,744	$7,545,744	$5,302,150	NA	NA
Documentation costs	$315,920	$315,920	$315,920	$243,908	$948	$948
Reformulation, reregistration, and relabeling costs	$2,117,491	$1,341,806	$1,341,806	$46,825	NA	NA
Feed substitution costs	$9,662,084	$7,985,912	$7,985,912	$3,623,561	NA	NA
Disposal costs	NA	NA	NA	NA	$5,121,949	$193,050
Total compliance costs	$49,861,611	$44,304,382	$44,304,382	$41,063,543	$5,122,897	$193,998
Other Societal Losses						
Industry Losses From Decline in Value of MBM	$304,317,610	$251,524,783	$251,524,783	$114,127,908	$4,221,794	$154,757
Gains from feed cost reductions for other sectors	($289,101,729)	($238,948,544)	($238,948,544)	($108,421,513)	NA	NA
Net other social losses	$15,215,880	$12,576,239	$12,576,239	$5,706,395	$4,221,794	$154,757
Net costs and losses	$65,077,492	$56,880,621	$56,880,621	$46,769,938	$9,344,691	$348,755

(a) In the medium and high market impact scenarios only, feedmills make capital investments and incur operating costs to handle two types of MBM.
(b) The loss to industry revenues has been set at $500 per ton equivalent of MBM to reflect both the loss of mixed species MBM and the associated tallow.
Source: ERG estimates.

market impact scenarios. The medium market impact scenario, based on the SCI forecast of a $68 per ton price decline, will generate a decline in value of $171.0 million per year. This decline in value appears initially as a decline in renderers' revenue, but renderers will pass the bulk of the losses on to their raw material suppliers, namely meatpacking operations and animal producers.

The decline in the price of mammalian MBM results in a cost savings for producers of nonruminant animals and pet food manufacturers, who can continue to use mammalian MBM. Table 2-2 shows that the cost savings to these groups are $59.7 million per year under the low market impact scenario, $162.5 million per year under the medium market impact scenario, and $238.9 million per year under the high market impact scenario. Thus, while the ruminant producing and processing sectors of the agricultural economy will lose significant revenues, nonruminant producers and others will benefit. The difference between the loss to ruminant sectors and the gain to other sectors is a net social loss resulting from the restriction on uses of mammalian MBM. This accounting of gains and losses is relevant only to the calculation of a total net cost and benefit of the regulation and should not obscure the economic impact on the ruminant sectors.

The affected industries will incur costs to perform required compliance actions or to adjust to the change in market circumstances. Renderers and feedmills, for example, must maintain records describing the animal proteins they are handling and relabel restricted products with warning labels to prevent them from being fed to ruminants. Those ruminant producers now using mammalian MBM will have to substitute other proteins, incurring incremental feed costs. The feed substitution costs can be described, in theoretical economic terms, as representing the loss of consumer surplus for ruminant producers. The costs represent the lost benefits for these producers from no longer being able to use mammalian protein.

Furthermore, while not explicitly required by the FDA final rule, feedmills will be induced to expand their storage capacity to accommodate both mammalian (restricted) and unrestricted MBM if mammalian MBM falls in price sufficiently. Feedmills are forecast to expand capacity under the medium and high market impact scenarios. Thus, these investments are not made under the low market impact scenario, where the price of mammalian MBM falls

by only $25 per ton. Also, renderers will incur incremental transportation costs to sell mammalian MBM to new, potentially more distant, markets. ERG estimated the compliance costs under the final rule to vary from $17.2 million per year under the low market impact scenario and $44.3 million per year for both the medium and high impact market scenarios.

Combining the compliance costs with the social losses generated by the restrictions on the sale of mammalian MBM, ERG estimated the total costs and losses of the final rule at $20.3 million per year under the low market impact scenario, $52.9 million per year under the medium market impact scenario, and $56.9 million per year under the high market impact scenario.

2.3 ADDITIONAL COST ELEMENTS

2.3.1 Costs of Relabeling for Feedmill Operators

ERG reexamined the costs of relabeling after reviewing industry comments and examining the compliance requirements for the final rule. Relabeling will be performed principally to add warning statements to feed mixes with mammalian protein. Some labels will also be revised to denote inclusion of unrestricted MBM, thereby allowing its use in ruminant feeds. Table 2-3 calculates the costs of relabeling for feedmills and renderers. As shown in the table, the revised relabeling costs are based on the number of labels affected whereas in the final report, ERG estimated relabeling costs on a per facility basis.

The unit relabeling cost is based on the incremental costs for revising the industry's tags and bag labels. ERG understands that in lieu of changing tags and bag labels, some companies could place warning stickers on products until such time as they can revise all the labels. Because in the normal course of business all tags and labels are eventually revised as feed formulations change, the use of stickers could make the incremental regulatory costs negligible. Some feedmills contacted by ERG, however, indicated that they would not use warning stickers because of the additional production labor needed to attach them and the potential for confusion in having to apply stickers to some products but not others. Thus, they judged that stickers would not reduce their compliance costs. Accordingly, ERG estimated the relabeling costs

assuming either that tags and bag labels are revised to add the required warning statements, or that, if stickers are used, they do not reduce the costs of compliance.

