Kansas Electric Utilities Research Program

THE ECONOMIC FEASIBILITY OF THE EVERGREEN PROCESS

KEURP Project KRD-9414 Final Report

Prepared by

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November 1996

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ABSTRACT

We first outline the structure of the cattle hide market from both a supply and demand perspective. We do this with two different types of information: the market based quantitative data, and information gained in interviews. From this information emerges a picture of domestic supplies of cattle hides increasing faster than domestic demand. An increase in foreign demand for cattle hides has provided the demand of the additional supplies of cattle hides. In addition, the cattle hide industry has volatile price swings, and because of the large amount of storage capacity, it appears that many of the brokers in the market act as speculators.

We conclude that the structure of the cattle hide industry, especially as it applies to Southwestern Kansas, does not currently lend itself to the use of the evergreen process for two reasons:

(1) Since most of the cattle hides generated in Southwestern Kansas go overseas and spend from 4 to 6 months in transport, the preservation process must allow for cheap storage to be competitive in this market. The evergreen process requires that after the process is complete, the hides must be refrigerated at 4° C. till they are used. That would be (prohibitively) expensive.

(2) The domestic market for cattle hides is close enough that the hides are currently shipped green (unprocessed). In this case the evergreen process adds nothing and is of no help.

The future feasibility of the evergreen process does not look any better unless a cheap method of storage for the hides can be found. If a tanning facility is built in Southwestern Kansas, as many people anticipate, there would be even less reason to expect the evergreen process to become economically feasible for Southwest Kansas. Right now only green hides are shipped to Texas; thus, a tannery in Southwest Kansas would certainly only need green hides.

THE ECONOMIC FEASIBILITY OF THE EVERGREEN PROCESS

Introduction

In this report we first outline the structure of the cattle hide market from both a supply and demand perspective. We do this with two different types of information: a quantitative description of the market based on available quantity supplied, quantity demanded, and price statistics, and anecdotal information gained in interviews to provide a more detailed picture of the industry, especially from the point of view of Southwestern Kansas. Then with this understanding of the market and the little information available about the evergreen process, we are able to show how the process is not economically feasible now and the major problem that needs to be solved before the process can ever be feasible in the foreseeable future.

Before discussing the cattle hide market, we will provide a little background on the cattle industry in Kansas. As everyone who has seen their quota of cowboy and western movies knows, Kansas was the destination of the cattle drives from Texas. The heyday of these cattle drives was from just after the Civil War to the mid-1870's. As a result a large part of the national meat packing industry developed along the Missouri River and its tributaries with towns such as Omaha, Nebraska, Des Moines, Iowa, St. Joseph, Missouri, and both Kansas City, Kansas and Missouri having large stockyard area with several meat packing plants. The development of the refrigerated car changed the cost structure of the industry, and from the 1960's on the meat packing plants moved closer to the feedlots. The result for Kansas has been an increase in the meat packing industry in Southwestern Kansas and a reduction of the industry in the eastern part of Kansas. Publish sources of data have little actual data on the meat packing industry in Kansas. Because the industry in Kansas is dominated by a few large companies, most of the data must be suppressed due to confidentiality requirements. However, data does exist for the meat processing industry which includes the meat packing industry. Table 1 has the meat processing employment data from 1972 to 1995 for Kansas and the United States. Although the Kansas portion of the industry has increased as a percentage of the national industry figures, the meat processing industry has remained about the same percentage of the Kansas economy. In 1972, meat processing represented about 1.2 percent of total Kansas non-farm wage and salary employment. It had dropped to 1.0 percent by 1980, then rose to 1.3 percent by 1990, and in 1995 it represent 1.4 percent.

