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TRANSPORTATION LOGISTICS AND ECONOMICS OF THE PROCESSED MEAT AND RELATED INDUSTRIES IN SOUTHWEST KANSAS

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16 Abstract

Kansas is one of the nation's leaders in meat production. Specifically, in the southwest Kansas region, there are more than three hundred feed yards and four meat processing plants. Traditionally, processed meat, some of the meat byproducts, grain, and other industry-related products are transported using large trucks (tractor-trailers). In addition to the highway system, there are two Class I railroad carriers and four Class III railroad carriers in the southwest Kansas region. Because there is a rich railroad network in the southwest Kansas region, it is necessary to study whether there is a need to utilize other transportation modes, such as railroad and intermodal, to transport goods and products for the processed meat and related industries.

The objectives of this research are to study the transportation modes, their utilizations for the processed meat and related industries in southwest Kansas, and their impacts on local economic development. To achieve the objectives, the research team conducted a literature review, collected data through site visits, interviews, and web-sites, estimated vehicle miles of travel (VMT) by truck using TransCAD software, and projected future growth of processed meat and related industries as well as emerging industry development in the region.

The research results demonstrate that there is heavy usage of trucks in the southwest Kansas region which need to be diversified to other transportation modes such as railroad and intermodal. To utilize railroad and intermodal transportation for the processed meat and related industries, there is a need to build required infrastructure near or within the feed yards and meat processing plants to support these transportation modes. In addition, to use the railroad for transporting feed grains, the system infrastructure of short line railroads needs to be improved.

During this project, the research team also found that two new industries, dairy and ethanol, are emerging in southwest Kansas. With the development of new businesses, the demand on railroad service (both Class I and Class III) has been increasing recently. Thus, it is important to have adequate investment in railroad infrastructure, particularly, to keep short line railroads running rather than being abandoned.

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THE KANSAS DEPARTMENT OF TRANSPORTATION
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PREFACE

The Kansas Department of Transportation's (KDOT) Kansas Transportation Research and New-Developments (K-TRAN) Research Program funded this research project. It is an ongoing, cooperative and comprehensive research program addressing transportation needs of the state of Kansas utilizing academic and research resources from KDOT, Kansas State University and the University of Kansas. Transportation professionals in KDOT and the universities jointly develop the projects included in the research program.

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ABSTRACT

Kansas is one of the nation's leaders in meat production. Specifically, in the southwest Kansas region, there are more than three hundred feed yards and four meat processing plants. Traditionally, processed meat, some of the meat byproducts, grain, and other industry related products are transported using large trucks (tractor-trailers). In addition to the highway system, there are two Class I railroad carriers and four Class III railroad carriers in the southwest Kansas region. Because there is a rich railroad network in the southwest Kansas region, it is necessary to study whether there is a need to utilize other transportation modes, such as railroad and intermodal, to transport goods and products for the processed meat and related industries.

The objectives of this research are to study the transportation modes, their utilizations for the processed meat and related industries in southwest Kansas, and their impacts on local economic development. To achieve the objectives, the research team conducted a literature review, collected data through site visits, interviews, and websites, estimated vehicle miles of travel (VMT) by truck using TransCAD software, and projected future growth of processed meat and related industries as well as emerging industry development in the region.

The research results demonstrate that there is heavy usage of trucks in the southwest Kansas region which need to be diversified to other transportation modes such as railroad and intermodal. To utilize railroad and intermodal transportation for the processed meat and related industries, there is a need to build required infrastructure near or within the feed yards and meat processing plants to support these transportation

modes. In addition, to use the railroad for transporting feed grains, the system infrastructure of short line railroads needs to be improved.

During this project, the research team also found that two new industries, dairy and ethanol, are emerging in southwest Kansas. With the development of new businesses, the demand on railroad service (both Class I and Class III) has been increasing recently. Thus, it is important to have adequate investment in railroad infrastructure, particularly, to keep short line railroads running rather than being abandoned.