While it was estimated that feedmill personnel can modify each label quite quickly (with ½ hour of activity for the mill's labeling manager), the companies will incur a fixed charge from their printers to modify each label's printing plate. Companies might also incur inventory losses as they discard unused old labels

Table 2-3

Relabeling Costs

	National Feedmill Companies	Regional Feedmills Companies	Large Local Feed Manufacturing Companies	Other Feedmills	Indep. Renderers and Affected Packer/Renderers
Number of feed mix labels affected per facility					
Mammalian prohibition	500	300	20	10	3
Mammalian prohibition with exceptions	400	200	16	8	3
Ruminant prohibition	400	200	16	8	3
Partial ruminant prohibition	60	25	5	0	3
Cost of printing change per feed label revised	$68	$68	$68	$68	$68
Percent of feedmills companies forecast to relabel products					
Mammalian prohibition	100%	100%	100%	20%	100%
Mammalian prohibition with exceptions	100%	100%	95%	15%	100%
Ruminant prohibition	100%	100%	95%	15%	100%
Partial ruminant prohibition	100%	50%	25%	5%	100%
Labor hours per staff level per feed label revised					
Staff level (Loaded Wage Rate)					
Senior management ($49.00)	0.05	0.05	0.05	0.05	2
Nutritionist ($45.00)	0.5	0.5	0.5	0.5	NA
Middle management ($32.20)	NA	NA	NA	NA	2
Clerical ($14.00)	0.05	0.05	0.05	0.05	0.25
Share of relabeling costs that can be incorporated into other labeling changes	10%	10%	10%	10%	10.0%
Per facility costs for relabeling feed mixes					
Mammalian prohibition	$41,918	$25,151	$1,677	$168	$630
Mammalian prohibition with exceptions	$33,534	$16,767	$1,274	$101	$630
Ruminant prohibition	$33,534	$16,767	$1,274	$101	$630
Partial ruminant prohibition	$5,030	$1,048	$105	$0	$630

	All Feedmills	Renderers
Total capital costs for relabeling		
Mammalian prohibition	$5,457,659	$155,654
Mammalian prohibition with exceptions	$3,346,693	$130,447
Ruminant prohibition	$3,346,693	$130,447
Partial ruminant prohibition	$38,145	$130,447
Total annualized costs for relabeling (a)		
Mammalian prohibition	$776,625	$22,150
Mammalian prohibition with exceptions	$476,234	$18,563
Ruminant prohibition	$476,234	$18,563
Partial ruminant prohibition	$5,428	$18,563

(a) Capital costs for relabeling were annualized over 10 years at a 7 percent annual discount rate.

and replace them with new labels. FDA has indicated, however, that feed companies will be given latitude to use up old label inventories; inventory losses, therefore, should be insignificant, and none were estimated. The compliance costs do not include the label printing runs because feedmills must always place a label on their products. The labels themselves, therefore, are not an incremental cost of the regulation. Most small feed dealers were excluded from the relabeling costs on the presumption that they are not blending their own mixes, and the labels on their feeds will have been revised by the original manufacturers.

As shown in Table 2-3, the annualized cost of the label revisions for feedmills are estimated at $0.5 million for the final rule. This includes a minor cost for renderers to cover revisions to their product documentation as well.

2.3.2 Capital Costs for Feedmill Expansion

ERG estimated that the capital cost per feedmill for expanding storage capacity will average $50,000. Table 2-4 presents the calculation of feedmill capital and operating costs. As noted in the final report, this capital cost is sufficient to construct an economically efficient storage bin capable of holding 30 to 40 tons, i.e., a bin adequate to receive a full truckload of MBM. The capital cost estimate is credible in view of an industry rule of thumb that it costs roughly $1,000 per ton to add storage capacity. The estimate is also greater than the estimate presented in comments by the National Grain and Feed Association (NGFA), which said that capacity expansion per feedmill is likely to cost $25,000 to $30,000.

In discussing feedmill capacity expansion with industry executives, ERG noted the reluctance of many individuals to undertake such projects. With the expansion, feedmills would be adding to their plant investment but would not necessarily be able to increase plant throughput or revenues over current levels. Nevertheless, the extra capacity would allow the feedmills to sustain their current customer base (including both ruminant and nonruminant producers) by providing the most economical MBM-containing feed mixes.

Feedmills will also incur one-time capital costs to reformulate and reregister their feed mixes in light of the restrictions on the sale of mammalian protein. Tables 2-4 and 2-5 present the feed industry's reformulation costs and the assumptions used in estimating costs, respectively. The reformulation and reregistration costs, like plant capital costs, were annualized over ten years.

Table 2-4
Incremental Capital and Operating Costs for Feedmills (a)