TABLE 1

ANNUAL AVERAGE EMPLOYMENT
IN THE MEAT PROCESSING INDUSTRY
(SIC 201)

Year	Kansas Annual Average	National Annual Average	Kansas as a percent of U.S.
1972	8.5	347.0	2.5%
1973	8.7	335.5	2.6%
1974	8.6	345.4	2.5%
1975	8.6	335.8	2.6%
1976	8.4	344.9	2.4%
1977	8.7	351.7	2.5%
1978	8.5	353.3	2.4%
1979	9.0	358.0	2.5%
1980	9.3	358.4	2.6%
1981	9.7	355.5	2.7%
1982	10.6	346.9	3.1%
1983	11.2	346.0	3.2%
1984	12.8	355.5	3.6%
1985	14.1	361.7	3.9%
1986	14.1	371.7	3.8%
1987	14.4	385.3	3.7%
1988	14.7	398.9	3.7%
1989	14.4	411.5	3.5%
1990	14.1	421.7	3.3%
1991	14.8	425.5	3.5%
1992	15.1	433.1	3.5%
1993	16.0	443.5	3.6%
1994	16.8	451.3	3.7%
1995	17.4	467.2	3.7%

The Structure of the Cattle Hide Industry

A Quantitative Picture of the Cattle Hide Market

Cattle Hides as Output

The supply data we have found for the cow hide market is the value of shipments from the ***Census of Manufactures's Industrial Series*** for meat products. Value of shipments of hides, skins, and pelts produced by the meat processing industry was $867.1 million in 1982 ($1,486.2 million in 1992 dollars), $1,608.8 million in 1987 ($1,532.8 million in 1992 dollars), and $1,992.2 million in 1992.[1] In real terms, these dollar figures represent a 3.1 percent growth rate from 1982 to 1987 and a 30.0 percent growth rate from 1987 to 1992 in the value of shipments. This indicates a significant change in the dollar value of the supply of cow hides between 1987 and 1992. As the demand data we will analyze next shows, this increase in supply is not primarily for domestic consumption. Although we could not find any data foreign trade data for cow hides, our interviews will suppliers indicated that the foreign market, especially for suppliers in Southwestern Kansas, represents a relatively new and increasing sizable portion of the market for cow hides.

Cattle Hides as Input

We have much more information on the demand side of the cow hide market, in particular, the Tanning; Industrial Leather Goods; and Shoes Industries.[2] These SIC codes seem to be the major source of demand for cow hides with the Leather Tanning and Finishing Industry dominating the demand for cow hides in this sector.[3] Table 2 has the basic industrial level data available for the Leather Tanning and Finishing Industry.

The number of establishments in the industry and the number of employees (both total and production employees) declined steadily from 1972 to 1987. From 1987 to 1992 the industry showed

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[1]This is Standard Industrial Classification (SIC code) 20119—Hides, Skins, and Pelts from Fresh and Frozen Meat from Animals Slaughtered in this Plant. The great majority of the value of shipments for hides, skins, and pelts was for cattle hides, including kip. In 1987 this type of hide represented 92 percent of the total and it had risen to 96 percent in 1992. The value for cattle hides is not know for 1982.

The price index used to translate the nominal dollar figures into 1982 dollar figures is the cow hide price index which is reproduced for the period 1970 to 1994 in Table 4. The reason for the curious differences between nominal and real dollar values is that cow hide price were actually higher in 1987 than in 1992.

[2]SIC codes 3111, 3131, 3142, 3143, 3144, and 3149.

[3]***Census of Manufactures's Industrial Series.***

TABLE 2
INDUSTRIAL DATA FOR LEATHER, TANNING & FINISHING
(STANDARD INDUSTRIAL CLASSIFICATION 3111)