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Chapter One - Executive Summary

Kansas is one of the nation's leaders in meat production. It ranks second in the nation in cattle and calves on farms and third in red meat production. Traditionally, processed meat (beef, chicken, and pork), meat byproducts, and other industry related products are transported using large trucks (tractor-trailers) from southwest Kansas to their final destinations. Also, feed grain is shipped into the region from local producers, other parts of Kansas, and other Midwest states. Because of the regional concentration of these industries, as well as the long-haul movement of products, there may be other modes of transportation that might be more cost efficient. Also, because of the vast highway and railroad networks in southwest Kansas, the economically superior shipping methods for the meat processing industry may not only be highway transportation but also railroad and/or intermodal transportation, depending on the conditions of the shipment.

Beef cattle are raised all over the United States, with Texas, Nebraska, and Kansas being the leaders in the industry. According to the Kansas Livestock Association (KLA), the advantages of feeding cattle in southwest Kansas include: (1) Kansas ranks near the top in the nation for the production of most high quality grain (corn, milo, and wheat); and (2) a moderate climate and access to roughage allow for predictable cattle performance. Many experts predict that the processed meat and related industries in the southwest Kansas region will continue to grow. To support the growth of this industry, there will be more trucks on the highways to transport goods and products for the processed meat industry.

With the increase in tractor-trailer transportation, highway capacity will be challenged. This can lead to increased traffic congestion, highway and bridge maintenance costs, frequency of bridge and roadway replacements, air pollution, fuel consumption, accidents, and travel times for road users. Because of these reasons, there is a need to study the transportation modes (truck, railroad, and intermodal) available for the industries to ship their products, and to determine which one is more efficient and cost effective, resulting in the long-term sustained growth of the industries and positive impacts on the local and regional economies.

The two main inputs of feed yards are feed grains (primarily corn, sorghum, and occasionally wheat) and feeder cattle. The transport mode for feed grain is truck and/or railroad. Feeder cattle must be moved only by truck due to regulations governing the transport of live animals. Cattle are fattened at finishing feed yards in southwest Kansas and other neighboring states. Once they reach a certain weight they are then moved to the meat processing plants by truck. Thereafter, boxed beef and beef byproducts from the meat processing plants are transported via trucks or rail-truck intermodal to customers in the United States and other countries.

Cattle are finished at feed yards in southwest Kansas, where they are fed specific rations of grain, roughage and supplements. Grains, such as corn and sorghum, and protein/nutrient supplements like soybean meal, vitamins, salt, minerals, and rumensin (to aid digestion) are fed to the cattle. Roughage such as alfalfa hay, prairie hay, corn silage and sorghum silage are also fed to the cattle. Kansas crops produced for feed include corn, sorghum, alfalfa hay, and occasionally wheat. According to Cory Kinsley, Risk Management Director of Cattle Empire in Satanta, KS, 50%-70%

of grain produced in Kansas is used for feeding cattle in the region, the remainder comes from outside of southwest Kansas. Corn is moved by trucks within a 30 mile radius to its destination using independent freight companies that work on a contractual basis. Grain is also shipped to Kansas grain elevators via rail shuttle trains from various locations in Iowa, Nebraska and Minnesota.

Cattle are transported in and out almost daily in order to serve the needs of the four major meat processing facilities located in southwest Kansas. Once live cattle are slaughtered, their meat is processed and packaged for shipment. These facilities will ship boxes of refrigerated beef all over the United States year round. Four of the five major meat (beef) processing facilities are located in the southwest Kansas region and in total have a combined daily kill capacity of 23,600.

Trucking has become the most popular mode of freight transportation because of its efficiency and convenience, but may result in increased highway maintenance costs. According to Gary Davenport, Director of Safety and Risk Management for the Kansas Motor Carrier Association (KMCA) in Topeka, KS, as of June 2006 there were 9,409 carriers in Kansas. There are approximately 6,604 private carriers, which include construction trucks, trucks used for lawn care, or trucks used to transport property. On the other hand, there are 2,805 for-hire carriers (also called common carriers) which haul mostly general goods and are the main haulers of livestock. In 2003, the trucking industry drove 1.5 million miles on Kansas roads, representing 5% of all roadway traffic in the state. Trucks transported about 80% of total manufactured tonnage in the state in 2003.