Calculation Parameter	Mammalian-to-Ruminant Prohibition		Mamalian-to-Ruminant Prohibition With Exceptions		Ruminant-to-Ruminant Prohibition		Partial Ruminant Prohibition	
	Capital Costs	Operating Costs	Capital Costs	Operating Costs	Capital Costs	Operating Costs	Capital Costs	Operating Costs
Number of feedmills	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Major commercial operations	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Other feedmills	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
Percent of feedmills forecast to add second MBM /bypass protein storage tank								
Major commercial operations	20%	40%	20% (b)	40%	20% (b)	40%	5% (b)	25%
Other feedmills	0%	0%	0%	0%	0%	0%	0%	0%
Expansion cost per facility								
Major commercial operations	$50,000	$10,000	$50,000	$10,000	$50,000	$10,000	$50,000	$10,000
Other feedmills	NA	NA	NA	NA	NA	NA	NA	NA
Total industry cost for expanding facilities								
Major commercial operations	$50,000,000	$20,000,000	$50,000,000	$20,000,000	$50,000,000	$20,000,000	$12,500,000	$12,500,000
Other feedmills	NA	NA	NA	NA	NA	NA	NA	NA
Number of affected feed manufacturing companies								
National feed manufacturing companies	3	3	3	3	3	3	3	3
Regional feed manufacturing companies	12	12	12	12	12	12	12	12
Large local manufacturing companies	100	100	100	100	100	100	100	100
All other feed dealers, cooperatives	29,000	29,000	29,000	29,000	29,000	29,000	29,000	29,000
Percent of feedmills companies forecast to reformulate nutritional formulas/reregister products								
National feed manufacturing companies	100%	100%	100%	100%	100%	100%	100%	100%
Regional feed manufacturing companies	100%	100%	100%	100%	100%	100%	50%	50%
Large local manufacturing companies	100%	100%	95%	95%	95%	95%	25%	25%
All other feed dealers, cooperatives	20%	20%	15%	15%	15%	15%	5%	5%
Reformulation cost per facility								
National feed manufacturing companies	$46,575	NA	$37,260	NA	$37,260	NA	$5,589	NA
Regional feed manufacturing companies	$27,945	NA	$18,630	NA	$18,630	NA	$2,329	NA
Large local manufacturing companies	$1,863	NA	$1,490	NA	$1,490	NA	$466	NA
All other feed dealers, cooperatives	$932	NA	$745	NA	$745	NA	$0	NA
Total industry cost for reformulating feed mixes								
National feed manufacturing companies	$139,725	NA	$111,780	NA	$111,780	NA	$16,767	NA
Regional feed manufacturing companies	$335,340	NA	$223,560	NA	$223,560	NA	$13,972	NA
Large local manufacturing companies	$186,300	NA	$141,588	NA	$141,588	NA	$11,644	NA
Other feed dealers, cooperatives	$5,402,700	NA	$3,241,620	NA	$3,241,620	NA	$0	NA
Total reformulating costs	$6,064,065		$3,718,548		$3,718,548		$42,383	

Table 2-4
Incremental Capital and Operating Costs for Feedmills (a)

Calculation Parameter	Mammalian-to-Ruminant Prohibition		Mamalian-to-Ruminant Prohibition With Exceptions		Ruminant-to-Ruminant Prohibition		Partial Ruminant Prohibition	
	Capital Costs	Operating Costs	Capital Costs	Operating Costs	Capital Costs	Operating Costs	Capital Costs	Operating Costs
Product reregistration cost per facility								
National feed manufacturing companies	$133,688	$33,422	$106,950	$26,738	$106,950	$26,738	$16,043	$1,604
Regional feed manufacturing companies	$48,128	$7,219	$32,085	$4,813	$32,085	$4,813	$4,011	$201
Large local manufacturing companies	$428	$43	$342	$34	$342	$34	$107	$5
All other feed dealers, cooperatives	$107	$5	$86	$4	$86	$4	$0	$0
Total industry cost for reregistering feed mixes								
National feed manufacturing companies	$401,063	$100,266	$320,850	$80,213	$320,850	$80,213	$48,128	$4,813
Regional feed manufacturing companies	$577,530	$86,630	$385,020	$57,753	$385,020	$57,753	$24,064	$1,203
Large local manufacturing companies	$42,780	$4,278	$32,513	$3,251	$32,513	$3,251	$2,674	$134
All other feed dealers, cooperatives	$620,310	$31,016	$372,186	$18,609	$372,186	$18,609	$0	$0
Total reregistration costs	$1,641,683	$222,189	$1,110,569	$159,826	$1,110,569	$159,826	$74,865	$6,150
	Total Annualized CapitalCost	**Total Annual OperatingCosts**	**Total Annualized CapitalCost**	**Total Annual OperatingCosts**	**Total Annualized CapitalCost**	**Total Annual OperatingCosts**	**Annualized Capital Cost**	**Annual Operating Costs**
Low market impact scenario - Total	$8,211,528	$20,222,189	$687,183	$159,826	$687,183	$159,826	$16,684	$6,150
Plant costs	$7,115,000	$20,000,000	NA	NA	NA	NA	NA	NA
Reformulating and reregistering costs	$1,096,528	$222,189	$687,183	$159,826	$687,183	$159,826	$16,684	$6,150
Medium market impact scenario - Total	$8,211,528	$20,222,189	$7,802,183	$20,159,826	$7,802,183	$20,159,826	$1,795,434	$12,506,150
Plant costs	$7,115,000	$20,000,000	$7,115,000	$20,000,000	$7,115,000	$20,000,000	$1,778,750	$12,500,000
Reformulating and reregistering costs	$1,096,528	$222,189	$687,183	$159,826	$687,183	$159,826	$16,684	$6,150
High market impact scenario - Total	$8,211,528	$20,222,189	$7,802,183	$20,159,826	$7,802,183	$20,159,826	$1,795,434	$12,506,150
Plant costs	$7,115,000	$20,000,000	$7,115,000	$20,000,000	$7,115,000	$20,000,000	$1,778,750	$12,500,000
Reformulating and reregistering costs	$1,096,528	$222,189	$687,183	$159,826	$687,183	$159,826	$16,684	$6,150

(a) Under the sheep /mink and sheep and goat prohibitions, feedmills will not incur any costs.
(b) Under the mammalian with exceptions, ruminant, and partial ruminant prohibitions, feedmills invest in expanded facilities only under the high market impact scenario. Under the mammalian prohibition, the incremental capital and operating costs are identical under either scenario.
(c) All capital costs for expanded facilities and costs for reformulating and reregistering products were annualized over 10 years.
Source: ERG estimates.

