

# General Sessions

Moderator: David McClary, Jon Townsend

## Rendering Farm Mortalities: How Veterinarians Can Influence the Cost?

**Dave Kirstein**

*National By-Products Inc, P.O. Box 615, Des Moines, IA 50303*

### Abstract

Service charges for the collection and rendering of farm/feedlot cattle mortalities have become common practice and have increased most notably in the past three years. The loss of cattle by-product value is primarily responsible for this trend. Further loss of by-product value is anticipated following the implementation of rules that are currently being proposed by the USDA to restrict additional cattle by-products from the food/feed chain. However, the collection and rendering of cattle mortalities will most likely remain the most appropriate environmental, biosecure and traceable means of disposal. Therefore, it is important to handle cattle mortalities in a manner that optimizes their remaining value. A number of practices that veterinarians and their clients perform can have a substantial impact upon the cattle by-product value. Cooperation with local renderers regarding these practices can help stabilize future disposal fees.

### Introduction

In the 1960s and 70s most of the disposal services for cattle mortalities were provided by independent collection companies. Drivers carried cash or a checkbook and paid the producers directly. Others gave calendars, thermometers or potholders in return for cattle carcasses. These practices began to change in the late 1970s as renderers felt the need to better control and screen their raw material supplies. It was also during this time that costs associated with collection and transport increased dramatically due to the oil embargo and fuel shortages. Renderers began instituting fees and it was not uncommon for producers to be charged \$5.00 per stop. Today, most cattle producers are being charged for disposal service. Fees may be structured on a per stop basis, per head basis or on

a monthly/yearly basis. Fees reflect some attempt by the disposal service and the cattle producer to structure an arrangement best suited for that producer's situation. These fees take into account distances traveled, frequency of service, anticipated volume and the resulting yield and quality of the cattle by-products. In the Midwest, fees can range from \$0 - \$35.00 per head. Fees for disposal are not a new practice; however, the amount being charged has increased dramatically in the past three years. What influences have created such a remarkable change in such a short period of time? Identification of these influences, their effect upon the economics of cattle mortality disposal, and what bovine veterinarians can do to minimize their impact will be discussed. Potential new regulations and their impact will also be discussed.

### Rendering

Rendering is a centuries-old practice of converting animal tissues that are deemed inedible or unsuitable for human consumption into useful products used in the feed and chemical industries. As our society has grown more affluent, consumers prefer higher quality meat portions so that a greater percent of the animal's original weight is considered unsuitable for human consumption. In the US the proportion of cattle, swine and poultry live-weights that are not destined for retail markets are 51, 44, and 25-30%, respectively.<sup>7</sup> Thus, 137 million pounds of waste animal tissues are created daily, or 50 billion pounds per year. This annual quantity would fill semi-trailers four abreast and end-to-end stretching from New York City to Los Angeles.

Renderers have made large investments to provide collection service for farm mortalities and inedible tissues. In fact, over half of an independent renderer's investment is in the equipment and people that provide this service. Although rendering is an old prac-

tice, state-of-the-art technology is employed today to improve cost efficiencies, as well as product safety and quality.

Raw materials contain 50-90% moisture. Therefore, one of the primary objectives of rendering is to remove this moisture while thermally pasteurizing the material. Upon arrival at the rendering facility, raw materials are sized and then transferred to steam-heated vessels where they are agitated and cooked at 245-290°F for 45-90 minutes. When the material exits the cooker, the moisture content has been reduced to 3-5%. Free fat is drained from the solids and combined with additional fat that is pressed from the solids. The fat is clarified by passing through a centrifuge, a series of oscillating screens, or a filter press. The solids, referred to as cracklings or crax, contain the meat and bone residue and represents the protein and mineral content of the tissues. Both the fat and the crax have been thermally pasteurized once they leave the cooker and presses. Finished products are distributed to manufacturers worldwide to make soaps, chemicals, cosmetics, plastics, fabric softeners, and lubricants, as well as livestock, poultry, and aquaculture feeds, pet foods and leather goods.