There were a total of 19 freight railroads operating in Kansas in 2005, among which there were four Class I railroads, 13 Class III railroads, and 2 switching railroads. These carriers operate 4,776 miles (excluding the trackage rights) with a total traffic of 6,274,881 carloads and approximately 362 million tons of freight in Kansas. Among the four Class I railroads in Kansas, BNSF Railway and Union Pacific Railroad cover a majority of Kansas and are the only Class I railroads in the southwest Kansas region.

1.1 RESEARCH OBJECTIVES AND SCOPE

The objectives of this research are to study the transportation modes, their utilizations for the processed meat and related industries in Southwest Kansas, and their impacts on local economic development. There are many feed yards and processed meat plants in Kansas. To keep the research scope reasonable, this study concentrated on the processed meat (beef) industry and related industries in the southwest Kansas region. This region includes the counties of Clark, Comanche, Edwards, Finney, Ford, Grant, Gray, Greeley, Hamilton, Haskell, Hodgeman, Kearny, Kiowa, Lane, Meade, Morton, Ness, Pawnee, Rush, Scott, Seward, Stanton, Stevens, and Wichita.

1.2 DATA COLLECTION

In order to thoroughly understand the meat processing industry, the research team conducted visits to the four major components of the industry. These industries are feed yards, meat processors, trucking carriers, and railroads. These industries are either direct participants in the preparation of the final products (i.e., beef and other meat related products) or are the transportation providers that are most widely utilized to transport these products. The first site visit involved becoming familiar with the industry's background which prompted the need to account for the quantities of feed grain transported apart from considering the population of cattle, meat (beef) and meat byproducts transported in and out of the region. Then, the second site visit involved acquiring more specific information from the packers and trucking carriers. Future growth projection trends were also researched by visiting the Grant County Chamber of Commerce in Ulysses, KS.

Apart from the two site visits to these industries, data collection also involved local site visits to the Kansas Livestock Association (KLA) and the Kansas Motor Carrier Association (KMCA), phone interviews with BNSF Railway, Union Pacific Railroad (UP), Kindsvater Trucking, and Tyson Fresh Meats and a literature search on websites, research reports, and other publications. Prior to the two visits to the southwest Kansas region, feed yard information was collected by conducting a search over the Internet and from information received from the Kansas Department of Health and Environment.

The first site visit involved interviewing officials from 9 different organizations. Data collected from these visits gave an estimation on the amounts of imports and exports (by rail and truck) in the southwest Kansas region in regards to the quantities used for feeding cattle along with issues on current transportation modes and projections for the future growth of these industries.

The second site visit focused on acquiring approximate production rates at three of the four biggest meat processing facilities in the southwest Kansas region. During the second visit, data collection also involved interviews with individuals in the trucking industry and at the Grant County Chamber of Commerce regarding any new business developments in the southwest Kansas area. Besides these two visits, the research team conducted a few other interviews to gather needed information.

1.3 ESTIMATING TRUCK VEHICLE MILES TRAVELED

The truck vehicle miles traveled (VMT) associated with business activities of the processed meat and related industries in southwest Kansas will help researchers to determine if there is a need to use other transportation modes (such as railroad and intermodal) to transport goods and products for the processed meat and related industries in southwest Kansas. The process of estimating truck VMT was broken down into six components:

1. Truck VMT for transporting feeder cattle to feed yards in southwest Kansas
2. Truck VMT for transporting feed grain to feed yards in southwest Kansas
3. Truck VMT for transporting finished cattle to meat processing facilities in southwest Kansas
4. Truck VMT for transporting boxed beef to customers in the United States
5. Truck VMT for transporting meat byproducts
6. Truck VMT for transporting boxed beef to export customers

TransCAD software is utilized to calculate the shortest paths in miles that are used to estimate the truck VMT.