	1972	1977	1982	1987	1992
Number of Establishments	517	465	384	344	332
With 20 or more Employees	223	191	172	126	139
Number of Employees (thousands)	25.7	23.0	19.5	14.6	16.6
Payroll (millions of dollars)	$200.0	$254.8	$310.6	$291.6	$420.3
Payroll per Employee	$7,782	$11,078	$15,928	$19,973	$25,319
Value Added per Employee	$14,331	$23,265	$29,733	$51,192	$53,970
Payroll as % of Value Added	54%	48%	54%	39%	47%
Production Workers (thousands)	22.1	19.6	16.2	12.1	13.3
As a % of Total Employment	86%	85%	83%	83%	80%
Hours (millions)	41.9	38.2	31.1	24.6	27.9
Annual hours per production worker	1,896	1,949	1,920	2,033	2,098
Wages (millions of dollars)	$151.3	$192.2	$225.2	$211.9	$293.5
In 1992 Dollars	$549.2	$487.0	$368.7	$246.2	$293.5
Average hourly earnings	$3.61	$5.03	$7.24	$8.61	$10.52
In 1992 Dollars	$13.10	$12.75	$11.85	$10.00	$10.52
Value Added by Manufacturing (millions)	$368.3	$535.1	$647.7	$747.4	$895.9
In 1992 Dollars	$1,336.8	$1,356.0	$1,060.3	$868.3	$895.9
Growth Rate in Real Terms		1.4%	-21.8%	-18.1%	3.2%
Cost of Materials (millions)	$708.0	$927.6	$1,272.8	$1,496.5	$2,035.9
In 1992 Dollars	$2,569.8	$2,350.6	$2,083.6	$1,738.7	$2,035.9
Growth Rate in Real Terms		-8.5%	-11.4%	-16.6%	17.1%
As a % of the Value of Shipments	67%	64%	66%	67%	70%
Cost of Materials and Payroll as a % of the Value of Shipments	86%	81%	84%	81%	84%
Total Value of Shipments (millions)	$1,059.5	$1,456.1	$1,928.7	$2,218.6	$2,910.4
In 1992 Dollars	$3,845.7	$3,689.8	$3,157.3	$2,577.6	$2,910.4
Growth Rate in Real Terms		-4.1%	-14.4%	-18.4%	12.9%
New Capital Expenditures (millions)	$16.3	$30.7	$47.9	$27.7	$48.5
In 1992 Dollars	$49.2	$60.0	$61.8	$31.3	$48.5
Growth Rate in Real Terms		22.0%	3.1%	-49.4%	55.0%

NOTE: All data is taken from the ***Census of Manufactures Industrial Series*** for Tanning; Industrial Leather Goods; and Shoes, Department of Commerce. Dollar values in real terms were calculated using the price index for leather (see Table 3) except for New Capital Equipment where its own index was used.

some small gains in the number of employees while the number of establishments continued to decline. In addition, the percentage of employees who are production workers has steadily declined since 1972. In real terms, the amount of wages paid by the industry to production workers also follows the pattern of decline through 1987 and then a slight increase in 1992. This is caused in part by the decline in the number of workers, but it is also caused by the steady decline in the real wages of the workers.[4]

The total value of shipments increased about 13 percent in 1992 from the 1987 figure. However, in real terms, the value of shipments is still only about 75 percent of the 1972 total. Value added by manufacturing had also generally declined until 1992. Even with the sight increase in 1992, the value added by manufacturing in 1992 is about 70 percent of value of manufacturing in 1972 in real terms. The remaining part of the value of shipments is the cost of materials. These followed the same basic patterned identified before for the other major parts of the value of shipments. An additional trend appears to be the increasing part that the cost of materials plays as a part of the value of shipments.

The cost of cattle hides for the leather industry represents about 73 percent of the cost of materials in 1987 and 1992.[5] In 1992 the leather industry used about 1.5 billion dollars worth of cattle hides. On the other hand, the cattle hide industry produced about 1.9 billion dollars worth of cattle hides in 1992. Since the leather industry is the primary market for cattle hides, these figures raise an interesting question: Where are the additional cattle hides going? Our interviews with people in the industry indicated that overseas trade was certainly large enough to account for this difference, although we could not find any trade data to support contention.

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[4]In Table 2 all real values are deflated by using the leather price index (see Table 4) except for the new capital expenditures which were deflated using the new capital expenditures price index Using the leather price index to deflate wages only makes sense if one is concerned only with the relative role of payroll in the cost structure of the industry. However, when discussing the change in purchasing power of wages, some type of consumption price index is more appropriate. For example, if the Consumer Price Index(CPI) is used to deflate wages, a slightly different picture emerges. Below is a comparison of production wages deflated using the leather price index and the CPI in 1992 dollars.