### **Rendering Protects the Environment and Animal and Public Health**

Rendering fulfills a critical step in the food chain. Unprocessed animal by-products create environmental and public health hazards. If not rendered, perishable animal by-products would accumulate and seriously impede the meat and poultry processing industries. Licensed renderers have the ability to collect and process these materials in a way that insures biosecurity and facilitates product traceability. Converting perishable animal tissues into useful products helps control animal and zoonotic diseases by:

- preventing surface and ground water pollution,
- limiting access of scavengers, rodents, and insects to these tissues,
- effectively destroying conventional food-borne pathogens,
- minimizing nuisance odors.

The salvaging of animal proteins and fats also reduces the need to farm marginal lands for protein and energy from alternative seed crops. The amount of dietary feed protein originating from animal proteins in the US during 2000 equaled that found in 13.8 billion pounds of 48% soybean meal. This would have taken another 8.22 million acres of soybeans, or an 11.3% increase in acres harvested during the same year. The amount of metabolizable energy for swine present in the inedible animal fats produced in 2000 equals that found in 16.6 billion pounds of corn. This would have

required an increase of 2.2 million acres of harvested corn. In addition, the phosphorus found in meat and bone meal reduces the drain on strategic phosphorus reserves. The phosphorus supplied by the annual production of meat and bone meal (MBM) spares 1.79 billion pounds of mined and industrially manufactured feed grade phosphate compounds like dicalcium phosphate and deflourinated phosphate. This amount has a current market value of \$233 million.

### **Impact of BSE on the Use of Animal By-Products**

The US livestock industry today lives under the cloud of public health concerns following the outbreak of Bovine Spongiform Encephalopathy (BSE) in the United Kingdom during 1986. BSE is a chronic, neurodegenerative disease of cattle defined by clinical symptoms and verified by post-mortem immunologic and microscopic examination of select brain tissue. In March 1996, British scientists reported a possible link between the consumption of central nervous system (CNS) tissue from BSE infected cattle and variant Creutzfeldt-Jakob disease in humans. This had a severe effect on the European livestock industry, with an estimated 20-30% decline in beef sales. Although the origin of BSE is unknown and the identity of the infectious agent is controversial, the mode of transmission appears to be almost entirely related to the consumption of cattle proteins contaminated with infected CNS tissue from cattle greater than 24 months of age.

### **Regulatory Controls**

BSE has not been diagnosed in the US and the United States Department of Agriculture (USDA) has taken aggressive steps to keep it that way. One may think of these steps as a series of "firewalls" that are dynamic and continue to evolve in response to new science and changes in the global distribution of BSE. The first firewall concerns import restrictions designed to prevent the introduction of BSE into the US. Since 1989, the Animal and Plant Health Inspection Service (APHIS) has prohibited the importation of live ruminants and ruminant products from countries where BSE is known to exist in native cattle.<sup>3</sup> As BSE has spread throughout Europe, restrictions have been extended to cover all of Europe. Japan was the most recent addition in 2001.

The second "firewall" involves a surveillance system designed to provide early warning detection of BSE. The surveillance targets high-risk cattle populations and has exceeded the number of samples recommended by the International Office of Epizootics (OIE) for each of the last six years. As of February 4, 2002, more than 21,451 brain samples from the US and Puerto Rico have been tested and all have been found to be negative for BSE and other TSEs.<sup>3</sup>

As a precautionary measure in 1997, the Food and Drug Administration (FDA) implemented a "ruminant-to-ruminant" feed ban under which ruminant materials from cattle, sheep, goats, deer and elk cannot be fed back to ruminants.<sup>1</sup> This constitutes the third "firewall" designed to prevent the amplification and spread of BSE if it were ever introduced into the U.S.

