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NE- 165 Case Study

LEANER PORK: Can New Sector Linkages Be Formed?

prepared by:

Karen Coaldrake and Steve Sonka

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LEANER PORK: Can New Sector Linkages Be Formed?

Abstract

A more demanding and evolving consumer is creating change in the market for pork and many working within the industry are predicting opportunities for leaner products. However, leaner pork enthusiasts also are frustrated by the established industry food chain that offers little incentive for modification. Modification would require change on the part of genetic suppliers, commercial producers, packers and processors, and retailers. However, many of these food chain participants traditionally have not collaborated with others in the sector. Yet the establishment of these new linkages may be key to the success of a leaner pork industry. This case study documents several of the activities currently occurring within the leaner pork industry and explores new linkages which may be critical in the future.

Currently, genetic suppliers are struggling with short-term needs of producers, while attempting to look at the long-term demands of consumers. Hog producers have been profitable and lack incentives to alter practices which would produce leaner animals. Packers are interested in efficiently running large scale operations with large quantities of low cost meat. Retailers struggle with labeling inconsistencies and a low cost mentality that make it difficult to market leaner pork in the meatcase.

Leaner pork enthusiasts are making strides to overcome the disadvantages found in the traditional system. Some genetic suppliers are now working with packers to determine animal quality beyond the producer's feedlot. Some packers are creating incentive programs that pay producers for leaner quality. These lean incentive programs may become more attractive for packers and producers if new technologies measuring lean become less prohibitive for larger operations. Many packers are moving into branded products, resulting in incentive programs for producers who supply animals with the desired quality. Overall, these efforts have remained a small portion of total pork industry activities.



LEANER PORK: Can New Sector Linkages Be Formed?

Introduction

The picture is complex. In many ways, the traditional pork system works well -- from genetic supplier to retailer. Each piece links comfortably with the next until a supply reaches the consumer. However, the consumer seems to be changing. Nutritional concerns, fears of fat, new consumption patterns, an aging population, lifestyle changes and many other factors are creating dramatic changes in the market for pork -- a segmented market composed of numerous consumer types.

The evolution of the consumer is being felt throughout the meat industry. Increased consumption of poultry and decreased consumption of red meat have been well documented over the past few years. Some in the meat industry are stepping back and taking a hard look at the total sector in an attempt to identify opportunities that may exist thanks to an evolving consumer. Those working within the pork industry, who predict a growing opportunity for leaner pork, are expressing both enthusiasm and frustration over their short term prospects. Perhaps the greatest barrier lies within an established industry food chain that offers little incentive or room for modification.

Because of this established system, those working with leaner pork are asking new questions, such as: What consumer demands will remain forces in the long-term? What new linkages between sector participants can be developed to enhance the promotion of leaner pork? What role will new technologies have in developing these linkages? What would an ideal food chain look like for leaner pork? Can the old system be modified to accommodate new, leaner products? How will or should innovations in leaner pork marketing and production occur?

Research Assistant Karen Coaldrake prepared this case under the direction of FAM Program Director Steve Sonka and with the assistance of Business Administration undergraduate Kristin Albers.

This case was developed to promote discussion on situations affecting the food and agribusiness sector. It is not intended to exemplify effective or ineffective management of a business situation. Supported, in part, by the University of Illinois Agriculture Experiment Station, Pioneer Hi-Bred International, and the Interinstitutional Food Animal Production Medicine Program funded by the Pew National Veterinary Education Program.

The Ever Changing Consumer

"Consumer preferences are influenced not only by quality, but also by the form and relative convenience of products and increasingly by dietary and health considerations and life-style."

Vaughn Speer and Gene Futrell
The Iowa Pork Industry: Competitive Situation and Prospects

The American population is dynamic with a blend of changing ages, family size, cultures and lifestyles which all contribute to shifting consumption patterns. By the year 2000, the United States population will be composed of more baby boomers past the age of 50 than youth under the age of 18. Within the next decade the traditional family will continue to be a distorted picture. The average number of children per family will drop to 1.81, one third of all households will be childless, 60% of children born in the 1980s will be from single parent homes, and 80% of women between the ages of 25 and 54 will work outside the home. Many of these women will be the sole "breadwinners" in their families. Increased immigration and a changing ethnic composition also will bring new food preferences.

This modified, segmented picture of the consumer brings a number of threats and opportunities to the meat industry in general. Smaller family size will require smaller portions. Time constraints on working women will reduce the amount of time spent in meal preparation and increase the importance of convenience. Within the next decade, aging baby boomers will become even more health conscious and may find nutrition to be an overriding factor in their dietary choices.

Already the meat industry is feeling the force of changing consumer attitudes (see Figure 1). Since the early 1980s, meat's overall appeal on the American plate has somewhat decreased with health, nutrition and convenience gaining as overriding forces in the consumer's mind. According to the National Livestock and Meat Board, fewer people view meat as an essential part of their diet.

Consumer habits and perceptions. Per capita meat consumption increased from 165.6 pounds in the mid-1960s to more than 180 pounds in the early 1980s. However, since 1985 meat consumption has leveled off and slightly decreased. Red meat expenditures have increased from \$136.00 in 1970 to \$298.30 in 1987. Although expenditures have increased, red meat purchases as a percent of disposable income have dropped from 3.36% to 1.94%, and its proportion of total food expenditures has declined from 23.74% to 15.98%.

Pork and processed meats are served by 55% to 60% of consumers at least once every two weeks, with the heaviest frequency attributed to bologna, which is followed by bacon, ham and fresh pork (see Figure 2). Consumption appears to be heaviest among income categories under \$50,000, age groups under 49 without a college education, and household sizes of three or more (see Figure 3).

Pork's image has not been strong in comparison to other meat and fish products. One study indicates that consumers give pork high marks for taste, but rank it poorly for health and nutrition when compared to chicken, beef and fish (see Figures 4 and 5). Chicken rates high in consumers' minds for taste, serving variety, health, and value. Fish and beef receive mostly above average or average marks in these same areas, while pork is considered average or below average.

Consumer perceptions and consumption habits are often in conflict with each other. Prior to 1986, pork outranked chicken in per capita consumption (see Figure 6). However, total per capita consumption of poultry outranked pork. Pork did remain ahead of fish in consumption, despite fish's strong health image. This situation remains true today. Those in the pork industry are striving to improve pork's status as a meat product. The most recent and well noted of these efforts is the "Pork -- The Other White Meat" promotion sponsored by the National Pork Producer Council (NPPC) (see Figure 7). A June 1991 pork attitude and perception study indicates that the NPPC promotion is having some effect. According to this study, consumer preference for white meat has a three to one advantage over red meat. Of those consumers who prefer white meat, 65% of those do so for health reasons. Perception of pork as a white meat is shared by 65% of the targeted consumers. Of the surveyed consumers, 43% indicate a positive response to the white meat reference of pork, which is an increase over the previous two years.

A Demand for Health. Pork quality has traditionally included color, firmness or texture, degree of exudation and marbling. More recently consumers have added "leanness" to the list of quality characteristics. Although color has long been used by consumers as a criterion for pork quality, it is a poor method of evaluation. Color variation is determined by chemical composition of the muscle, slaughter technique, genetic predisposition of the animal to stress, and packaging. Preference for meat firmness and texture poses a contradiction for the consumer. Studies indicate that although consumers prefer the appearance of a leaner cut, with less visible fat, higher scores are given for tenderness to cuts with more fat. This suggests that reducing fat content could lead to reduced pork quality in the mind of the consumer. Still, it appears that leanness is a current consumer concern which cannot be ignored.

Directly linked to leanness is the growing issue of health. McDonald's has responded with the introduction of the McLean Deluxe at the fast food level, and ConAgra has announced the introduction of a leaner hamburger under the Healthy Choice brand. Consumers have been demanding leaner meat because of the apparent negative ramifications of a diet high in fat and cholesterol.

High fat intake is commonly linked to blood cholesterol levels. However, saturated fats are the most often implicated in raising blood cholesterol levels, and not dietary intake of cholesterol. Also, a diet high in polyunsaturated fats is not considered harmful. In order to assess pork's relative health benefits or hazards next to its competitors in the meat case, the average consumer should better understand which nutritional information to compare (see Figure 8). According to the NPPC, a boneless loin roast in 1983 contained 11.7 grams of fat. In 1990, fat content declined to an average 6.4 grams, a 45% reduction. Calorie content also declined by 23% over the same period.

Defining Lean, Leaner, Leanest Pork

"... We breed and feed our pork for leanness. Plus, we carefully trim each cut to make LeanCuts at least 93% fat free (7% fat). Our certified seal guarantees it. We know of no other pork so carefully raised for great taste and good health."

**LeanCuts fresh pork retail package
Mariah Packing Company**

Achieving a uniform definition of lean or leaner pork is difficult. Consumer perceptions of leaner can differ from those of the packer or producer. As a result, genetic suppliers, producers, and processors are receiving mixed signals from the major players in the food chain, limiting their ability to respond to an apparent consumer demand.