	1972	1977	1982	1987	1992
Leather Price Index	$13.10	$12.75	$11.85	$10.00	$10.52
Consumer Price Index	$12.40	$11.64	$10.52	$10.62	$10.52

[5]***Census of Manufactures Industrial Series*** for Tanning; Industrial Leather Goods; and Shoes, Department of Commerce, Table 7. Dollar values in real terms were calculated using the price index for leather (see Table 4).

The Geographical Distribution of the Leather Industry

The leather, tanning and finishing industry is concentrated in only a few states. Table 3 has the geographic distribution of the major centers of the industry. The state with the fastest growing leather industry is Pennsylvania while the two states with the most noticeable declines are New York and Wisconsin. In the case of Wisconsin, it appears that the industry is using old factories built in the last century which are not competitive today. Without new capital investment, the Wisconsin industry appears to be in a downward spiral.

TABLE 3
STATES WITH A SIGNIFICANT PORTION OF THE LEATHER, TANNING & FINISHING INDUSTRY

	1982		1987		1992	
	Employees (thousands)	Value Added (millions)	Employees (thousands)	Value Added (millions)	Employees (thousands)	Value Added (millions)
California	1.3	$48.3	NA	NA	0.7	$24.9
Massachusetts	1.1	$67.0	1.1	$45.9	1.0	$54.1
New Jersey	0.9	$39.6	0.7	$48.2	0.6	$67.9
New York	2.7	$65.2	1.9	$62.5	1.5	$65.4
Pennsylvania	1.1	$2.4	1.4	$72.0	2.1	$87.4
Wisconsin	2.6	$97.2	1.8	$85.8	1.8	$115.4

Price Data

The Bureau of Labor Statistics has detailed producer prices for many industries including cattle hides and leather. The cattle hide index goes back to at least 1947 and the leather index goes even further. Table 4 has the annual average for these two indexes from 1970 to 1994 (the 1995 annual average is not yet available) plus the aggregate price index for intermediate materials, supplies, and components. Two trends are obvious from Table 4: (1) the annual average price increase is greatest for cattle hides (11.7 percent), next greatest for leather (7.8 percent), and least for intermediate goods (5.3 percent); and (2) the cattle hide price index is much more volatile than the leather price index which is much more volatile than the intermediate goods price index. The volatility is illustrated in Figure 1 which has the annual percentage changes for each index.