### Lost Markets and Value

Despite strong regulatory actions in Europe and North America that were intended to allay fears of BSE, public concerns have not abated. Most domestic feed manufacturers will not inventory restricted MBM in feed mills making both ruminant and nonruminant feeds in order to guarantee no cross contamination. The American Feed Industry Association recommends this practice and offers verification through a third party certification process. Other feed companies and some integrated livestock operations are creating marketing opportunities with "no animal by-products" merchandise. Others simply feel overwhelmed with the publicity and want to avoid any stigma associated with feed containing animal by-products or animals raised on feed containing animal by-products. Traditional international markets for US MBM remain edgy. The Philippines, Australia, New Zealand and Japan have prohibited MBM in all animal diets. The following figures illustrate the impact these forces have had on the product values of MBM, animal fats and hides.

Since the feed ban in 1997, the price of MBM<sup>6</sup> has been on a downward trend (Figure 1). Development of export markets during 1999-2001 temporarily supported prices until fears were renewed by the spread of BSE across Europe in 2001. After the EU banned the use of all animal protein in all feeds and removed nearly 500,000 metric tons from the world market, prices rebounded for a short time before weakening again. Sparks<sup>9</sup> reports that since March of 1996, MBM has suffered an average loss of \$17.25/ton in relation to soybean meal prices.

Animal fats have never been shown to be the source of BSE infectivity and have no "use" restrictions in North

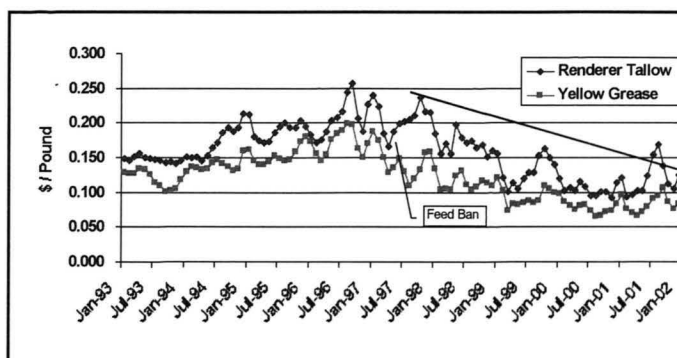
America. However, the EU restricts their use and is contemplating extending those restrictions. The EU had been an important export market for US animal fats, but these restrictions have prompted soap and cosmetic manufacturers there and elsewhere to begin moving away from animal based fats to alternative tropical oils. Figure 2 illustrates the downward trend in tallow and yellow grease prices<sup>6</sup> since 1996.

Cattle hides have never been implicated in harboring BSE infectivity. Unlike animal proteins and fats, hide prices<sup>8</sup> have not been influenced by BSE concerns and reflect other market forces (Figure 3). For example, the foot and mouth epidemic in the United Kingdom removed a significant amount of hides from the world market. Combined with the uncertainty of how far the epidemic would spread, hide prices spiked briefly before over-correcting to levels lower than those before this episode.

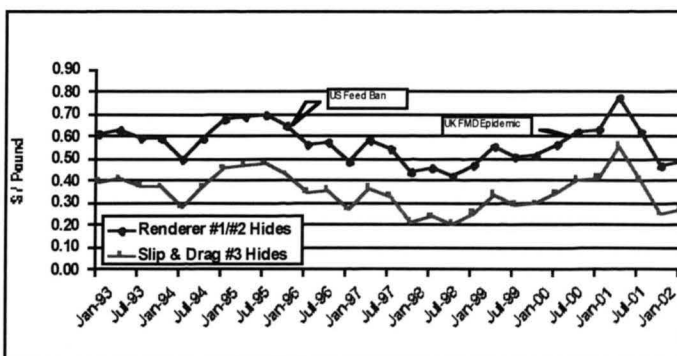
### The Impact of Lost By-Product Value on Rendering Profitability

Since 1996, the hide value has become an increasingly important component in cattle by-product value. Cattle hides fall into three general classes: cows, steers and bulls. Within each class hides are identified and traded within weight ranges, whether the hide is branded and whether they are packer or renderer hides.