Table 2-5

Elements of Reformulation and Reregistration Costs for Feedmills

	National Feedmill Companies	Regional Feedmills Companies	Large Local Feed Feedmills Companies	Other Feedmills
Number of feed mix formulae affected directly				
Mammalian prohibition	500	300	20	10
Mammalian prohibition with exemptions	400	200	16	8
Ruminant prohibition	400	200	16	8
Partial ruminant prohibition	60	25	5	0
Number of products registrations affected				
Mammalian prohibition	500	300	20	10
Mammalian prohibition with exemptions	400	200	16	8
Ruminant prohibition	400	200	16	8
Partial ruminant prohibition	60	25	5	0
Average number of state registrations per product	25	15	2	1
Total number of reregistrations required				
Mammalian prohibition	12,500	4,500	40	10
Mammalian prohibition with exemptions	10,000	3,000	32	8
Ruminant prohibition	10,000	3,000	32	8
Partial ruminant prohibition	1,500	375	10	0
Average state registration fee per product	$25	$25	$25	$25
Estimated percentage of reregistrations addressed in normal annual registration cycle or waived by states	75%	75%	75%	75%
Labor hours per staff level per feed mix reformulated				
Staff level (Loaded Wage Rate)				
Senior management ($49.00)	0.05	0.05	0.05	0.05
Nutritionist ($45.00)	2	2	2	2
Middle management ($32.20)	NA	NA	NA	NA
Clerical ($14.00)	0.05	0.05	0.05	0.05
Labor hours by staff level per product per state for reregistering with state agencies				
Staff level (Loaded Wage Rate)				
Senior management ($49.00)	0.02	0.02	0.02	0.02
Middle management ($32.20)	0.5	0.5	0.5	0.5
Clerical ($14.00)	0.05	0.05	0.05	0.05
Per facility costs for reformulating feed mixes				
Mammalian prohibition	$46,575	$27,945	$1,863	$932
Mammalian prohibition with exemptions	$37,260	$18,630	$1,490	$745
Ruminant prohibition	$37,260	$18,630	$1,490	$745
Partial ruminant prohibition	$5,589	$2,329	$466	$0
Per facility costs for reregistering products				
Mammalian prohibition	$133,688	$48,128	$428	$107
Mammalian prohibition with excemptions	$106,950	$32,085	$342	$86
Ruminant prohibition	$106,950	$32,085	$342	$86
Partial ruminant prohibition	$16,043	$4,011	$107	$0
Percentage of per facility reregistration cost that will recur annually				
Mammalian prohibition	25%	15%	10%	5%
Mammalian prohibition with exemptions	25%	15%	10%	5%
Ruminant prohibition	25%	15%	10%	5%
Partial ruminant prohibition	10%	5%	5%	0%
Annually recurring per facility costs				
Mammalian prohibition	$33,422	$7,219	$43	$5
Mammalian prohibition with exemptions	$26,738	$4,813	$34	$4
Ruminant prohibition	$26,738	$4,813	$34	$4
Partial ruminant prohibition	$1,604	$201	$5	$0

Source: Based on discussions with feedmill operators and industry representatives.

2.3.3 Incremental Operating Costs for Feedmills

As part of its review of economic impacts, ERG reexamined the estimates of the incremental plant operating cost for feedmills (See Table 2-4). ERG noted that feedmills that are forecast to handle both restricted and unrestricted MBM will incur incremental costs to perform additional cleanout procedures and sequencing during operations. (Cleanout procedures ensure that residual levels of restricted proteins are not mixed into ruminant feeds). In its final report, ERG applied the incremental plant operating costs (estimated at $10,000 per year) to the 1,000 feedmills forecast to expand storage capacity to handle both types of MBM. In this review, ERG judged that the incremental plant operating costs should also be applied to those additional feedmills (also estimated at 1,000) that have adequate capacity at present to handle two types of MBM. This change increases the incremental plant operating costs for feedmills due to regulation to $20.0 million per year.

Protein blenders, who purchase rendered protein products and, by mixing them, improve the overall product quality and consistency, will also incur costs to perform cleanouts. There are approximately 30 protein blenders in the United States (John, 1997). Given the approximate nature of the estimates of the number of feedmills incurring capital and operating costs, ERG assumed that its feedmill costs encompassed the regulatory impacts on protein blenders as well.

2.3.4 Regulatory Effects on Dead Stock Estimates

As renderer revenues decline, they will increase charges to their raw material suppliers, including those that supply dead stock. Renderers obtain dead stock from large and small farmers and ranchers, dairy farms, and feedlots. Besides sending animals to rendering, other on-farm disposal practices include burial, burning, composting, or abandoning of animal carcasses in remote areas of the farm or ranch.

Using the forecast of a $68 per ton drop in the price of mammalian MBM, the FDA regulation will reduce the market value of protein in animal carcasses by about $2 per calf or pig

and up to $7 per head for a 900-lb cow. Thus, a small farmer might reasonably expect to pay incremental renderer charges of $2 to $7 dollars for each animal lost. Some renderers reported that they were currently charging small farmers up to $20 for dead-animal pickups. Large-scale producers are more likely to be paid for their dead animals because they contribute more dead stock more consistently, although some large operations are also being charged for pickups.

Increases in the renderer pickup charge deters rendering and will increase on-farm disposal of animals. Some industry contacts suggested that small producers might respond by simply dragging animals off to remote areas and leaving them. In comparison, large livestock operations are currently more likely to send dead animals to rendering, and ERG judged that larger operations are less likely to change management practices. Since large animal enterprises supply dead stock to renderers in greater quantities and more consistently, the renderer is likely to offer a premium for the dead animals in order to obtain this relatively valuable supply of raw materials. One type of large livestock operation, namely feedlots, currently sends approximately 90 percent of dead stock to renderers (APHIS, 1996).

Several factors will limit the increase in on-farm disposal caused by increased rendering charges. Few large operations appear likely to achieve a large cost savings from switching to on-farm disposal. For feedlots and dairy farms, for example, on-farm burial will increase the potential for groundwater and surface water pollution problems and will require considerable management oversight. Also, some large animal operations like dairy farms and feedlots might be constrained in their choice of dead stock management technique by the amount of land available. For smaller operations, if on-farm burial is necessary or desired, it often will cost more than even the increased renderer charges. Many farmers do not have backhoes or equivalent earthmoving equipment available for burying animals. On-farm burial is also impossible during winter months in many regions.