From the retailer's perspective, a leaner product contains less visible fat for the consumer to "see" in the meat case. From a packer's perspective, a leaner product may be defined as less measurable backfat, an increase in the total percentage of lean carcass, reduced carcass fat, or lean depth at the 10th rib of the slaughtered animal. Some packers look at lean quality of the ham, loin and shoulder. Many packers are offering lean incentive programs for producers, but consistency among the industry has not emerged. The result is inconsistent products at the retail level.

If leaner pork is defined as reduced fat content of the pork carcass, fat reduction in the animal has been occurring since the 1920s. However, this reduction in animal fat has leveled off over the past 40 years, according to Dr. Floyd McKeith of the University of Illinois Meat Science Department. McKeith doubts that there has been a significant change in on-farm fat content of animals since the 1970s. In response to consumer demand for leaner products, retailers have reduced fat with closely trimmed, boneless products. Examples of this are significant reductions of fat in blade steaks, center loin chops, and sirloin roasts sold at the retail level (see Figure 8). This leads many to believe that in the short-term, fat reduction will continue to be by knife, rather than with animal selection or on-farm management, indicating that consumer messages are not getting back to the producer.

Leaner activities within the established system. As stated earlier, the industry picture for lean pork is complex, while the established pork food chain is quite simple. The genetic supplier works with the producer, who in turn supplies the packer. The packer then supplies the retailer or the processor with cut and uncut loins. Often the processor provides a branded, further processed product to the retailer, which ultimately reaches the consumer.

Variations in the system in response to demand for leaner products do exist, and some packers have begun expanding into branded products. Traditionally, each individual industry participant has fairly limited interaction with either upstream or downstream firms. For example, genetic suppliers have not typically worked with packers and packers have not typically assisted producers in animal management. Some of these relationships are now changing.

The Breeding Stock Supply Industry - the Beginning of the Chain

"We'll see lines that have grown very rapidly, have good appetites and are acceptable in terms of backfat... Those lines will be bred to some individuals that are very lean and we will work with that composite."

David Meyer
Spectrum Genetics

Breeding stock suppliers provide the initial input required for commercial production of market hogs. Commercial hog producers typically select female breeding stock from within their own herds; they then purchase boars and some gilts as a means of introducing new genetics to their operation.

Breeding stock suppliers consist of purebred and corporate breeders. Purebred breeders normally breed solely within one animal family, while corporate breeders develop crossbreeds or hybrid animals in order to obtain preferred genetic characteristics from different swine lines. Some purebred breeders have also begun experimenting with cross breeding over the past few years. By crossing lines of animals with selected genetic characteristics, heterosis, or hybrid vigor, improves animal performance.

Whether a purebred or hybrid breeder, the goal of each supplier is to produce an animal with improved performance and meat quality, often requiring 5 to 10 years of research. This requires different traits for gilts and boars. Breeders emphasize maternal traits such as litter size, litters per years, live births, and weaning percentage. Paternal traits include feeding performance, average daily weight gain, backfat depth, loin eye area, length, and sireing ability. Most breeding for carcass quality takes place within the paternal lines.

Customer motivation. Although breeding stock catalogs from companies, such as DeKalb, Pig Improvement Company (PIC), Illini Swine, Lone Willows Genetics, and Spectrum Genetics, all provide ratings for lean efficiency, these characteristics have yet to become a major priority to the average swine producer. This lack of interest certainly complicates the efforts of genetic supply operators, who must meet their customer demands for litter size and weight gain, while also acknowledging consumer demands for leaner products. According to Derrick Gee, Meat Projects Manager of PIC in Spring Green, Wisconsin, "The best our researchers can strive for now is to breed animals of acceptable lean quantity and quality with strong reproductive performance and growth efficiency."

Gee points out that breeding stock suppliers are at a real disadvantage. "What is in the research pipeline now, is what we will have for commercial use in 1995. We almost have to predict the future as far as what consumers will want and how well those messages will get back to the producer, who is our immediate customer. So far we haven't seen many producers who actively search for animals with the best "lean" characteristics."

David Meyer, President of Spectrum Genetics in Sterling, Illinois, agrees with Gee's perception of the producer and suggests that, "the average producer needs to know more about

those lean characteristics before he incorporates the idea into his on-farm operation. We may see a more educated producer if packers begin rejecting poor, non-lean animals."

The cost of breeding stock to a producer typically reflects the price for market hogs, with some variation depending on whether superior genetic characteristics provide for some price differentiation. Gee believes that today's commercial producer would find a cost difference in purchasing breeding stock for leaner quality animals, but the higher cost would be a good investment.

Modifying the system - new linkages and new technologies. According to Gee, the challenge for geneticists attempting to respond to a leaner-oriented consumer lies with modifying the current U.S. pork system. "The U.S. has the fattest hogs in the developed world. There is a cheap feed supply. In Europe and Asia, higher premiums exist for leaner animals and higher penalties are provided for non-lean animals. Packers may offer stronger incentives in the future, but until penalties are also in place it will be difficult to send a strong message to producers."

Both PIC and Spectrum Genetics are looking at ways to develop new, non-traditional links within the pork food chain that can enhance their ability to breed for consumer demands. For example, David Meyer is attending workshops offered by packers to better understand what they may be looking for in the future. Gee has initiated meetings with packers to discuss animal quality from the packer's perspective. Gee has also invested time in visiting packing facilities where animals have been identity-preserved. This way, PIC can gather information on breeding stock quality after the animal is slaughtered. Gee describes this as "an obvious, but mostly unused opportunity on the part of breeding stock suppliers to see how breeding efforts are responding to needs of packers and potentially, consumers."

"Packers have been mixed in their attitudes towards working with us," says Gee. "Since this hasn't been a traditional link, they are not always sure what we want. ... and what we want is better information that will aid them."

Meyer and Gee agree that new technology will certainly influence the breeding world, especially as affordable methods of measuring lean become available. Innovations, such as ultrasound, electronic magnetic resonances, and improved probes, are slowly becoming available. These will assist breeders in their work, while improving the ability of packing plants to measure lean quality. Meyer says, "These will not only improve our abilities to breed and make information available to interested producers, but they will make us more accountable for the breeding stock we release. I think it will be great for the entire industry."

Porcine somatotropin (PST) and ractopamine are recent biotechnology developments with potentially strong implications in the production of leaner animals. PST is a growth hormone that speeds the production of leaner quality animals by improving feed conversion and reducing backfat. Ractopamine is similar to PST except it is delivered as a feed additive. Neither PST or ractopamine have yet been approved by the FDA and there is concern about consumer acceptance over the use of these types of bio-engineered products.

PIC is carefully watching the progress of PST, but is not concerned over the hormone's potential effect on the breeding stock industry. According to Gee, most research suggests that PST complements genetics. Dave Hawkins, vice president of strategic planning and

development for Pitman Moore agrees with Gee and describes PST as "producing an additive effect for feeding efficiency and carcass quality." If PST is approved and well-received by the public, geneticists may respond by increasing their breeding efforts on reproductive qualities and move away from carcass quality. "Of course," Gee cautions, "this would be several years down the road and would only occur if we were certain consumer demand for leaner pork was being fully met through PST. There also is a lot of uncertainty surrounding PST's input and application costs."

The Commercial Producer - Slow to Respond to Change

"We've talked about lean hogs for a number of years. But I think the industry is finally getting serious about it... People are looking for better ways to figure out what a good hog is worth. When they do that and people produce more of them, there will be competition for good hogs."

George Brauer
Veteran Illinois Hog Producer

Today's commercial producer is facing a hog industry that is undergoing change. Changes include potential use of contractual arrangements, decreased numbers of local meat packing operations, greater reliance on a small number of large packers, talk of value-based marketing, attempts at carcass merit programs, introduction of new technologies, and the distant sounds of consumers demanding leaner products. However, facing a changing industry and responding to those changes are two different actions.

Currently it seems only a handful of producers are responding to changes that could revolutionize the industry. This semi-apathy can be attributed to favorable market hog prices, cheap corn prices, high demands, and healthy profit margins of the last few years, according to Dr. Gilbert Hollis, swine production specialist at the University of Illinois (see Figure 9). "Life is pretty good for these guys right now," says Hollis. In 1990, cash hog market prices averaged around \$54.58 cwt, which was a 23% increase over 1989.

Despite anticipated profits, producers are breaking out of their historical molds and are conservative in their herd expansion efforts. Among the reasons cited for limited expansion is the 60% cut in the number of hog operations since 1980. Experts feel that this decline has encouraged current producers to invest in facilities and increased their desire to improve their financial situation. Other reasons may be the expected large supplies of red meat and poultry, making expansion unattractive for the average producer. The producer's share of retail price averaged 41% for 1990. Average spreads for 1991 are expected to top the 1990 record by 1% to 2%.