**Figure 2.** Historical prices for renderer tallow and yellow grease.



**Figure 3.** Historical prices for renderer #1/#2 hides and slip & drag #3 hides.



**Figure 1.** Historical Illinois MBM prices.



In addition, hides are graded regarding their quality as described below, starting with the highest valued grade and descending to a hide having no value.<sup>5</sup>

HIDE GRADE	DESCRIPTION
#1 Hide	Has a correct pattern, is free of holes, cuts, slips, warts, broken grain (over 1"), deep scours or gouges.
#2 Hide	Has an off-pattern, contains a hole or cut, a deep score or gouge (located above a straight line drawn between the front and rear flanks, a grain break over 1", and warts in an area no larger than 18".
#3 Hide deep	Has hair slips, five holes and/or scores and gouges, one hole or cut of 6", warts over 18", or any defect covering more than 1/3 of the hide area.
#4 Hide	Hides having further damage or deterioration.

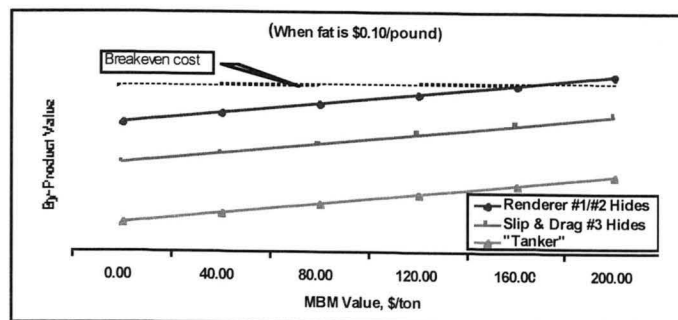
Pricing hides can be complex, so in order to more simply illustrate the impact hide value has on the profitability of rendering cattle by-products, three grades of hides will be used to describe the renderer hides: #1/#2s will be grouped together as "renderer hides", #3s will be called "slips and drags", and #4s will be called "tankers" since they have deteriorated to a point where they cannot be salvaged.

Over the past three years, National By-Products has seen an increase in the proportion of "tanker" hides, rising from 8% to 18%. Moreover, the proportion of "drags and slips" totaled over 36% in 2001. These figures suggest a growing reluctance of producers to make timely calls for removal of cattle, an increase in stockpiling, and/or a disregard for the by-product value when faced with increasing disposal fees.

Figure 4 shows how rendering profitability varies with different hide and MBM values when animal fat is selling for \$0.10 per pound (which has been its average value over the past two years). A breakeven value can be achieved with a good hide when MBM is worth at least \$160.00 per ton (which has been its average value for the past two years). In this scenario, any hide valued at less than a #1/#2 hide will not result in a profitable total cattle by-product value until MBM reaches \$320.00 per ton, a value that has not been achieved since the 1970s when the Nixon administration placed a

"freeze" on commodity prices during the oil embargo. This illustrates two points. First, it demonstrates how difficult it is for renderers of cattle by-products to be profitable without charging a service fee. Second, it shows how much the value of the hide influences the size of the disposal fee.

**Figure 4.** Influence of hide value and MBM prices on rendering profitability.



### Practices That Effect the By-Product Value

Veterinarians and their clients play an important role when it comes to handling deceased cattle. There are a number of practices that can be performed or avoided to improve the quality of the resulting by-products and thus minimize the need to raise disposal fees.

1. When possible, use a post mortem examination technique that does not damage the hide. Diagrams 1 and 2 show the preferred cuts that will retain the value of the hide. Horizontal cuts across the belly will usually render the hide worthless. If the examination includes the front or rear of the animal, the diagrams illustrate where cuts can be made that will not damage the hide.
2. Do not remove the head unless absolutely necessary. Some renderers have policies that preclude them from collecting cattle that have had their head removed or brain tissue removed for diagnostic purposes. Although the FDA's "feed ban" rule, does not prevent renderers from processing these carcasses as long as the resulting MBM is labeled, "Do Not Feed to Cattle or Other Ruminants", some renderers have chosen not to collect them. In the event a case of BSE were ever discovered in the US and it was determined that a certain company rendered that animal, the damage to their markets would be irreparable. It would be best to check with your local renderer on their policy regarding "headless" cattle.