Data on the relative contributions of each category of dead stock supplier and on their likely response to regulation are quite limited, and no quantitative estimate of the decline in dead stock rendering was prepared. The forecasts of the mammalian MBM price decline (see Table 2-2) are intended to capture all regulatory impacts on the affected markets, and therefore

represent post-regulation equilibrium mammalian MBM prices, after all markets adjustments, including reductions in dead stock rendering, have been taken into consideration.

2.3.5 Projected Price Decline for Mammalian MBM

The FDA regulation will restrict sales of mammalian MBM in some markets, thereby lowering the price of this product. Under the mammalian prohibition, with exceptions, the price of mammalian MBM will fall. The extent of the price decline will depend on the price elasticity of demand for mammalian MBM, i.e., the percentage increase in demand that results from a 1 percent decline in price.

If the price decline is as large as the maximum price decline estimated in the ERG study, i.e., $100 per ton on average, then this protein source will have become considerably cheaper relative to the competing, unregulated protein sources. Using MBM prices as of late March 1997, a decline of $100 represents a 33 percent price reduction.

ERG notes that mammalian MBM competes with other protein sources (e.g., corn gluten, fish meal, pure pork MBM, soybean meal, and others) in animal diets. Mammalian MBM also contains essential minerals and is, therefore, more valuable than some of these protein sources, such as soybean meal, that require such minerals to be added.

While the price elasticity of demand for MBM in the nonregulated markets is not known, there is reason to expect it to be fairly high. This is based on the observation that MBM can be substituted for other protein sources in some animal diets. The relative ease of substitution suggests that the price decline for mammalian MBM could be at the lower end of the $25 to $100 per ton range estimated by ERG. On the other hand, industry personnel commented at public hearings that some of the potential markets for mammalian MBM are fully saturated with the product. Thus, purchases of mammalian MBM by poultry and hog producers are sufficient in some cases to satisfy their nutritional requirements for this form of protein. Nevertheless, in some sectors, including hog producing, MBM is not used nearly as widely as other protein sources. Also, MBM is not widely used in certain regions of the country.

As noted, the National Renderers Association sponsored the SCI study of the regulatory impacts on rendering. SCI developed a price forecast for mammalian MBM based on interviews with 30 executives and observers. While noting considerable uncertainty about the market

outcomes, the average of the executives' responses was a price decline for mammalian MBM of approximately $68 per ton. This estimate is nearly the midpoint of the range ($62.50 per ton) estimated by ERG.

The price decline for mammalian MBM could be larger than that forecast in the ERG and FDA analyses if purchasers in nonregulated markets also reduce purchases of MBM. Large buyers of MBM for poultry feed or pet food, for example, are known to be sensitive to public perceptions about the safety of their product and could, therefore, react to public uncertainty or concerns about BSE dangers. These reactions could also occur, however, without FDA action and/or as a response to unrelated events, such as an outbreak of BSE in the U.S., concerns triggered by the presence of BSE in Europe, or new research findings of greater health risk. This analysis has considered only impacts generated directly by the FDA actions.

ERG did not identify sufficient new information about likely market outcomes to affect its forecast of the price decline for mammalian MBM. The industry comments did not present arguments that could be the basis for forecasting that mammalian MBM prices would fall by more than $100 per ton. ERG also noted the substantial conformity between its estimate and that of the industry-sponsored study.

2.3.6 Feed Price Reductions in Nonruminant Sectors

Nonruminant animal producers, including poultry and hog producers, and pet food manufacturers, will be able to continue purchasing mammalian MBM and will realize a reduction in purchase prices. Assuming that ruminants currently consume approximately 10 percent of all mammalian MBM, purchasers of the other 90 percent will realize cost savings as its price declines (APPI and NRA, 1996). The size of the cost savings (and of the revenue losses), however, will vary with the demand and supply conditions in the mammalian MBM market. In general, the benefit to these groups is nearly as great as the loss to renderers.

ERG examined the relative size of the revenue losses and cost savings using several assumptions about the nature of the demand curve and varying estimates of the price elasticity of

demand. Assuming the demand curve for mammalian MBM is linear, ERG calculated that the cost savings for nonruminant producers and other purchasers are approximately 95 percent of the revenue losses to renderers. The cost savings are slightly lower than the revenue losses because mammalian MBM is slightly less valuable in its alternative uses than in its current, baseline uses. Applying this relationship, ERG estimated the savings to nonruminant animal producers and pet food manufacturers at $162.5 million per year under the final rule.

2.4 SMALL BUSINESS IMPACTS

Most businesses in the affected agricultural industries are small, as defined by the standards used by the Small Business Administration (SBA). SBA commented to FDA on the proposed rule and provided data on the employment size of businesses in several of the affected sectors. SBA reported that 86.9 percent of the businesses in the Animal and Marine Fats and Oils Industry (which encompasses animal rendering) employ fewer than 500 employees. In the meatpacking industry and sausage and other prepared meats industries, 96.1 percent and 93.3 percent of businesses, respectively, employ fewer than 500 workers. ERG notes that the great majority of cattle producers are also small, family-owned businesses. According to statistics collected by the National Beef Cattlemen's Association, 98 percent of cattle producers are small- to mid-sized family businesses with less than 500 head. In 1993, the average size of beef cow herds was 38.3 head (NCA, 1996). Finally, among the feedmills classified in Standard Industrial Classification (SIC) 2048 (Prepared Feeds and Feed Ingredients for Animals and Fowls, Except Dogs and Cats) and SIC 5191 (Farm Supplies), the large majority employ fewer than 500 employees, and thus are small businesses. SBA data show that 95 percent of feedmill firms in SIC 2048 and 99 percent of firms in SIC 5191 employ fewer than 500. The small businesses in SIC 2048 operate 70 percent of all feedmill establishments. A total of 61 large companies operate the remaining 30 percent of feedmills classified in SIC 2048 (Bureau of the Census, 1996).