1.3.1 Truck VMT for Transporting Feeder Cattle to Feed Yards

In order to determine the truck VMT for transporting feeder cattle to feed yards in southwest Kansas, researchers must first determine the number of truckloads of feeder cattle that are transported into the area. The total number of feeder cattle in southwest Kansas in 2005 is estimated to be 3,721,050. Therefore, based on the assumption that 75 feeder cattle are transported per truck, the annual truckloads for transporting feeder cattle are 49,614 (3,721,050 /75).

Next, researchers determined the average distance (miles) from county centroids (center points in a county used as a drop off point and pick up point for the purposes of this research) to the feed yards in each county. Also, it was also necessary for researchers to determine the distance that these truckloads travel from entry points of the southwest Kansas region to the 24 county centroids in the region. Based on the total distance traveled and the number of truckloads, the truck VMT for transporting feeder cattle to feed yards in southwest Kansas can be determined by multiplying the total distance traveled by the total number of truckloads of feeder cattle transported to feed yards in the southwest Kansas region. Therefore, the truck VMT for transporting feeder cattle to feed yards in southwest Kansas is 11,317 daily and 4,130,854 annually.

1.3.2 Truck VMT for Transporting Feed Grain to Feed Yards

To estimate the truck VMT due to transporting feed grain to the southwest Kansas region, it is pertinent to estimate the amount of feed grain consumed by feeder cattle. On average cattle consume a total ration of 4,242 lbs. for nearly 150 days. With data on the number of cattle in each county in the southwest Kansas region and information on the daily consumption of feed grains and feed grain demand, the truckloads for transporting the feed grains can be estimated for the various counties in southwest Kansas. There were approximately 3,721,050 feeder cattle in southwest Kansas in 2005. These cattle consume a annual total of more than fifteen and a half billion pounds of feed grain (3,721,050 x 4,242 =15,784,694,100) that generates 365,392 annual truckloads of feed grains and other inputs. Among these truckloads, about 168,855 truckloads are used for transporting corn, 114,616 truckloads for sorghum, 72,990 truckloads for alfalfa-hay, and 8,931 truckloads for supplements.

The daily and annual truck VMT for transporting feed grain is calculated similar to that of transporting feeder cattle, where a county centroid is used as a drop off and pick up point for the feed grains. The VMT for transporting feed grain to feed yards is determined by multiplying the average distance from county centroids to feed yards, times the number of truckloads of feed grain for each county. The total daily and annual truck VMT for transporting feed grain are 25,564 and 9,332,302, respectively.

1.3.3 Truck VMT for Transporting Finished Cattle to Meat Processing Facilities

There were 3,721,050 cattle fed in southwest Kansas in 2005. It is assumed that all cattle fed in southwest Kansas are slaughtered in southwest Kansas. Thus, there were 2,539,280 (6,260,330 – 3,721,050) cattle that were brought into southwest Kansas from other states and/or other parts of Kansas. Based on USDA data, there were 7,321,400 cattle slaughtered in Kansas in 2005. Using the proportional method, the researchers estimated that there were 6,260,330 cattle slaughtered in the southwest Kansas region. Therefore, it is necessary to take two steps to calculate the truck VMT for transporting cattle to meat processing facilities in southwest Kansas. The first step is to determine the truck VMT for transporting cattle from feed yards in southwest Kansas to the meat processing facilities; and the second step is to estimate the truck VMT for transporting cattle from other states and/or other parts of Kansas to meat processing facilities in southwest Kansas.

To calculate the truck VMT for transporting finished cattle from feed yards in southwest Kansas to meat processing facilities in the region, the researchers used a three-step approach. Required truckloads for transporting cattle were determined first.