3. Communicate the "cause of death" in a timely manner. Again, some renderers have implemented a "*Raw Material Inspection - Good Manufacturing Practice*". This means that any call requesting the disposal of multiple adult animals will require a statement from the attending veterinarian or owner that the animals did not die as a result of being exposed to one of the following: **insecticides, herbicide, fungicides, rodenticides, PCBs, PBBs or heavy metals**. By requiring this determination, renderers greatly reduce the risk of processing materials that might create a potential food safety hazard in their finished products.
4. Direct your clients to make timely calls for animal removal. The greater the duration of time from death to processing, the lower the by-product value. Renderers recognize that feedlot and dairy operators have more opportunities to observe their livestock than cow-calf producers, nevertheless, any management changes that would improve the timeliness of the call would improve the by-product value. Most collection services can provide pick-up within 24 hours.

5. Advise your clients to move carcasses to shaded areas, like under a tree, or provide a cover that will shade the carcass. Some producers use sheets of plywood that will permit air movement. Do not use dark colored tarps or plastic, as these will absorb energy from the sun and bake the carcass. Besides the loss of protein and fat quality, heating of the hide causes the hair to fall out ("slips"), which greatly reduces the quality of the hide's surface.
6. Animals rarely succumb in convenient locations. Carcasses usually need to be moved to a location where it can be examined or picked-up. Advise clients not to drag the carcass. This will result in deep scratches and gouges in the hide that lowers its value ("drags"). Many producers use a chain and front-end loader to lift the carcass and transport it to the desired location. It is also desirable to designate a site for carcass pick-ups, which should aid the biosecurity efforts of the operation, as well as the efforts of the driver trying to locate the carcass.
7. Advise clients not to stockpile cattle. Some renderers have attempted to minimize their increases in carcass removal fees by structuring their charges on a "per stop" basis rather than "per head". Unfortunately, this has the undesired affect of encouraging producers to stockpile. During warm months, the carcasses quickly degrade and reduce or eliminate any of the original value. Some renderers will not remove these carcasses. When the ground is frozen and air temperatures are not above freezing, some renderers may permit stockpiling; however, the volumes and timing of removal must be coordinated with your local renderer.

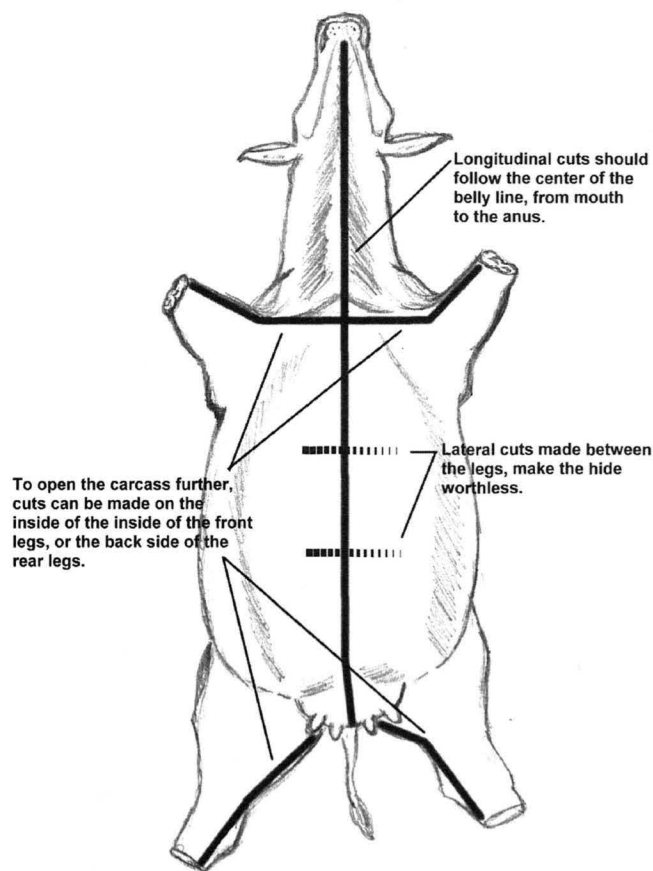


Diagram 1. Postmortem techniques.