FIGURE 1
PERCENTAGE CHANGE OF PRICE INDEXES

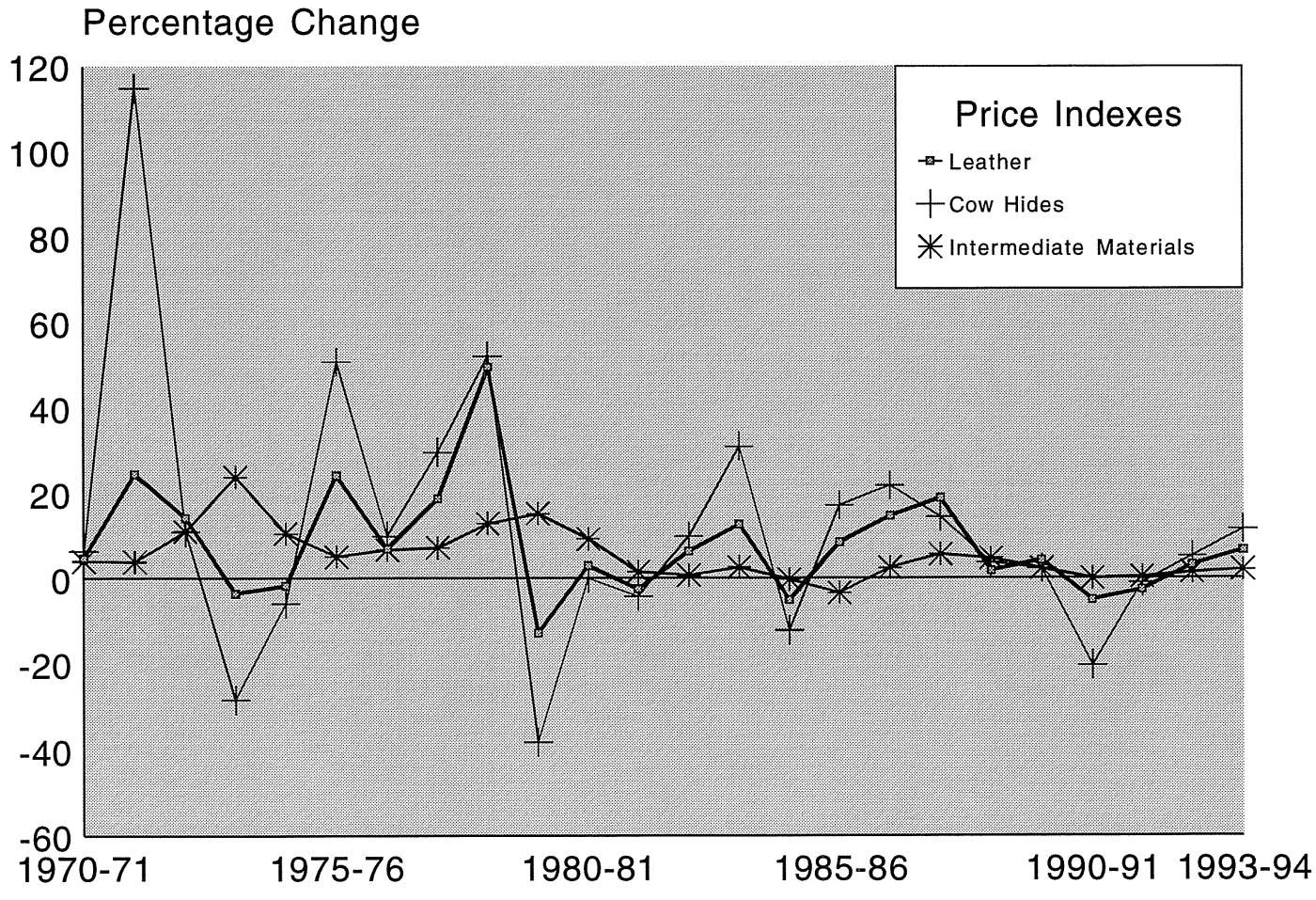

TABLE 4

PRICE INDEXES

	Leather Price Index	Percentage Change from previous year	Cow Hides Price Index	Percentage Change from previous year	Intermediate Materials, Supplies, and Components Price Index	Percentage Change from previous year
1970	34.6		30.4		35.4	
1971	36.2	4.6	32.3	6.3	36.8	4.0
1972	45.1	24.5	69.4	114.9	38.2	3.8
1973	51.4	14.1	76.9	10.8	42.4	11.0
1974	49.6	-3.6	55.1	-28.3	52.5	23.8
1975	48.7	-1.8	51.8	-6.0	58.0	10.5
1976	60.4	24.2	78.1	50.8	60.9	5.0
1977	64.6	6.9	85.8	9.9	64.9	6.6
1978	76.6	18.7	111.2	29.6	69.5	7.1
1979	114.6	49.5	169.3	52.2	78.4	12.8
1980	99.8	-12.9	104.6	-38.2	90.3	15.2
1981	102.7	2.9	104.5	-0.1	98.6	9.2
1982	100.0	-2.6	100.0	-4.3	100.0	1.4
1983	106.2	6.2	109.8	9.8	100.6	0.6
1984	119.6	12.6	143.8	31.0	103.1	2.5
1985	113.4	-5.2	126.1	-12.3	102.7	-0.4
1986	122.9	8.4	147.7	17.1	99.1	-3.5
1987	140.9	14.6	179.9	21.8	101.5	2.4
1988	167.5	18.9	205.8	14.4	107.1	5.5
1989	170.4	1.7	213.1	3.5	112.0	4.6
1990	177.5	4.2	217.8	2.2	114.5	2.2
1991	168.4	-5.1	173.4	-20.4	114.4	-0.1
1992	163.7	-2.8	171.4	-1.2	114.7	0.3
1993	168.6	3.0	180.2	5.1	116.2	1.3
1994	179.6	6.5	200.9	11.5	118.5	2.0
Mean		7.8		11.7		5.3
Variance		1.7		9.3		0.4