2.4.1 Small Renderers

Because most independent renderers are small businesses, with numerous single-establishment operations, data compiled in the ERG final report and its addendum provides information on small business impacts. For example, as shown in Table 2-6, ERG calculated the revenue impacts on representative large and small independent rendering establishments at $637,000 and $370,000 per year, respectively, assuming a $68 per ton price decline for mammalian MBM. The revenue loss is calculated by multiplying the amount of offal processed by these facilities and the mammalian MBM price decline. Should the price decline be higher or lower, revenue impacts will be proportionately larger or smaller. These calculations do not include the revenue decline caused by potential reductions in dead stock throughput.

Table 2-6

Regulatory Impacts on Revenues for Renderers

	Mammalian-to-Ruminant Prohibition	Mammalian-to-Ruminant Prohibition (with exceptions)
Quantity of restricted MBM		
Restricted ruminant/mink protein and dead stock	5,474.7	3,956.5
Unrestricted protein used in mixed species MBM (a)	611.6	1,074.0
Total restricted MBM (million lbs)	6,086.4	5,030.5
Probable Price Impact (b)		
Low impact ($/ton)	$25	$25
Annual industry decline in revenues	$76,079,402	$62,881,196
Medium impact ($/ton)	$68	$68
Annual industry decline in revenues	$206,935,975	$171,036,853
High impact ($/ton)	$100	$100
Annual industry decline in revenues	$304,317,610	$251,524,783

Distribution of forecast annual revenue decline (b)	Share of MBM Production	Revenue Decline $25/Ton	$68/Ton	$100/Ton	Share of MBM Production	Revenue Decline $25/Ton	$68/Ton	$100/Ton
Packer/renderers	59.1%	$44,926,915	$122,201,208	$179,707,658	50.7%	$31,874,887	$86,699,693	$127,499,548
Large independent renderers	32.8%	$24,921,990	$67,787,814	$99,687,961	39.4%	$24,805,047	$67,469,728	$99,220,188
Small independent renderers	8.2%	$6,230,498	$16,946,953	$24,921,990	9.9%	$6,201,262	$16,867,432	$24,805,047

Estimation of annual revenue decline per establishment (c)	$25/Ton	$68/Ton	$100/Ton	$25/Ton	$68/Ton	$100/Ton
Packer/renderers	$472,915	$1,286,329	$1,891,660	$335,525	$912,628	$1,342,101
Large independent renderers	$235,113	$639,508	$940,452	$234,010	$636,507	$936,040
Small independent renderers	$136,634	$371,644	$546,535	$135,993	$369,900	$543,970

Source: ERG estimates.

(a) Includes rendered protein yield of ruminant offal that is not separated and of unrestricted species, such as chicken, when it is used in mixed species MBM.

(b) Price impacts and revenue declines will be distributed to suppliers of raw materials through increases in pickup charges, and other adjustments.

(c) Does not include revenue loss from decline in dead stock throughput.

Table 2-6 (cont.)

Regulatory Impacts on Revenues for Renderers

	Ruminant-to-Ruminant Prohibition	Partial Ruminant Prohibition
Quantity of restricted MBM		
Restricted ruminant/mink protein and dead stock	3,956.5	816.0
Unrestricted protein used in mixed species MBM (a)	1,074.0	1,466.6
Total restricted MBM (million lbs)	5,030.5	2,282.6
Probable Price Impact (b)		
Low impact ($/ton)	$25	$25
Annual industry decline in revenues	$62,881,196	$28,531,977
Medium impact ($/ton)	$68	$68
Annual industry decline in revenues	$171,036,853	$77,606,978
High impact ($/ton)	$100	$100
Annual industry decline in revenues	$251,524,783	$114,127,908

Distribution of forecast annual revenue decline (b)	Share of MBM Production	Revenue Decline $25/Ton	$68/Ton	$100/Ton	Share of MBM Production	Revenue Decline $25/Ton	$68/Ton	$100/Ton
Packer/renderers	50.6%	$31,822,984	$86,558,516	$127,291,935	2.7%	$759,018	$2,064,529	$3,036,073
Large independent renderers	39.5%	$24,861,421	$67,623,065	$99,445,683	75.0%	$21,402,010	$58,213,468	$85,608,041
Small independent renderers	9.9%	$6,196,791	$16,855,272	$24,787,165	22.3%	$6,370,949	$17,328,981	$25,483,795

Estimation of annual revenue decline per establishment (c)	$25/Ton	$68/Ton	$100/Ton	$25/Ton	$68/Ton	$100/Ton
Packer/renderers	$334,979	$911,142	$1,339,915	$7,990	$21,732	$31,959
Large independent renderers	$234,542	$637,953	$938,167	$201,906	$549,184	$807,623
Small independent renderers	$135,895	$369,633	$543,578	$139,714	$380,022	$558,855

Source: ERG estimates.

(a) Includes rendered protein yield of ruminant offal that is not separated and of unrestricted species, such as chicken, when it is used in mixed species MBM.

(b) Price impacts and revenue declines will be distributed to suppliers of raw materials through increases in pickup charges, and other adjustments.

(c) Does not include revenue loss from decline in dead stock throughput.

Table 2-6 (cont.)