Second, the truck VMT from feed yards to the centroids of counties was calculated. Finally, the truck VMT from the centroids of each county to each of the four major meat processing facilities in southwest Kansas was determined. The sum of steps 2 and 3 is the total truck VMT for transporting cattle from feed yards in southwest Kansas to meat processing facilities in the region. It is estimated that there are 82,690 truckloads that transport 3,721,050 finished cattle from feed yards in southwest Kansas to meat processing facilities in the southwest Kansas region in 2005. Based on this information and the average distance from feed yards to county centroids and from these centroids to the four meat processing facilities, the truck VMT for transporting finished cattle from feed yards in southwest Kansas to meat processing facilities in southwest Kansas is 36,868 daily and 13,456,956 annually.

According to the data collected from the four largest meat processing facilities in the southwest Kansas region, the daily kill in the area is approximately 23,600 cattle. Apart from these four meat processing facilities, about 4,000 cattle are slaughtered in another large meat processing facility in Kansas, but it is not in the southwest Kansas region (AllExperts, 2006). Thus, in total there are approximately 27,600 cattle killed every day in Kansas. And based on USDA data, there were a total of 7,321,400 cattle slaughtered in Kansas in 2005 (USDA, 2006d). Thus, approximately the number of cattle slaughtered in the southwest Kansas region in 2005 can be proportionately estimated as 6,260,330 cattle ((7,321,400 / 27,600) x (23,600)). Researchers estimate that there were 3,721,050 cattle that were fed in southwest Kansas in 2005. Thus, the number of finished cattle coming from other states and/or other parts of Kansas to the four major meat processing facilities in southwest Kansas in 2005 is 2,539,280 finished cattle (6,260,330 – 3,721,050).

These cattle have to be allocated to each of the four major meat processing facilities in the southwest Kansas region. Based on the information collected from some of the feed yards and the site visits conducted in the southwest Kansas region, the following assumptions are made about the quantity of cattle coming from different directions – 70% of the cattle come from the south and 10% of the cattle come from each of the north, east, and west directions. Thus, the number of finished cattle coming from the south is 1,777,496 cattle (70% x 2,539,280). And the number of finished cattle coming from the north, east, and west is 253,928 cattle from each direction (10% x 2,539,280).

It is further assumed that cattle from each direction, shown above, are distributed to each of the four meat processing facilities evenly. The numbers of cattle coming from different directions to each of the meat processing facilities remains the same (634,820 cattle per meat processing facility) since it was assumed that cattle are distributed equally among the four meat processing facilities. The total daily and annual truck VMT for transporting finished cattle from other states and/or other parts of Kansas to the four meat processing facilities in the southwest Kansas region are 28,598 and 10,438,844, respectively.

Combining the results presented above, the overall daily and annual truck VMT for transporting finished cattle from feed yards in southwest Kansas, other states, and other parts of Kansas to the four meat processing facilities in southwest Kansas and returning to the origins are 65,466 and 23,895,800, respectively.

1.3.4 Truck VMT for Transporting Boxed Beef to US Customers

The processed meat (boxed beef) from each of the four major meat processing facilities is transported to various customers in the United States. For analysis purposes, researchers assumed that processed meat is first distributed to customers in large cities in the U.S. including Atlanta, Chicago, Dallas, Los Angeles, New York, and Phoenix. Then, the meat is distributed from these large cities to customers in other smaller cities and towns. When calculating the truck VMT for transporting boxed beef to customers in the United States, first, it is necessary to calculate the number of truckloads of boxed beef originating at each of the meat processing facilities. Next, the researchers calculate the VMT for transporting boxed beef to the six cities. The distances traveled from the respective meat processing facilities to the six cities were determined using TransCAD software.