The top five states for 1987, in order of value of hogs and pigs sold and inventory, are Iowa, Illinois, Indiana, Minnesota and Nebraska. Of course, rankings change from year to

year, but the major state producers remain fairly constant. In 1987, 57% of all farms with hog operations were managed by producers who received less than \$50,000 from agricultural products sold. Interestingly, these operators represented less than 10% of the total market value of hogs that year. Operators who earned between \$100,000 and \$500,000 from agricultural products sold accounted for nearly 60% of the total market value of hogs. In 1978, 34% of commercial hogs produced came from farms marketing 1,000 head or more. By 1988, this number rose to 68%.

Additional effort required by hog producers. According to Hollis, one problem of U.S. producers is the large percentage who view hog production as a value-added or secondary farm activity. "This makes it difficult to promote systems which could enhance the quality of their animals. For example, feeding studies have shown that diets higher in protein enhance the laying down of lean tissue. The cost of the protein, and the additional labor to add it, is small per animal. Yet, the average producer is not interested in even this small investment." Derrick Gee of PIC supports recent evidence from the University of Kentucky that there are feeding efficiencies to be gained by tailoring feed to animal genotypes. This would require even more on-farm feed management.

Breeding stock supplier, David Meyer notes that a serious leaner hog producer would most likely need to invest in improved animal facilities, careful health maintenance, and on-farm technologies capable of measuring lean quality, such as hand held ultrasound equipment. "The value of fat is in the form of insulation, so more specialized facilities would definitely be one costly investment. Leaner animals lower their intake, so they are more prone to illness. This requires careful monitoring of an animal's health status. Also, leaner animals are more easily stressed, creating some undesirable meat quality problems."

Hollis adds, "Packers can talk about lean quality all they want, but until an incentive system is in place, they can only hope for an increase in the number of average leaner animals hitting their floor. Commercial producers are not going to become serious about the investment required in producing leaner quality animals until a system exists that moves hog production from a comfortable, low-cost operation."

Dr. Bob Kauffman, a meat science specialist at the University of Wisconsin at Madison, said at the Pork Strategies 2000 symposium, that producers may resist a carcass merit system that pays for packer-defined lean quality. Kauffman speculates that producers would oppose such a system because of reduced marketing of live hogs, penalties for poor hogs, shared plant condemnation costs, and required expertise in evaluating carcass qualities on the farm. However, he feels that if packers move to a carcass merit program and do not provide marketing alternatives, producers will simply be forced into accommodating the new system. Jim Beckett, an Illinois hog producer and supplier to the hospitality and restaurant industry, believes the day will come when, "producers begin to realize a big litter size does not satisfy their needs, while leaner animals will." Beckett accepts that this new mentality will take time, since it is a combination of packers altering their buying programs and an education process geared to the producer.

The Packer - Problems for Both Large and Small Scale Operations

"When this little piggy is ready for market, he had better be in good physical shape. If he's not, his owner will not be paid top dollar for him. More and more packers are implementing pricing systems that pay producers for the amount of lean pork produced..."

Feedstuffs
May 28, 1990

When thinking of a meat packing operation, the "kill-and-cut" type plants typically come to mind. In these operations live hogs are slaughtered for sale as fresh whole cuts (see Figure 10) . A reasonable percentage of these cuts move directly to retailers who process them either in the store or in a retail fabrication operation. The most common of these cuts are loins, Boston butts, and spareribs. The remainder of the fresh pork at the packing operation is sold to specialized companies who cure products such as hams, or manufacture sausages, luncheon meats or other combination products.

Pricing by the packer normally comes in two forms -- live weight or carcass merit. Live weight pricing is the simplest for the buyer and seller, because a price is negotiated and paid on the basis of a live hog at the time of delivery. A base price may cover a weight range and discounts may be applied for lighter and heavier animals. If packers do not sort animals, a base price covers the load of hogs, even if the animals are not uniform in weight. Although the live weight pricing mechanism is easy, weight is a poor judge of animal quality and may not be fair to the producer or packer.

Carcass merit pricing allows the packer to evaluate hog carcasses rather than live hogs. Hog carcasses are weighed and graded after slaughter and before they enter the chill room. Meat packers who use such a system maintain their own grading system, which is often different from USDA standards. Common components of carcass merit pricing are: backfat thickness, muscling, carcass weight as a percentage of live weight, carcass weight, base carcass price quoted by packer, current premiums, and discounts. Any one or combination of these components may make up a packer's merit program.

Ideally, carcass merit systems should permit packers to attract hogs of certain grades and qualities which satisfy their own needs, while also sending messages to producers as to desired quality. However, this system proves to be confusing to producers, who may not be able to compare packer merit programs easily since they vary from one facility to another.

In 1987, more than 10.5 million hogs were purchased on a carcass basis, which is equivalent to 13.5% of the total kill. This figure is down from 1985, when 16.2% of the total kill was purchased on a carcass basis. The percentages vary greatly from region to region and company to company. A representative of Morrell says that the company's carcass merit program consistently equals 30% to 35% of their total kill. The 10 top packers in 1987 bought approximately 15.7% of their hogs on a carcass merit system, which is slightly higher than the industry average. Regionally, carcass buying seems to be more active in the western corn belt. In fact, Nebraska plants purchased more than 37% of their hogs with some type of

carcass system in 1987. In states such as Ohio, Indiana, Illinois, Michigan and Wisconsin, this number was only 7.4%.

USDA grades are used in some pricing, but they are more appropriately designed to measure yields rather than quality. Any pork carcasses having lean meat of acceptable quality receives a grade of No. 1, 2, 3, or 4, based on expected yield of lean cuts, such as hams, loins, picnics, and Boston butts. Carcasses with unacceptable lean yields are graded utility. A grade of No. 1 implies expected lean cut yields of at least 53%, while grade No. 4 implies expected lean cut yields of less than 47%. The USDA assigns grades based on visual inspection of average backfat thickness, carcass length or weight. The problem with this method is that these observable factors do not effect lean cut yield. USDA grading is voluntary and therefore, participation is at the packer's discretion, who may or may not use the system in a carcass merit program. With pressure from consumers for less fat, attributes between USDA grades become more significant (see Figure 11). As USDA grades increase from No. 1 to No. 4, the percentage of ham, loin, Boston butt and picnic should decrease. Also, the percentage of fat that needs to be removed increases.

Larger operations look to daily yields. Over time the smaller, local packer has been replaced by large, high volume plants capable of handling up to three million head per year. Many slaughter/processing facilities have begun private labelling. The kings of the pork industry include names such as Excel, IBP, ConAgra, Oscar Meyer, Hormell and John Morrell (see Figure 12). The number of plants killing hogs has dropped from around 450 to 300 since the early 1980s. Larger plants, those capable of handling 1.5 million hogs annually, now control more than 50% of the market. The 20 largest companies now slaughter almost 75% of the hogs in the United States.

These larger operations have created a stir within the pork industry. Some argue these large operations are at the mercy of their size and therefore, the goal of high yield per day governs the system. This creates problems with attracting and monitoring animal quality, since large numbers of animals are required to be efficient. Marvin Hayenga, Iowa State University economist, disagrees. He suggests that larger, more efficient operations lead to better quality control. He believes more control over quality may lead to pork moving away from its generic status to a branded item that will increase overall pork consumption. Also, excess capacity has driven packers into processing operations, where more profit can be obtained than in fresh pork alone. In fact, packers with less than 33% fresh pork production earn an additional \$2.59 per \$100 of sales, while those with over 66% fresh pork production earn only \$0.21 more per \$100 of sales.

Smaller producers may find the reduced number of packers detrimental to their future, since a decrease in packer competition and poor access to markets in outlying areas may result. For producers in the midst of packer country, competition may be strong even though the number of firms has decreased. The incredible size of larger operations may force firms to compete to keep kill floors running at the efficient level demanded by their size. Smaller packers still make up 60% of the industry organization, even though their hog kill is only 25% of total industry slaughter. Many smaller, regional packers have found strength in niche markets, such as barbecue products, sausage biscuits and other specialty foods.

Cost of leaner carcasses in dollars and technology. Both larger and smaller packers with specialized interests are placing an emphasis on hog quality, especially in the

area of leanness. According to one study, packers paid an average premium of \$0.45 per cwt in 1988 for each 1/10 inch of reduced backfat, which is up \$0.06 from 1984. However, another study demonstrated that a hog produces \$0.85 per cwt of additional value for each 1/10 inch reduction in backfat (see Figure 13). The question then is, how well is the packing system rewarding the producer for leaner efforts on the farm? As of now, costs are not clear as to the labor, technology and administrative expenses of the packer attempting to pay for measurably leaner carcasses.