NOTE: All price indexes are from the Bureau of Labor Statistics ***Producer Price Indexes***.

Qualitative Analysis of the Cattle Hide Market

From our interviews with the beef processing industry and one tannery, we obtained the following description of the cattle hide market as it applies to Kansas.

(1) Nearly all the cattle hides generated in Southwestern Kansas are shipped overseas to either Japan, Korea, or China. They travel by ship and take from 4 to 6 months to get to their destination. The quickest possible shipping period is probably 90 days.

(2) The cattle hides that are sent to domestic tanners is small. They only represent about 3 percent of the total market for cattle hides in Southwestern Kansas. The hides that are shipped domestically are sent to Texas and are shipped as green hides (no processing).

(3) The cow hide market is erratic and has many brokers that act as speculators.. The people in Dodge City described it as "flaky"or volatile. In particular, the meat processors feel that a certain amount of price manipulation is at least tried by the tanners. At times the cattle hides will stack up because their is no demand for them. One plant in Dodge City has the capacity to store up to 25,000 hides. At other times, like when we were in Dodge City, they were trying to get the cattle hides out the door as soon as they were created. One of the reasons given for the volatility of the market is that the hides can be stored relatively easily and a lot of storage space exists.

(4) Each individual tanner has their own unique demands and specifications for their purchase of cattle hides. A general standard of what is an appropriate process to prepare a cattle hide does not seem to exist.

Trying to verify this anecdotal evidence is not really possible with any certainty. However, the price and quantity data described and presented in the previous section is consistent with (1) , (2) and (3). The supply of hides is greater than the domestic demand, there are not a lot of tanners near Kansas, and the price of cattle hides is extremely volatile.

The Feasibility of the Evergreen Process

Current Economic Feasibility

The structure of the cattle hide industry, especially as it applies to Southwestern Kansas, does not lend itself to the use of the evergreen process for two reasons:

(1) Since most of the cattle hides generated in Southwestern Kansas go overseas and spend from 4 to 6 months in transport, the preservation process must allow for cheap storage to be competitive in this market. The evergreen process requires that after the process is complete, the hides must be refrigerated at 4° C. till they are used.[6] That would be (prohibitively) expensive.

(2) The domestic market for cattle hides is close enough that the hides are currently shipped green (unprocessed). In this case the evergreen process adds nothing and is of no help.

Future Economic Feasibility

Everyone we talked to was interested in the process. The key drawback this process must overcome for it to be feasible in Southwestern Kansas is that it must provide hides that can be stored cheaply. Until that happens, there is little reason to consider the process unless the cattle hide market changes in an unforeseen manner.

One additional discouraging scenario emerged from our interviews with cow hide suppliers in Southwestern Kansas. Everyone we talked to thought that eventually a tanning facility would open in Southwest Kansas. However, for it to work, it would have to be tied to the beef processors. If only green hides are shipped to Texas, a tannery in Southwest Kansas would certainly only need green hides. Thus, if a tannery should emerge in Southwest Kansas, there would be even less reason to expect the evergreen process to become economically feasible for Southwest Kansas.

Conclusion

The evergreen process is not economically feasible and will not be until it can produce cattle hides that can be cheaply stored for an extended period of time. Its weakness now is the need to keep the processed hides refrigerated at 4° C during storage.

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[6]"Electron Beam Preservation of Cattle Hides for Leather Production,", p. 2. This a five page attachment to Research Proposal number IP-9414 from EPRI with Gary Walzer as principal investigator.