In order to calculate the number of truckloads of boxed beef originating at each of the meat processing facilities, the amount (lbs.) of boxed beef from each head of cattle was acquired from the site visits. Based on the data collected from these site visits, researches came to the determination that the weight of cattle at the time of processing was 1,200 lbs., with about 720 lbs. (60%) of red meat (boxed beef) and 480 lbs. (40%) of byproducts (tallow, bone meal, hides, etc.). Also, researchers made the assumption that a truck can carry a total of 42,000 lbs. of boxed beef. Therefore, the annual quantity of red meat originating at each of the meat processing facilities is 1,126,742,400 lbs. (1,564,920 x 720 lbs.). With the amount of red meat produced at each meat processing facility know, the annual number of truckloads of boxed beef produced at each facility is 26,827 (1,126,742,400 / 42,000). The quantity of boxed beef from each of the meat processing facilities (origins) is equally distributed among the six large cities (destinations). Accordingly, about 16.67% (1/6 =16.67%) of the annual number of truckloads of boxed beef originating at each meat processing facility is distributed to each of the six cities. Therefore, each city receives 4,471 truckloads of boxed beef from each meat processing facility in southwest Kansas. Then by combing the above information and the distance to each of the six cites, the truck VMT to transport boxed beef to U.S. customers is calculated. The truck VMT within southwest Kansas for transporting boxed beef from the four major meat processing facilities in the region is 38,620 daily and 14,096,170 annually.

1.3.5 Truck VMT for Transporting Meat Byproducts

The meat byproducts produced at each of the four meat processing facilities constitutes to about 40% of the total live weight of the cattle. It is also known from the site visits to the southwest Kansas region that about 50% of the byproducts produced at the four major meat processing facilities are transported by rail and another 50% by truck. Some of the byproducts are exported to Mexico via Dallas and East Asia via Phoenix and Los Angeles. Small amounts of the byproducts such as technical (inedible) tallow and meat and bone meal are sent by trucks to local feed yards for feeding swine, chickens, and turkeys. Because the quantity of byproducts sent to the feed yards are very small, researchers ignore the truck VMT for transporting this portion of the byproducts. It is assumed that the amount of byproducts exported from each of the meat processing facilities is equally distributed to the three paths via Dallas, Los Angeles and Phoenix. These three cities are considered as the destinations for calculation purposes. The distances traveled from the respective meat processing facility to the three destinations were previously determined using TransCAD software.

With each finished cattle accounting for about 480 lbs. (40% of 1,200 lbs.) of byproducts, the annual quantity of byproducts originating at each of the meat processing facilities is 751,161,600 lbs. (1,564,920 x 480 lbs.). Then, based on the assumption that 50% of byproducts produced at these facilities are transported by truck, the amount of byproducts transported by truck from each facility is 375,580,800 lbs. (50% x 751,161,600). Based on the assumption of 42,000 lbs. of byproduct transported per truck, the amount of truckloads of byproducts from each meat processing facility in southwest Kansas is 8,942 (375,580,800 / 42,000 lbs.).

It is then assumed that 65% of the byproducts transported by trucks are distributed south to Mexico via Dallas and the rest of the 35% are distributed to East Asia via Los Angeles and Phoenix with a half-and-half split (the route to Phoenix is assumed as an alternative route to Los Angeles since the mileage is about the same as the direct route to Los Angeles). Therefore, about 17.5% (35%/2 = 17.5%) of the annual number of truckloads originating at each meat processing facility are distributed equally to the Los Angeles and Phoenix paths. Based on these assumptions, the annual truckloads of byproducts from each meat processing facility to Mexico via Dallas are 5,812 (65% x 8,942). Using the same method, researchers determined the truckloads for transporting byproducts via the Los Angeles and Phoenix paths, which are 1,565 (17.5% x 8,942) for both of them.

Using the number of truckloads of byproducts from each meat processing facility, the annual truck VMT in the southwest Kansas region for transporting byproducts from a meat processing facility to each of the three destinations (Dallas, Los Angeles and Phoenix) can be determined. The total daily and annual truck VMT for transporting byproducts to export customers is 13,338 and 4,868,736, respectively.

1.3.6 Truck VMT for Transporting Boxed Beef to Export Customers

Currently, the market is closed for transporting meat to export customers in East Asia. However, if the market re-opens, then approximately 10% of the total boxed beef produced at each of the four major meat processing facilities will be distributed to export customers in East Asia. To anticipate the future market development, truck VMT for transporting boxed beef from the four meat processing facilities to export customers in East Asia has been estimated. During the calculation process, it is assumed that all boxed beef sent to export customers is transported via the Los Angeles path. The travel distances from the four meat processing facilities to Los Angeles have been calculated using TransCAD software.