Measuring lean quality requires costly technology, such as ultrasounds, optical probes and other electronic devices. Ultrasound scanners measure backfat depth and loin muscle at specific areas of the carcass. Ultrasound requires no cutting, so they can be used on live animals. Fat-O-Meaters, which are optical probes inserted at the 10th rib of the carcass, measure the light reflected off the fat and muscle. This produces a reading for backfat thickness and loin eye, which is used to predict lean composition. TOBEC, the most expensive device, provides the same lean composition information. TOBEC measures the electromagnetic conductivity of an animal, which changes depending on fat or lean.

Gee, of PIC, estimates that 50% of all plants currently have Fat-O-Meaters. Unfortunately, these devices are slow and inaccurate at the high rates of speed required by larger plants. TOBEC appears to be promising as a more accurate device potentially capable of handling 1000 head per hour. According to John Forrest of Purdue University, the challenge is to develop techniques which are rapid enough to keep pace with line speeds, while equipment, labor and maintenance costs must be low enough to satisfy budget constraints. Forrest believes that the ultimate test for any carcass evaluation technique is the precision and accuracy at which the technique determines value. He says, "Realistic carcass values can only be established by determining the value of the products that result from the carcass based upon the selling price of those products as they leave the plant less the cost of production and profit margin."

The technology currently is being refined and is cost prohibitive to most plants now. However, Indiana Packing Company (IPC), a joint venture between Central Soya, Mitsubishi and Ferruzzi, has installed TOBEC and plans to create a lean meat percent payment schedule in the future. Morrell uses the Fat-O-Meater in its carcass merit program, where producers are paid for percent of lean, as measured by the Fat-O-Meater, plus the carcass weight. The goal is to offer larger premiums for lean hogs and steeper discounts for fat ones.

According to Meat Scientist Bob Kauffman, the ideal system for producers would require a number of innovations within the pork sector. First, producers would be paid for pounds of quality lean pork. To do this, animals would be evaluated with a practical and accurate form of measurement, carcass quality would be defined industry wide, and packers would quote prices based on their desired percent of lean for their specific needs. Although the technology may become available, packers may still face the dilemma of keeping the daily production yields high enough to maintain plant efficiency. A true carcass merit system would force identity-preservation of animals, per animal measurement, and an increased amount of administrative work in paying producers. This creates a situation where large packers may settle for an improvement in the amount of "average lean" brought into the plant.

Companies experimenting with suppliers of leaner animals. Some smaller operations that lack the scale and efficiency stresses of their larger counterparts are

experimenting with varying carcass merit systems. For example, Mariah Packing of Monmouth, IL and Columbus, IN has created a "Premium Lean Program" (see Figure 14). According to Del Gero, plant manager in Columbus, "This program pays producers for hogs that yield higher than average ham and loin percentages, reflecting market value of cuts." Mariah, a subsidiary of Purina Mills, slaughters, processes, and markets boxed and branded pork.

Mariah works closely with area producers. Mariah President John Stadler describes Mariah's "vertical information system" as a means of providing recommendations from genetics to nutrition that can aid in the production of top-quality hogs. Hogs that are brought into Mariah are audited individually based on the Premium Lean Program. Information on hogs is fed back to producers, who can then better evaluate their practices. Joe Brands, Mariah procurement manager, envisions a day when a producer's check will be accompanied by a report of animal performance after slaughter. "We want a producer to be able to tell how well his genetics and feeding programs are working from our end. "

According to Gee of PIC, Meyer of Spectrum Genetics, and hog producer Beckett, Mariah offers one of the best incentive programs for getting the quality message back from the consumer. Mariah's Gero also believes the informal relationship that has been developed between Mariah and companies such as PIC will prove to be valuable for their future requirements. He says, "It all starts with the genetics. I'm always happy to open the door for someone in the pork industry who is willing to make leaner animals available." Gero believes that Mariah is one of the few packers who has an on-going, productive relationship with the genetic supply industry and that there is an advantage for geneticists to evaluate lean quality from the packer's perspective.

Although Mariah works closely with hog producers, there are no formal ties. If another firm offers a more attractive incentive program, Mariah assisted producers are free to sell to the other firm. Brands and Gero do not view this as a risk, but simply as a means to improve overall producer performance. Gero says, "The way we see it, we are developing alignments that will keep producers interested in Mariah, while making the kind of quality product we need available."

Another avenue being explored by a few packers is that of contractual arrangements with producers. Contractual arrangements are not new to the pork industry. Agricultural economist Jim Rhodes of the University of Missouri estimated that 10% of the 1988 hog slaughter was under contract. Smithfield Foods, a supplier of branded, prepacked fresh pork cuts, is an example of a company which has initiated contractual arrangements with producers in an effort to become vertically integrated in their pork business.

In 1986 Smithfield purchased nearly 35% of its hogs from Midwestern producers. These hogs proved to be inconsistent in quality and high in cost, leading the company to develop joint production arrangements and long-term supply contracts with southeastern producers. In 1991, Smithfield purchased 37% of its hogs from southeastern producers and only 10% from Midwest producers. According to Smithfield President Joseph Lutter III, the company also invested in leaner breeding stock from the United Kingdom which will be made available to joint arrangement partners, long-term contract suppliers and other Smithfield producers.

Packers are also facing concerns other than leaner products. Pale, Soft, Exudative (PSE) pork, a condition that creates an undesirable product for consumers is another problem that limits a packer's ability to provide a quality product. Approximately 10% to 20% of all pork products are somewhat affected by PSE. PSE can occur due to a number of factors. Animals which are genetically disposed to leanness can also inherit a stress condition that leads to PSE. On-farm management, handling between the farm and the packer, handling at the packer, and storage conditions after slaughter all contribute to differing levels of PSE. Because the condition can be attributed to a number of factors outside the plant, packers are unable to manage the quantity of PSE affected meat.

Consumer concerns reflected in branded products. Consumers are now questioning food safety and in particular the use of feed additives, hormone growth promotants, illegal drugs, and residues. Because many of these concerns are centered in the producer's farm management, it becomes difficult for a packer to evaluate the number of elements that compose the undefined definition of quality for the consumer. Mariah Packing is addressing these issues through their LeanCuts brand of prepackaged pork (see Figure 15). A separate carcass merit program and on-farm requirements exist for producers who want to become LeanCuts suppliers. Not only do LeanCuts suppliers have to meet certain leanness criteria, but farms have to be inspected for water quality and residue levels. On-farm feeding programs also must be antibiotic free. Currently the LeanCuts market is limited to parts of Indiana and Ohio, but the company remains optimistic as to the product's future. Mariah maintains a list of certified LeanCut farms, so as demand increases, they can accommodate with quality suppliers. However, these suppliers will not be under a formal contract.

Some industry experts believe that packer interest in branded products, such as LeanCuts, will pave the way for quality incentives and better carcass-based pricing methods. If pork were to follow the route of poultry with new value-added forms in the supermarket meat case, packer branding would necessitate quality specifications at the plant.

The Retailer - Trying to Meet a Confusing Consumer Demand with Confusing Products

"I saw a lot of labelling inconsistency... I don't know how you police that, but it sends mixed signals to the consumer and reduces their confidence in your product."

**Jeff Held, Assistant Project Director
National Live Stock and Meat Board**

Of course, the retailer has to respond to consumer demand. But, consumers that are demanding less fat in their diet, can easily turn to readily available products such as fish, chicken or turkey. A retailer's incentive to push leaner meats is somewhat limited by available substitute products and cost. The price of most pork cuts is lower than that of their beef counterparts (see Figure 16), but remains higher than turkey and chicken. However, many believe that baby boomers, the most likely candidates for products deemed healthy, are less

likely to be price discriminating since they are at the height of their income earning years. If pork can improve its nutritional reputation, the market may be strong despite price comparisons with poultry.

Perhaps the most confusing question for the retailer and consumer is, what is "leaner"? A survey of Champaign-Urbana stores in Illinois found prepared ham products labelled as 93%, 95%, 96% and 97% "fat free". It is difficult to determine if this small differentiation warrants price variances and if, these products are really significantly different from pork products not labelled as "fat free". This confusion is certainly not limited to pork. For example, a recent survey by California Polytechnic State University nutritionists found that a beef T-bone is 89.9% fat free, a top sirloin is 93.9% fat free, and top round is 95% fat free. These products represent meat found typically in the meat case which have undergone close trimming. The questions facing retailers are, if significantly leaner products are being made available or if consumers are simply receiving products with leaner labelling.

Pork currently ranks third for meat case space, behind number one beef and number two poultry. Meat case space also is dominated by the variety of an item available. According to the NPPC there are 24 different ways in which to purchase chicken breasts, increasing the presence of chicken to consumers. The NPPC is optimistic that as more types of pork products are introduced, pork's presence also will increase.

Another problem in the meat case lies with inconsistent labelling, cut types, meat color, loin eye sizes, and visible fat. These inconsistencies send mixed signals to consumers who are now accustomed to poultry's consistency and beef's grading of select or prime.