Regulatory Impacts on Revenues for Renderers

	Sheep, Goat, Deer, Elk, and Mink Prohibition		Sheep and Goat Prohibition	
Quantity of restricted MBM				
Restricted ruminant/mink protein and dead stock	16.9		0.6	
Unrestricted protein used in mixed species MBM (a)	NA		NA	
Total restricted MBM (million lbs)	16.9		0.6	
Range of Probable Price Impact (b)				
No revenues generated; some offal is not rendered (c)	$500		$500	
Annual industry decline in revenues	$4,221,794		$154,757	
Distribution of forecast annual revenue decline (b)	**Share of MBM Production**	**$500/Ton**	**Share of MBM Production**	**$500/Ton**
Packer/renderers	0	NA	0	NA
Large independent renderers	50%	$2,110,897	50%	$77,379
Small independent renderers	50%	$2,110,897	50%	$77,379
Estimation of annual revenue decline per establishment (c)		**$500/Ton**		**$500/Ton**
Packer/renderers		NA		NA
Large independent renderers		$19,914		$730
Small independent renderers		$46,292		$1,697

Source: ERG estimates.

(a) Includes rendered protein yield of ruminant offal that is not separated and of unrestricted species, such as chicken, when it is used in mixed species MBM.

(b) Price impacts and revenue declines will be distributed to suppliers of raw materials through increases in pickup charges, and other adjustments.

(c) Reflects approximate loss of revenue from discontinued sale of MBM and tallow from restricted material.

The initial revenue losses to renderers will be passed on to their suppliers of animal offal, i.e., meatpackers and animal producers. SCI reported that most renderers have contracts with their raw material suppliers that link the prices paid for animal tissue to publicly available information on the price of MBM. Thus, much of the revenue impact will automatically be passed on to the raw material suppliers. In addition to the revenue decline, renderers will incur impacts due to a decline in raw material throughput and other costs and incremental MBM marketing expenses associated with the regulation. The number of rendering establishments has been decreasing for several years, and many small operations have closed. As ERG noted in its final report, the smallest renderers tend to be those most dependent upon dead stock supplies for their raw materials. (Larger renderers obtain raw material supplies predominantly from medium to large meatpacking plants and, therefore, are less dependent upon dead stock supplies.) As noted in the discussion of dead stock supplies, dead stock quantities sent to rendering will decline due to regulatory impacts, and much of this decline will fall upon the smallest rendering operations. A decline in dead stock quantities might harm the ability of these businesses to cover their fixed and variable operating expenses. As for other process industries, profitability is closely tied to the utilization rate for plant equipment.

ERG estimated in its final report that 20 to 25 rendering establishments are in this vulnerable group of small businesses. None of the rendering company comments to the proposed rule forecast plant closures. The SCI study did not predict plant closures except when it considered the possibility that mammalian MBM would become unmarketable. Nevertheless, as estimated in the ERG report, FDA judged that some business closures are possible among these companies, but data are not sufficient to determine how many closures will occur.

2.4.2. Small Meatpacking Operations

Meatpacking facilities will be required by their renderers, generally through contractual arrangements, to pay higher charges (or receive smaller payments) for renderer pickups of animal offal. These increases in costs (or decreases in revenues) will create negative economic impacts on small meatpacking operations.

As of March 1997, based on companies contacted by ERG, all large and medium-sized meatpackers, and some small meatpacking operations are paid by renderers for their supplies of animal offal. Many of the very small meatpacking plants, however, are being charged for renderer pickups. Very small meatpackers have insufficient animal offal to attract competition among renderers, and the fixed costs of operating the renderer's route truck are sufficient to require the renderer to charge for picking up animal offal.

Renderers generally offer payments based on current market prices for fats, tallows, and protein. With a decline in the price of mammalian MBM, the value of the protein obtained from meatpackers declines. The reduction in the value of animal offal per pound can be derived by dividing the price decline forecast (in dollars per ton) by 2000. Using the low ($25 per ton), medium ($68 per ton), and high ($100 per ton) market impact scenarios, therefore, the value of mammalian protein per pound declines by $0.0125, $0.034, and $0.05 respectively. With these price declines, the value of animal offal per cow (assuming 225 lbs in offal and a 25 percent protein yield) falls by $0.70, $1.91, and $2.81, respectively. The value of animal offal per hog (assuming 63 lbs of offal and a 25 percent yield) falls $0.20, $0.54, and $0.79, respectively.

Even under the worst-case scenario, the high market impact, all large and most medium meatpacking operations (many of which are small businesses according to the SBA definitions) will continue to receive payments from renderers for raw materials, although the size of the payments is expected to decline with the fall in mammalian MBM prices. These plants will endeavor to pass through costs by paying less for slaughter cattle. Assuming competitive market conditions for meatpacking, all meatpackers of ruminant animals will experience similar declines in renderer payments, and new equilibrium prices will reflect a pass-through of these charges to cattle producers.

The smallest plants in the industry, often referred to as locker plants, provide custom slaughtering services, thereby differentiating themselves from the large packer/renderers. The number of small meatpacking or locker plants has declined in recent years for several reasons, including the decline in small farm operations and in the consumption of red meat and custom meat products. The smallest meatpacking plants, i.e., those with 2 to 3 employees, are also at a

cost disadvantage relative to even slightly larger plants. As noted, the smallest companies are also likely to be charged by renderers for pickups.