Because the focus of the analysis is the truck VMT within the southwest Kansas region, only mileages within the southwest Kansas region are considered. Since 10% of the total production of boxed beef (processed meat) at each meat processing facility is distributed to export customers in East Asia, the number of truckloads from each meat processing facility to export customers in East Asia can be calculated by taking 10% of the annual truckloads of boxed beef transported from each meat processing facility to U.S. customers. Therefore, the annual truckloads of boxed beef from each meat processing facility to East Asia are 2,682 (10% x 26,827). The number of truckloads of boxed beef (processed meat) from each meat processing facility remains the same since it is assumed that the production rate is the same at each meat processing facility.

Using the same method to calculate boxed beef to U.S. customers, the annual and daily truck VMT in southwest Kansas for transporting boxed beef (processed meat) from each meat processing facility to export customers in East Asia via Los Angeles is 2,998 and 1,094,846, respectively.

In addition, if the East Asian market re-opens in the future, 10% of boxed beef from each of the four meat processing facilities will be transported to export customers in East Asia via Los Angeles. Thus, there will be a 10% reduction in quantity in the U.S. market. Accordingly, truck VMT for transporting meat to U.S. customers will be reduced by 10%.

By combining all of the VMT information from above, the total truck VMT in southwest Kansas associated with the processed meat industry can be determined. The total daily and annual truck VMT in southwest Kansas associated with the processed meat industry are 168,230 and 61,407,125, respectively.

1.4 FUTURE GROWTH

The meat processing industry in southwest Kansas has driven tremendous economic and demographic change over the last 30 years. The meat processing and related industries place many demands on the transportation industry. While the story of the last 30 years has been one of growth, there are signs that the meat processing and related industries are maturing. Furthermore, new industries such as ethanol may develop in the region, and may compete with the meat industry for water and grain.

The future growth of the meat processing industry will be determined by the demand for red meat. National and international demand for beef and beef byproducts ultimately limit the size of the Kansas industry. Local factors such as labor, input supply, taxes, and transportation help to determine whether the meat processing industry will remain a major contributor to the Kansas economy.

All of the packers plan to serve Asian markets, but they anticipate that the meat for Asian export will be shifted from domestic supplies. According to the interviews with beef industry executives and managers, the meat processing industry in Kansas will follow national trends. Most meat packers in Kansas are already operating at their capacities, at least during the times of year when demand warrants it. As for expansion, none of the packers see this in their immediate future and overall, many of those interviewed feel that the industry had matured within the southwest Kansans region. They expect growth in production volume to be modest at best.

Several interviewees mentioned the possibility of a new meat processing facility to be placed about 20 miles south of the Kansas border near Hooker, Oklahoma. Researchers have not been able to confirm if ground has broken on the plant. Should the plant be built as anticipated, many of its new employees probably would live in Kansas, and some of the cattle would be pulled from Kansas feed yards.

Southwest Kansas meat processing facilities currently ship fresh boxed beef almost exclusively by truck. A small amount of beef (some interviewees said none, some said 1%) is frozen at the plant and sent east to Kansas City by rail. Current rail use is seen as too slow for fresh meat products. Furthermore, delivery of beef by rail would require off-loading and then re-loading onto trucks for delivery to the final consumers. Overall, researchers expect the number of truck shipments of boxed beef to grow modestly if at all. An exception may be in the Liberal area, if indeed the meat processing industry expands across the Oklahoma border. In that case, beef shipments from Oklahoma will use US Highway 54 to serve customers in the eastern and central part of the country. Researchers anticipate that traffic patterns will change, with more boxed beef moving towards the west than in past years to serve Asian and West Coast markets. However this is unlikely to change the total VMT on Kansas highways.

Packers currently split their shipments of byproducts about 50-50 between rail and truck. Overall growth in the volume of byproducts will depend on the growth of the meat processing industry, which is projected to be fairly flat.