Branded products provide more than just meat. Paul Poe, marketing manager for Mariah's LeanCuts product line, feels that prepackaged, smaller cuts with nutritional information will greatly contribute to the pork industry. Nutritional labelling is mostly limited to processed products like ham and bacon. "The only other way to get nutritional information out is with branded, prepackaged products," Poe says. "The store butcher is not a nutritionist or a home economist. Prepackaged, branded products with nutritional information and a convenient cut of meat appeal to the average consumer. The consumer is looking to buy a meal, not just meat. The more information the package contains, the better the consumer feels about the meal." All LeanCuts products include a recipe on the package, which Poe believes rounds out the consumer's desire for a meal. Poe also emphasizes that the average consumer likes to cook a meal in less than 10 minutes, so cut size is important.

Branded products in the store are convenient for the owner, but price mark-ups are less than for store cut meat. Although branded products reduce the labor associated with meat cutting, unionized butchers may not be as responsive to large quantities of prepackaged cuts. Most believe that butchers readily relinquished the nuisance of chicken cutting, but red meat may not be as easy. The label of "fresh" indicates that the product, whether branded or unbranded, has not been frozen. New packaging technologies will extend already acceptable shelf lives of branded, fresh products. The shelf life of a vacuum packed, case ready product, common to branded pork, is six to seven times longer than in-store packaged pork. Vacuum packaging permits refrigeration of up to 21 days, a distinct advantage over store packaged products -- which have to be replaced every two to four days.

The average wholesale/retail spread has decreased between 1985 and 1989. In 1985, wholesale/retail price spreads for pork products equalled more than 62%. In 1989, this figure declined to 54.2%. Poe says that mark ups for branded pork products are lower than store cuts. However, since there is no required labor the profit margins are attractive as compared to in-store cuts. This is especially true since spoilage risks are far less than store packaged items. Still, the retailer is motivated by low-cost and struggles with the economics associated with branded pork cuts, such as packaging, cost of additional processing or administrative costs of securing higher quality animals. Retailers are not anxious to have these costs reflected in their price.

In-store consumer confusion. In-store pricing comparisons between branded products and in-store cuts are not available. Many branded leaner products are just now entering the market and how their pricing will eventually level out is uncertain. Newer products are entering the market with prices comparable to in-store cuts as a means of building demand. It is interesting to note that in Germany the present retail price difference between branded and unbranded pork averages around 30% and predictions suggest that in the next decade this figure will climb as more branded products are introduced. Four or five German brands, where the consumer is guaranteed that the entire process of meat production is carefully controlled, have been well received by the public. Branded products from companies that lack the ability to fully integrate and monitor quality are not expected to survive.

Inconsistencies between U.S. product types also make comparisons difficult. For example, many prepackaged products are boneless, while store cuts may not be, making it difficult to compare price per pound for meat. Product descriptions between prepackaged products and in-store cuts varies enough to create havoc for the consumer. For example, a certain type of chop in a branded product may be called something entirely different than the in-store cut.

Creating a "Leaner" Pork System

"The retailer sells on price, so he needs the cheapest product. Packers are encouraged to provide a lower price product. Therefore, they strive to increase production yields while decreasing costs. The producer sells lots of cheap pork at a profit and the genetic supply people are faced with a customer base interested in litter size and fast weight gains.

The problem is -- the consumer wants a leaner product. Is the current system wrong or is it simply difficult to derive value throughout the food chain? Everyone in the leaner pork industry is struggling with how to modify the established, but working, system."

**Paul Poe, Director of Marketing, LeanCuts brand
Mariah Packing, a subsidiary of Purina Mills**

Don Tyson, CEO of Tyson Foods, spoke to the Pork Strategies 2000 symposium and said, "you're still producing and selling live animals, not food." This interesting point certainly has application to the entire pork sector, but perhaps is even more applicable and timely to those in the "leaner" pork industry.

Everyone in the pork industry believes they are contributing to leaner pork. There is evidence that pork products have become leaner with additional trimming. But, trimming at the packer and retail level does not indicate a change throughout the entire chain. "Leaner" pork enthusiasts, those that are actively seeking modifications to the entire system, are dependent on the continued health interest of consumers. Assuming health concerns will act as a motivating force for consumers, the pork industry is facing a variety of changes and challenges -- which raises a number of questions.

Starting at the beginning, how can geneticists look beyond the current, short-term needs of hog producers and predict future animal characteristics that will be driven by the consumer? The traditional genetic supplier/hog producer relationship must be expanded to include packers, processors and possibly retailers.

Will hog producers modify their on-farm operations, perception of quality and business practices to accommodate a leaner system? The majority of producers are profitable and see no need to alter their practices, especially when packer incentives are not yet established for leaner quality animals.

Will packers and processors be hindered by large scale operations that inhibit identification and producer reward systems for leaner quality animals? New technologies may make this situation more manageable, but for now, the goal is to have large quantities of meat at the lowest cost.

How can a retailer's low cost mentality be overcome? Unless there is a consumer outcry for even "leaner" pork products, in-store butchers will probably continue to trim fat, rather than demand leaner animals from their suppliers. Branded pork products may have a place in the meatcase, but demand availability and profit margins are uncertain.

The final concern is, how trusting will the average consumer be? Good fat vs. bad fat, 96% vs. 97% fat free, and questionable labelling are all sending mixed messages to the consumer.

With so many players in the pork sector, no one participant can totally overcome those elements that may impact consumer acceptance and the overall industry in the long run. Once again, the pork industry is facing a variety of changes and challenges -- and new linkages between sector participants appear to be among the most critical.

Figure 1
Consumer Attitude Statements: Percent Who Strongly Agree

	1983	1985	1987
Meat			
To satisfy appetite, main meal must include meat.	34	28	24
Meat is best tasting part of main course	22	21	25
Meat is healthier than most foods.	13	12	12
Plan to cut down on meat for health reasons.	19	26	27
Don't eat more meat because it's too expensive.	18	17	12
Health/Nutrition			
Important to limit fat in diet.	57	68	66
Extremely concerned about salt in diet.	46	53	50
Avoid foods high in cholesterol.	39	45	48
Rarely buy foods with additives, preservatives.	26	26	29
Concern about weight influences purchase.	35	38	42
Meat Preparation			
Rarely have time to fix meals taking 30-60 minutes.	23	36	34
Speed/ease of preparation influence food purchases.	20	25	29
Enjoy spending time preparing meals.	37	32	29
Experimenting with recipes feels creative.	36	36	36
Price/Economizing			
Don't let price govern food choice.	24	25	28
Grocery is first place to economize.	22	22	16

Source: Burke Marketing Research, 1987.

Figure 2
At-Home Servings

Kind of Meat	% of Respondents Who Have Served During			Average Serving Frequency Past 2 Weeks			
	Past 2 Weeks		Past Year	Total Sample		Users Only	
	1985	1987		1985	1987	1985	1987
Fresh Pork	54	54	85	1.3	1.3	2.3	2.4
Ham	51	54	89	1.4	1.4	2.8	2.7
Pork Sausage	39	36	--	1.1	.9	2.7	2.6
Bacon	60	57	88	2.6	2.2	4.4	3.8
Bologna/ Luncheon Meats	59	59	85	3.5	3.3	5.9	5.6
Hot Dogs	58	55	85	1.5	1.3	2.6	2.4
Chicken	89	87	97	3.3	2.8	3.7	3.3
Ground Beef	87	88	98	3.1	3.2	3.6	3.6
Other Fresh Beef	78	80	95	2.6	2.5	3.3	3.1
Fish Other than Canned	64	55	89	1.6	1.8	2.6	2.8

Source: Burke Marketing Research, 1987
 Courington, Sheila McKay. Pork and the Consumer Market* Pork Technical Reference Manual: New Ideas.
 Pork Industry Group, A Division of the National Livestock and Meat Board. Volume 1, Issue 1, August 1989.

Figure 3
Average Number of Times Served in the Past Two Weeks - 1987

Demographic Characteristics	Products of Primarily Pork Origin				Bologna Luncheon Meats	Hot Dogs
	Fresh Pork	Ham	Pork Sausage	Bacon		
Sex						
M	1.6	1.6	.9	2.4	3.4	1.4
F	1.3	1.4	1.0	2.1	3.3	1.3
Income						
<\$15000	1.5	1.8	1.1	2.9	3.4	1.4
\$15000-\$24999	1.4	1.5	NA	2.2	3.5	1.7
\$25000-\$49999	1.4	1.3	.9	1.9	3.4	1.2
<\$50000	.8	1.4	.6	1.7	2.7	.9
Age						
18-24	1.8	2.2	.8	2.0	4.4	2.5
25-49	1.3	1.4	1.0	2.0	3.7	1.4
50-64	1.2	1.2	.8	2.4	2.8	.9
65+	1.2	1.4	1.0	2.5	2.0	.9
Education						
HS or less	1.6	1.6	1.1	2.7	3.7	1.5
College+	1.0	1.3	.7	1.6	2.9	1.1
Household Size						
1-2	2.2	1.2	.8	2.0	2.2	.9
3-4	2.8	1.6	1.0	2.2	4.1	1.6
5+	2.8	1.8	.3	2.7	4.5	1.7
Race						
White	1.2	1.4	.8	2.0	3.3	1.3
Nonwhite	1.8	1.5	1.7	2.9	3.6	1.8

Source: Burke Marketing Research, 1987
 Courington, Sheila McKay, "Pork and the Consumer Market" Pork Technical Reference Manual: New Ideas.
 Pork Industry Group, A Division of the National Livestock and Meat Board. Volume 1, Issue 1, August 1989.