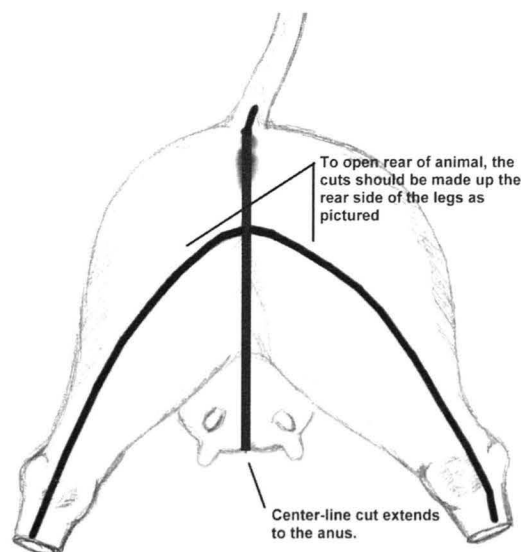


Diagram 2. Postmortem techniques.

## Implications of Future USDA Regulations

On November 30, 2001, the Harvard University School of Public Health released their BSE Risk Assessment.<sup>4</sup> This was a three-year cooperative effort with the USDA to model and evaluate the efficacy of USDA measures to prevent the introduction and amplification of BSE in the US. The assessment clearly shows that the measures the USDA has already implemented are largely responsible for keeping BSE out of the US, and would prevent it from spreading if it ever entered. Nevertheless, the USDA feels it is necessary to propose additional regulations that will extend restrictions on the use of certain cattle tissues. As of the writing of this paper, the Food Safety and Inspection Service (FSIS) has published its "thinking paper", and the FDA and APHIS are writing their Advanced Notices of Proposed Rulemaking (ANPR). Some of the potential new restrictions they are considering include the removal from the food chain of high-risk tissues (brain, spinal cord, vertebral column) from cattle greater than 24 months of age, the removal of downer cattle, and dead stock cattle greater than 24 months of age.

New restrictions of this type would further reduce the total value of cattle by-products and shift the primary remaining value to hides. Increases in disposal charges would likely reflect the loss in by-product value. In response to rising disposal fees, cattle producers will seek alternative disposal options such as burial, land-fill, incineration and composting. Renderers are already experiencing a shift away from rendering. This past year, National By-Products documented the disappearance of over one million pounds per week in Iowa alone. However, these alternative disposal options have limitations, too and are not without their own costs and risks. A survey of Iowa pork producers in 2001 reported that rendering was still the least expensive disposal option when compared to burial, composting and incineration.<sup>2</sup> Future disposal options will undoubtedly need to meet the following criteria:

- Be capable of destroying animal and human pathogens
- Minimize surface and ground water contamination

- Prevent access of scavengers, rodents and insects to the raw material
- Minimize particulate, chemical and odor emissions
- Prevent access by ruminants to finished products
- Provide traceability of restricted materials from their origin to their final disposition
- Aid regulators in verifying compliance

## Conclusions

It is likely that the USDA will still view rendering as the preferred option. Whether it becomes a required option for restricted materials remains to be seen. It also remains to be seen how society will assume the cost associated with the perceived health benefits these new restrictions promise to bring. One thing is certain: as generators of cattle by-products, cattle and dairy producers will be on the front-line of these changes. The economic impact of future regulations will cascade from the livestock producer to those providing services like the veterinarian and renderer. Whatever we can do to minimize the impact while protecting the environment and animal and public health will be in the best interest of society and animal agriculture in particular.