To assess the significance of impacts on these small plants, ERG developed revenue estimates for locker plants with slaughtering rates covering a spectrum of the smallest plants in the industry. Table 2-7 presents these estimates. The revenue estimates slightly underestimate company revenues because the

Table 2-7

Regulatory Impacts on Representative Small Meat Packing Plants

	Locker Plants, Categorized by Size			
Calculation Parameter	**Small**	**Medium**	**Large**	**Source**
Head slaughtered per week				
Cattle	10	30	50	Assumed ranges of locker plant activity; specific
Hog	0	30	50	distribution of kills chosen only for illustration.
Revenue per pound (a)				
Cattle	$0.20	$0.20	$0.20	Midpoint of range estimated in industry contacts.
Hog	$0.20	$0.20	$0.20	Midpoint of range estimated in industry contacts.
Fixed charge per head for slaughter service	$24	$24	$24	Midpoint of range estimated in industry contacts.
Revenue from sale of cattle hide/head of cattle	$25	$25	$25	Midpoint of range estimated in industry contacts.
Revenue per week (b)	$1,890	$7,890	$13,150	Calculated using data shown
Estimated offal for rendering	2,500	9,390	15,650	Estimated at 250 lbs per cow and 63 lbs per hog (c)
Increase in renderer pickup charge (or decline in payment received from renderer)	$21	$80	$133	Estimated based on decline on protein value for a $68/ton decline in protein value.
Incremental costs due to regulation as a percent of weekly revenues	1.1%	1.0%	1.0%	Renderer charges as a percentage of revenues

(a) The charge for service is based on the draft weight (without offal) for cattle and the live weight for hogs.
(b) Additional revenues from additional meat processing services, including curing of ham, specialized cutting services, or other sales, were not estimated.
(c) The offal quantity per cow was estimated at 250 lbs rather than the 360 lbs used in estimating overall offal quantities due to the tendency of small locker plants to kill younger animals.

amount of special custom slaughtering services provided by these model facilities (and for which additional charges are levied) was not estimated. With that caveat, ERG estimated that the increase in renderer charges (or decrease in payments), assuming a $68 per ton decline for mammalian MBM, would lower revenues for these operations by approximately 1 percent. (The revenue impacts for the low or high market impact scenarios are proportionally smaller or larger than those shown.) Because the change in renderer charges/payments is proportional to the animal offal quantities, this regulatory impact does not create a disproportionate impact on the smallest meatpackers and other establishments.

Small meatpackers are expected to pass increased charges forward to their customers, but several of those contacted did not think that all increased costs could be passed on. One owner's company had been forced to increase its "cut and wrap" price by a cent or two per pound per year in recent years due to other cost increases, such as the cost of meat-wrapping paper. This owner was uncertain if additional price increases could successfully be passed on without the loss of too many customers.

ERG did not identify sufficient data on the profit levels of very small meatpacking operations to determine the impact of the change in renderer charges/payments. One company, which employed 14 workers, stated that the decline in renderer payments would cut noticeably into its profit margin. The owner stated that the decline in payments would reduce the company's operating margin considerably. This company owner expected to remain in business, but predicted that some of the smallest operations (those with 2 or 3 employees) would fail. Of several other small meatpackers contacted by ERG, none predicted that they would shut down, although one owner stated that it was a possibility. He noted that the viability of his business had been tenuous in recent years, despite the closure of several other locker plants in his area. Beyond these comments, the small meatpackers contacted generally did not know what to expect regarding renderer charges/payments or what increased charges would mean for their businesses.

ERG concluded that some of the smallest meatpackers, particularly those with only a few employees, are vulnerable to increased renderer charges and, in the context of a poor

economic environment for these businesses, might cease operations. No reliable quantitative estimate could be made, however, of the number or percentage of facilities likely to close. Small meatpackers have considerable uncertainty regarding the final economic effects of the regulation.

2.4.3. Small Cattle Producers

The reduction in slaughter prices and the increase in cattle feed prices are not expected to differentially impact small ruminant producers. Assuming that the decline in the value of mammalian MBM (from $25 to $100 per ton) is passed back to cattle producers, ERG estimated in its final report that the price of cattle would fall by $1 to $5 per head. The impact of this decline on cattle producers is directly proportional to the size of each producer's herd. To the extent these impacts fall on feedlot operators and other producers of slaughter-weight cattle, they will pass on impacts to the stocker operators and producers of feeder cattle that supply their operations.

Increases in feed prices may be expected to differentially impact those producers that are relatively heavy users of purchased feed that includes mammalian protein. Small producers might be more reliant than larger operations on purchased feed instead of natural grazing, although the significance of any difference is not known. Feedlot operations may be the most dependent on purchased feed and therefore would suffer the greatest initial impacts from increases in feed prices.

A decline in the value of cattle will eventually affect the value of grazing land. Cattle ranchers will reduce their demand for such lands, causing a reduction in its price. Thus, landowners will also incur a portion of the impacts of the FDA final rule.

2.4.4 Small Feedmills

Feedmills will incur costs to document their handling of ruminant protein and to perform cleanout procedures to ensure separation of restricted and unrestricted MBM. Also,

feedmills that currently lack capacity to handle two types of MBM and that serve both ruminant and nonruminant producers will be encouraged to add storage capacity if the price of the two types of MBM diverge significantly. This induced capital investment and the incremental operating expenses create the principal potential impacts on feedmill operators, and could reduce profit margins for some feedmills.

Feedmill operators contacted by ERG noted that feedmills would be reluctant to invest in new storage capacity. These investments were viewed as unattractive because they would add capital expense but total feed sales would not increase over current levels. Most of the feedmill operators stated, however, that they did not expect their own or other mills to cease operations, and most increased costs could be passed on to their customers. One feedmill operator, however, noted that some mills that serve both ruminant and nonruminant producers might face more difficult competitive conditions. Such mills might see increased costs due to handling both feed types, but also might compete with mills that specialize in either ruminant or nonruminant species. The latter mills would incur little or no increases in capital or operating expenses due to regulation.

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