Figure 4
Advantages/Disadvantages of Selected Fresh Meats and Fish

Of 200 people questioned:	Pork %	Chicken %	Beef %	Fish %
Greatest Advantage				
Taste	58	22	46	22
Price	12	18	9	8
Convenience	10	14	18	5
Health/Nutrition	8	38	18	60
Greatest Disadvantage				
Taste	4	6	2	12
Price	22	13	38	36
Convenience	6	17	4	11
Health/Nutrition	29	7	22	2

Source: Burke Marketing Research, 1987
 Courington, Sheila McKay. Pork and the Consumer Market* Pork Technical Reference Manual: New Ideas.
 Pork Industry Group, A Division of the National Livestock and Meat Board. Volume 1, Issue 1, August 1989.

Figure 5
Average Ratings of Fresh Meat Products

	Chicken	Fish	Beef	Fresh Pork
Taste Appeal	+	+	+	0
Kid Appeal	+	-	0	-
Serving Variety	+	+	+	0
Nutritional Value	+	+	+	-
Fattening	+	+	0	-
Wholesomeness	+	+	+	-
Cholesterol	+	+	0	0
Salt	+	+	0	0
Fat	+	+	0	-
Calories	+	+	0	-
Ease of Preparation	+	0	+	-
Package Size Variety	+	+	+	0
Cost	+	0	+	0
Value	+	+	+	-

+ = The product received above average ratings.

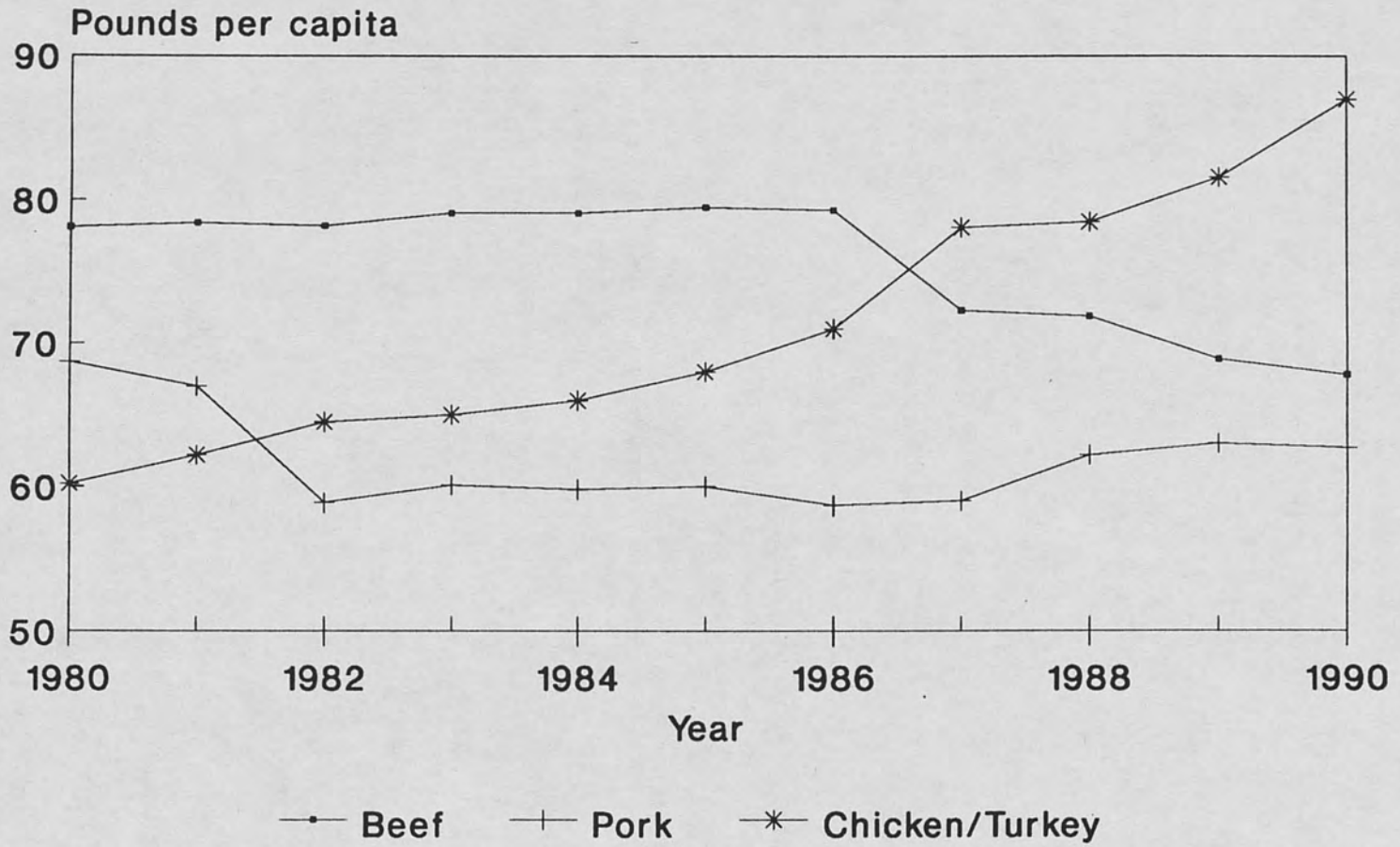
0 = The product received average ratings.

- = The product received below average ratings.

Source: Burke Marketing Research, 1987

Courington, Sheila McKay. "Pork and the Consumer Market" Pork Technical Reference Manual: New Ideas.
Pork Industry Group, A Division of the National Livestock and Meat Board. Volume 1, Issue 1, August 1989.

Figure 6
Changing Consumption Trends of Meat Products



Source: Agricultural Outlook

Figure 7 Pork -- The Other White Meat

PORK: THE OTHER WHITE MEAT STORY

Long before the poultry industry began touting the fact that chicken and turkey were "white meats," it was clearly established that pork bore white meat credentials as well. In fact, Webster's dictionary definitions of pork as a white meat can be traced back at least as far as 1914. So, although it may have taken the American public by surprise when the NPPC launched its contemporary advertising campaign with the slogan *Pork -- The Other White Meat*, it was certainly no surprise to pork industry insiders themselves.

Dictionaries aside, it is easy to ascertain that pork is truly a white meat. That's because fresh pork -- especially popular cuts

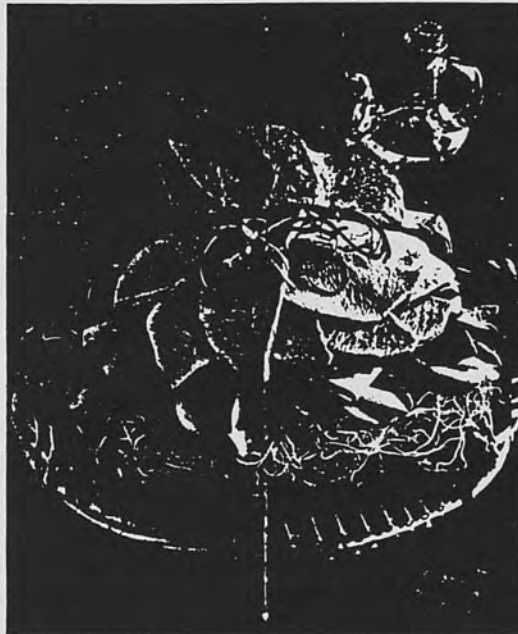
like pork chops -- is white in color after being cooked. And that is the true means of determining color "classifications" for meat products -- the color of the meat after it is cooked. Note that neither chicken nor turkey meats are "white" in their uncooked states, either.

However, the pork industry did not mount its *Other White Meat* campaign solely to inform the public about the true color of the meat. In fact, pork industry leaders had determined that it was time for a total repositioning of pork within the meat industry.

Pork was originally produced as much for the land as for the meat. Lard was the primary fat source prior to vegetable oils and was used for cooking, as well as for munitions and other industrial purposes.

In the 1950s and '60s, the pork industry began to evolve. Producers recognized the need to change their product. The idea of producing pork that was leaner became the driving force behind the industry's research and development. Industry efforts focused on improving the product through genetic research and enhanced feeding and management techniques.