## References

1. *Animal Proteins Prohibited in Ruminant Feed*, Food and Drug Administration, Code of Federal Regulations, Title 21, Part 589, Section 2000, June 5, 1997.
2. Bass T, Glanville T, Schwager M: A closer look at mortality management. *Iowa Pork Producers Association*, 2001.
3. *Bovine Spongiform Encephalopathy Fact Sheet*, Animal & Plant Health Inspection Service – Veterinary Services, February 2002.
4. *Evaluation of the Potential for Bovine Spongiform Encephalopathy in the United States*, Harvard Center for Risk Analysis, Harvard School of Public Health, and the Center for Computational Epidemiology, Center for Veterinary Medicine, Tuskegee University, November 26, 2001.
5. *Hides and Skins*, National Hide Association, Eakin Press, 1979.
6. *Jacobsen Sheet*, By-Products Interactive Inc, March, 2002.
7. *Meat & Poultry Facts*, American Meat Association, 2000.
8. National By-Products, LLC, (corporate records), 2002
9. *The Rendering Industry: Economic Impact of Future Feeding Regulations*, Sparks Companies Inc, June 2001.

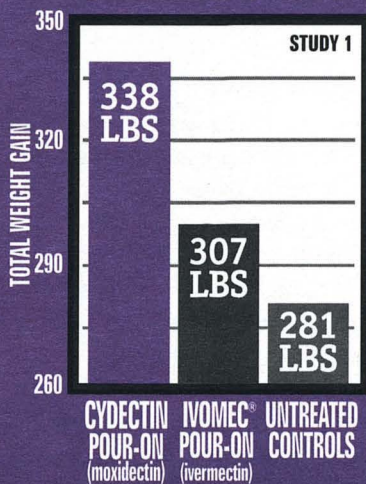


**WE HATE TO BRAG  
ABOUT WHAT CYDECTIN®  
PARASITE CONTROL DOES  
FOR WEIGHT GAIN.**

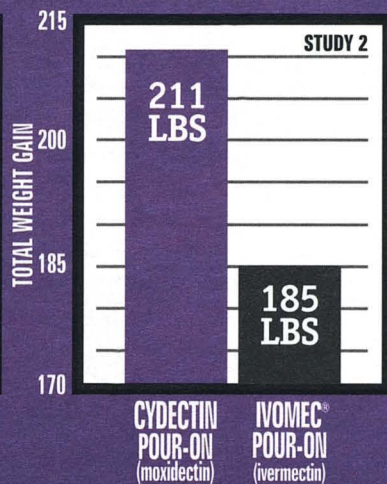
**WELL, OKAY.  
BUT JUST THIS ONCE.**



**112-DAY STEER  
GRAZING STUDY¹**



**129-DAY HEIFER  
GRAZING STUDY¹**



**+26 TO +31 LBS OVER IVOMEC  
+57 LBS OVER UNTREATED CONTROLS**



**SUPERIOR PERSISTENCY AND  
INTERNAL/EXTERNAL  
PARASITE CONTROL MEANS  
BETTER WEIGHT GAIN FOR YOU.**

- CYDECTIN Pour-On returned **\$23 to \$27 more per calf** over animals treated with IVOMEC Pour-On (based on a calf price of \$90/cwt.)
- Compared to untreated controls, calves treated with CYDECTIN returned **\$51 more per head**
- Weatherproof formulation
- Nonflammable
- Zero slaughter withdrawal
- Purple marker dye
- See your Fort Dodge Animal Health supplier or call **1-888-DEWORM-1** (1-888-339-6761)

**CYDECTIN®**  
(moxidectin)

**BREAK AWAY FROM THE HERD.**

¹ Comparison of cumulative body weights of individual calves on pasture. Data on file.

CYDECTIN is a registered trademark of American Cyanamid Company. All other product names are registered trademarks of their respective holders.

©2002 Fort Dodge Animal Health, a division of Wyeth.