Twenty years later, the results of this industry-wide effort came to fruition. A 1981 USDA study



Pork Pig Day



Stuffed Pork Loin Casserole

PORK MAKES A PERFECT FLAVOR MARRIAGE WITH MANY HERBS AND SPICES.



showed that fresh pork was dramatically lower in calories and fat than it was in 1963. As astonishing as it might seem, the industry had managed to lower the caloric and fat levels by more than 50 percent, depending on the particular cut of fresh pork studied.

Today's average cut of fresh pork tenderloin is comparable to skin-off chicken breast in calories, fat and cholesterol. A three-ounce serving of pork tenderloin contains 141 calories, 4.1 grams of fat and 79 milligrams of cholesterol. Three ounces of chicken breast, skin-off -- 140 calories, 3.9 grams of fat and 71 milligrams of cholesterol.

New research data reveals even more startling advances in the industry's ongoing effort to produce the type of leaner, healthier cuts of meat that the American public now demands. One 1989 study shows a dramatic decrease of fat and calorie content in pork loin. Further research is ongoing to determine the true nutrient value of fresh pork cuts. New data is anticipated to be available mid-1990.

Armed with this type of research information, the pork industry today proudly and confidently depicts its product as *The Other White Meat*. The *Other White Meat* campaign

highlights the news that the pork industry has succeeded in improving the quality of its meat products significantly over the past 20 years, to the point that lean pork is of comparable nutritional value to other white meats.

Just as not all cuts of fresh pork are the same, neither are all cuts of chicken or turkey alike either. Furthermore, the exact nutritional value of a meat product can vary widely, depending on not only the cut but also the method of preparation. For example, frying chicken can result in a much higher calorie content than broiling -- and frying preparation techniques are much more common for chicken than they are for fresh pork.



The Other White Meat:

Figure 8
Nutrition Profile of Meat and Fish Products

	Cal	Total Fat	Sat	Polyunsat	Chol	
Sodium		(g)	(g)	(g)	(mg)	(mg)
BEEF (broiled 3.5 oz.)						
Rib-eye, lean	225	11.6	4.9	.4	80	69
Porterhouse steak	218	10.8	4.3	.4	80	66
T-Bone steak	214	10.4	4.2	.4	80	66
CHICKEN (skinless, roasted)						
1/2 Breast	142	3.1	.9	.7	73	63
1 Thigh	109	5.7	1.6	1.3	49	46
FISH (raw, 3.5 oz.)						
Tuna, albacore	177	7.6	---	trace	60	40
Shrimp	91	.8	---	---	150	140
PORK (broiled 3.5 oz.)						
Loin-"pork chop"	257	15.3	5.3	1.9	95	75
Tenderloin, lean	166	4.8	1.7	.6	93	67

Source: Burke Marketing Research, 1987.

Leaner Pork Cuts Over Time (based on 3 oz. servings of lean, cooked pork)

Cut	1990	1983	Reduced %
Blade Steak			
fat (g)	10.6	15.6	-32%
cholesterol (mg)	80	89	-10%
Center Loin Chop			
fat (g)	6.9	8.9	-22%
cholesterol (mg)	70	83	-16%
Sirloin Roast			
fat (g)	8.8	11.2	-22%
cholesterol (mg)	73	77	-5%

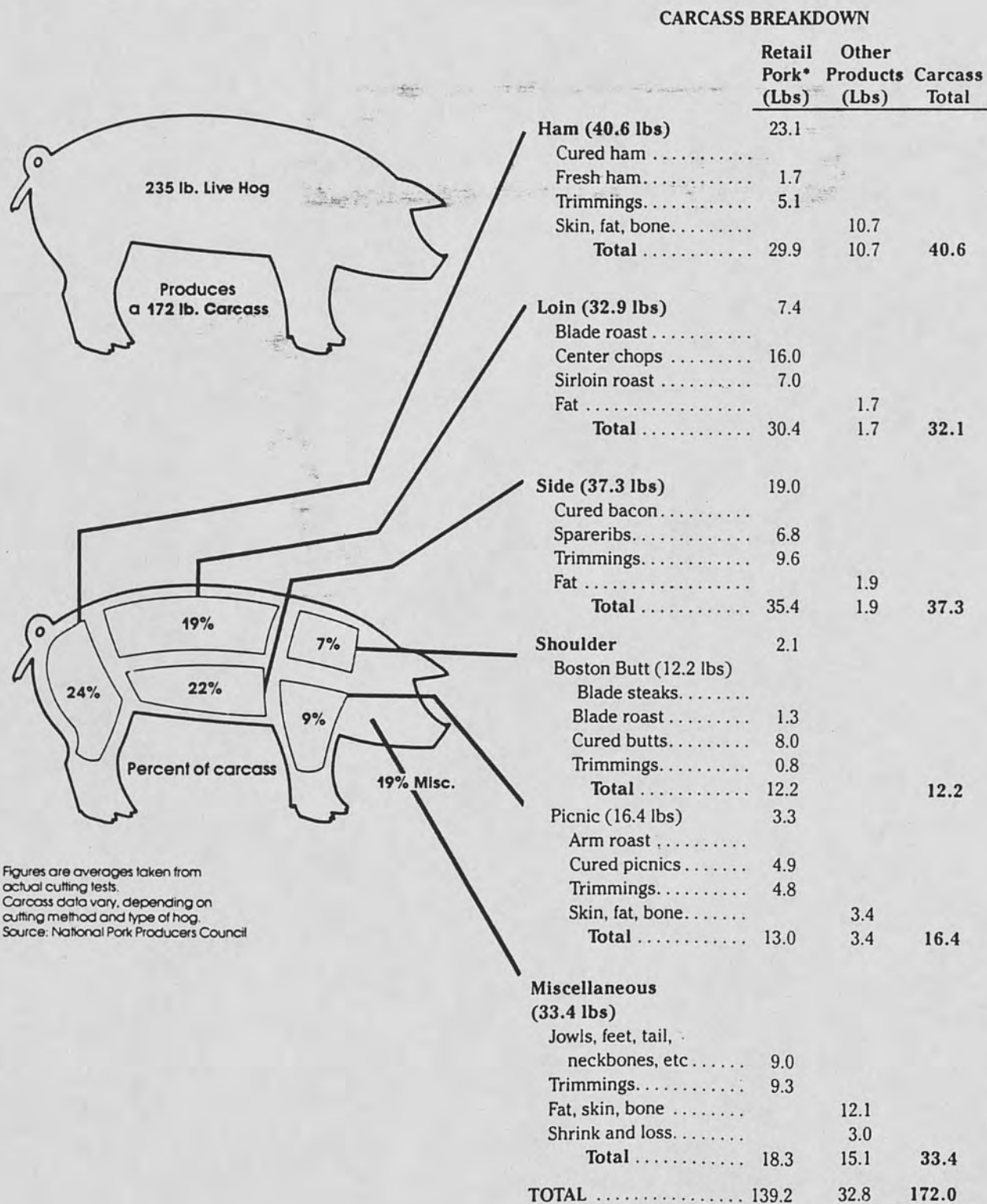
Source: National Pork Producers Council

Figure 9
Costs and Returns
Farrow-to-Finish, North Central Region

	Jul	1990 Aug	Sep		Jul	1991 Aug	Sep
				\$/cwt			
Breakeven Price	46.34	45.79	46.40		44.37	44.08	44.96
Selling Price	61.49	56.26	54.63		54.67	50.04	45.75
Net Margin	15.15	10.47	8.23		10.30	5.96	0.79

Source: Livestock and Poultry Update, USDA

Figure 10
Hog Carcass Breakdown



*Retail cuts on semi-boneless basis. Fully boneless would show lower retail weight.
Source: Derived by AMI from USDA and industry figures, 1988

Figure 11
Percentage Yield of Major and Minor Cuts from Pork Carcasses of Different USDA
Grades when Trimmed to Either 1/4-inch or 0-inch Fat

Carcass Component	Surface fat trimmed not to exceed 1/4 inch				All surface fat removed			
	U.S. No.				U.S. No.			
	1	2	3	4	1	2	3	4
Ham	23.3	22.1	21.0	20.3	19.3	17.4	15.9	14.7
Loin	21.4	20.6	19.4	18.2	19.0	18.3	17.0	14.8
Boston Butt	7.7	7.4	6.8	6.4	7.3	7.1	6.5	5.8
Picnic Shoulder	11.0	10.5	9.6	9.0	9.5	8.9	7.9	6.8
Subtotal	63.4	60.6	56.8	53.9	55.1	51.7	47.3	42.1
Ham Fat	1.7	1.7	1.9	2.1	5.7	6.4	6.9	7.6
Loin Fat	6.4	8.4	10.9	12.9	8.8	10.7	13.3	17.3
Boston Butt Fat	2.0	2.2	2.5	2.7	2.3	2.6	2.8	3.4
Picnic Fat	.71	.81	.76	.75	2.2	2.4	2.4	2.6
Subtotal	10.81	13.11	16.06	18.45	19.0	22.1	25.4	30.9

Source: Cross, Russell H. and Rhonda K. Miller. "Macro Composition of U.S. Pork." Pork Technical Reference Manual: New Ideas. Pork Industry Group, A Division of the National Livestock and Meat Board. Volume 3, Issue 2, July 1989.

Figure 12
Top 15 Hog Packers

Rank	Company	1987 daily slaughter capacity /1	Share of industry slaughter capacity /2
1	IBP	38500	9.5%
2	Con Agra/Swift	34600	8.6%
3	Morrell	27200	6.7%
4	Smithfield Foods	26200	6.5%
5	Hormel	18500	4.6%
6	Farmstead Foods	17400	4.3%
7	Wilson	17200	4.25%
8	FDL	17100	4.2%
9	Thompson Valley	13500	3.3%
10	Excel	13500	3.3%
11	Farmland	13400	3.3%
12	Lundy Packaging	12000	3.0%
13	Sara Lee /3	11500	2.8%
14	Utica Packaging	7800	1.9%
15	Oscar Meyer	6300	1.6%

/1 Open and operating in June 1987, or scheduled to open later in 1987. Plants owned or controlled via lease or contract by the company listed.

/2 Based on proportion of 1986 Federally Inspected Slaughter by these firms, and assuming equal capacity utilization and days of operation for plants. These firms accounted for 73% of F.I.S. in 1985.

/3 Smaller plants owned by the firm are not included in these figures.

Source: John McDaniel and Marvin L. Hayenga, Iowa State University, Ames, IA.
Smith, Mike. "This little market went to market" Pork '88. June 1988.

Figure 13
Lean Guide to Pork Value/1 Based on a Percentage of Base Market Price

Last Rib Fat Thickness (in.)

Carcass Wt. lbs.	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4
139 -145	88.7	88.1	87.8	86.8	86.6	85.8	84.1	83.8	83.6
146 - 152	97.5	97.0	96.6	95.6	95.4	94.6	92.8	92.5	92.3
153 - 159	100.1	99.6	99.2	98.2	98.0	97.2	95.5	95.2	95.1
160 -166	102.5	101.9	101.6	100.6	100.4	99.5	97.9	97.5	97.4
167 -173	102.9	102.3	102.0	101.0	100.8	100.0	98.3	98.1	97.8
174 -180	102.3	101.8	101.4	100.4	100.2	99.4	97.7	97.5	97.3
181-187	102.3	101.8	101.4	100.4	100.2	99.4	97.7	97.5	97.2
188 -194	101.7	101.1	100.7	99.8	99.6	98.7	97.0	96.7	96.6
195 - 201	101.3	100.7	100.3	99.4	99.2	98.3	96.7	96.5	96.2

/1 Pork value based on muscle and fat quality assumed to be acceptable.

Source: Cross, Russell H. and Rhonda K. Miller. "Macro Composition of U.S. Pork." Pork Technical Reference Manual: New Ideas. Pork Industry Group, A Division of the National Livestock and Meat Board. Volume 3, Issue 2, July 1989.

Figure 14
Mariah Packing Premium Lean Program

PREMIUM LEAN PROGRAM

How does it work?

Premium prices are paid for hogs that yield higher than average ham and loin percentages. As a packer we are in a reverse manufacturing process in that we take raw materials (hogs) apart and sell or further process the parts. Basically all we are doing is keeping track of the key parts (ham and loin) on a per lot basis.

Why the ham and loin?

This is the largest and most valuable muscle group and is an excellent indication of leanness throughout the carcass.

Is there a limit on lot size?

Currently it takes 150 hogs per lot to use this system.

Is there a scheduling requirement?

Lots need to be scheduled a day prior and delivered before 10:00 a.m. the following day.

What are the weight requirements?

Hogs must have a minimum weight of 230 pounds and a maximum weight of 255 pounds.

Is there a minimum ham and loin requirement?

In order to receive premium payments the trimmed loin yield must be above 13.50% of live weight.

What is the base price and when will it be published?

The base price is established at the plant every morning by 10:00 a.m. for the next day's delivery. In establishing the base the Interior Indiana or Interior Illinois market is the leading indicator.

Is this base lower than other packers' base prices?

Most likely the base for this system will be lower because it is tied to an average hog. Because this system reflects actual cutability, the premiums for hogs producing more lean will receive a price competitive to and in most cases exceeding those being offered by other packers.

Example:

150 hogs at 240 lbs. = 36,000 lbs.	
× .58 (base price) =	\$20880.00
Ham % 17.25 — 16.50 (base %)	
= .75 × 36000 = 270 × .70 =	189.00
Loin % 14.25 — 13.50 (base %)	
= .75 × 36000 = 270 × 1.25 =	337.50
	\$ 526.50
Processing Premium — 1.60/head	
× 150 =	240.00
TOTAL PREMIUM	\$ 766.50

Actual price of hogs	\$20,880.00	Base
	766.50	Premium
	\$21,646.50	— 36000 =
		\$60.13/cwt

Contact:

Mariah Hog Procurement Department
Monmouth, Illinois:

In State 1-800-247-7675
 Out of State 309-734-4666

Columbus, Indiana:

WATS 1-800-227-6328
 812-378-3366


Base price and premiums subject to change.

Figure 15
LeanCuts Packaging

FRIGIDANT OR FREEZER

BONELESS PORK SPARERIBS

Fresh!




Cooks In 10 Minutes

LEANCUTS™
From Mariah

FRESH PORK BONELESS

BONELESS PORK SPARERIBS



KEEP REFRIGERATED

At Mariah, we know how important it is for all of us to watch the amount of fat and cholesterol we consume. We breed and feed our pork for leanness. Plus, we carefully trim each



cut to make LeanCuts at least 93% fat free (7% fat). Our certified seal guarantees it. We know of no other pork so carefully raised for great taste and good health.

VACUUM PACKED TO SEAL IN FRESHNESS AND GREAT TASTE.

Nutritional Information (Uncooked)			
	3 - OZ. SERVING		
	LEAN CUTS Comminuted Boneless Pork Spareribs	CHICKEN* Lightweight with skin	BEEF TOP LOIN STEAK** 1.25 lb. per lb.
Calories	130	155	217
Protein	19 gm.	17 gm.	16 gm.
Carbohydrates	0 gm.	0 gm.	0 gm.
Fat	6 gm.	9 gm.	17 gm.
Cholesterol	65 mg.	57 mg.	57 mg.
Sodium	40 mg.	55 mg.	45 mg.

*SOURCE: USDA Handbook 8-1 **SOURCE: USDA Handbook 8-13

Great Meals In Minutes

You are now only minutes away from a delightful LeanCuts pork dish. For best results, avoid overcooking; LeanCuts are best served slightly pink in the middle. For your convenience, you can freeze LeanCuts for up to 6 months for easy to prepare meals. To thaw, place in the refrigerator, or slit plastic package and thaw in microwave.

Mariah Packing Company
Columbus, Indiana 47201

Barbecued Country Ribs

1 package LeanCuts
Boneless Pork Spareribs
1/4 cup barbecue sauce

1 tablespoon orange
marmalade
1/4 teaspoon lemon pepper

Preheat broiler. Place ribs on broiler pan. Spread open slightly. Combine barbecue sauce and marmalade. Spoon mixture over ribs. Sprinkle with lemon pepper. Broil 3 to 4 inches from heat source for 6 minutes. Makes 4 4-oz. servings.

200 Calories • 25 gm. Protein • 3 gm. Carbohydrates • 10 gm. Fat

BONELESS PORK SPARERIBS

PRIVATE STRATEGIES, PUBLIC POLICIES & FOOD SYSTEM PERFORMANCE

Working Paper Series

Purpose: The NE-165 Working Paper Series provides access to and facilitates research on food and agricultural marketing questions. It is intended to be a publication vehicle for interim and completed research efforts of high quality. A working paper can take many forms. It may be a paper that was delivered at a conference or symposium but not published. It may be a research report that ultimately appears in full or abbreviated form as a journal article or chapter in a book. Using the working paper series enables a researcher to distribute the report more quickly and in more extensive detail to key research users. A working paper may also be an end product in itself, for example, papers that collate data, report descriptive results, explore new research methodologies, or stimulate thought on research questions.

Procedures: Working papers may address any issues in the food and agricultural marketing area as described in the NE-165: Private Strategies, Public Policy and Food System Performance, project statement. This research agenda is available from Professor Ronald Cotterill, Chair of NE-165 at the address given below. A prospective working paper should be forwarded to the Chair who will coordinate a review of the paper by two research peers. Alternatively authors may submit two independent peer reviews with their paper. Based upon independent reviewer comments the Chair may accept, accept with revisions, or reject the submission. If accepted the Chair will issue working paper covers, and a mailing list to the author who shall have responsibility for preparing and distributing copies to all persons and organizations on the mailing list. Additional copies of working papers are available from the author or from the Food Marketing Policy Center at The University of Connecticut.

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