The meat processing industry has stimulated demand for the products of related industries that provide inputs: in particular corn and sorghum. The region grows substantial amounts of corn and sorghum and also relies on supplies from Central and Eastern Kansas and from cornbelt states. The northern half of southwest Kansas appears to have a corn deficit while the southern part appears to have a corn surplus. Complicating matters, it is unlikely that corn will flow from south to north within the region because prices tend to be higher in the south. Therefore, the northern part of the region will need to import corn from Central and Eastern Kansas and from cornbelt states, while the southern counties may actually ship corn to feed yards in the Oklahoma panhandle.

As is the case with corn, the southwest region relies on in-shipments of sorghum as well as local production. Ford, Scott, Gray, and Finney counties in the southwest are large producers, but the majority of sorghum production in Kansas occurs in the central portion of the state. Given the high levels of sorghum production within Kansas, it is unlikely that large quantities are imported from other states.

In the future, researchers expect about the same amount of feed grain to be produced in the region as today, although the mixture between sorghum and corn probably will change. Trucks probably will continue to have an advantage for short hauls of feed grain of less than 200 miles and it is likely that corn imports from other states will rise. Some of the corn will arrive by truck from Nebraska and some on unit trains from states further to the east. Once corn arrives at terminal elevators, the mode used for distribution to the final customers could include short line rail, depending on the location of the customers and on cost.

The concentrated feed yard industry has grown from its infancy by a factor of almost four. Currently southwest Kansas feed yards hold about 1.8 million head of cattle, and fatten over 3.5 million per year. The industry pulls in feeder cattle from eastern Kansas, Nebraska, Missouri, and other areas and delivers finished cattle to nearby meat plants. Meat demand is expected to grow at only a modest pace in the next decade. However, the feed yard industry in the southwest Kansas region can continue to grow if the industry shifts from less competitive locations. Interviewees were of mixed opinion about whether an expansion of the feed yard industry in Kansas will take place.

A larger feed yard industry will mean more truck traffic for southwest Kansas. Trucks will continue to be used to ship cattle in and out of feed yard facilities, with the number of trucks proportional to the number of cattle on feed. Corn from outside the state will probably arrive by unit trains at shuttle facilities. Where facilities exist, short line rail could haul feed grain to elevators close to the feed yards, or even into the feed yards directly, but currently price is a barrier. Energy price increases could make rail prices comparatively cheaper and tip the balance towards rail. As for the feed yard industry, there exist possibilities for using rail to bring in feed grains to large facilities, depending on cost.

Two new industries are emerging in southwest Kansas: dairy and ethanol. The dairy industry in southwest Kansas is centered in Grant County, where the industry is expected to double to 160,000 cattle within the decade. Trucks will continue to be the primary transport mode for the dairy industry. It is likely that the final products of the industry, fresh milk and possibly cheese, will continue to be shipped by truck because of concerns for freshness. As the industry expands, more trucks will be needed to haul in feed.

Ethanol production will potentially change the economic landscape of southwest Kansas. Construction is already underway on a 110 million gallon plant in Seward County near Liberal. In Garden City, ground has been broken on a 55 million gallon plant. Ford, Haskell, Kearney, and Grant counties are among those that have plans in the works. If all the proposed plants were completed, the ethanol production capacity in southwest Kansas would be well over 800 million gallons per year.

Ethanol can be produced from almost any plant material, but facilities typically are constructed to use corn or sorghum as raw materials. Some of the grain used for ethanol can be recovered in the form of distillers grains. Distillers grains can be fed to cattle on a pound per pound substitution basis, although modifications to feed yard equipment and procedures will be necessary

Development of ethanol production facilities in southwest Kansas will affect transportation in several ways. First, more grain will need to be imported into the region, both from Central and Eastern Kansas and from other states. Secondly, the proposed volumes of ethanol will require a large number of tank cars or trucks for transport. Third, ethanol is flammable so safety considerations will be foremost, whether the product is shipped by truck or rail. Fourth, ethanol plants will introduce a new product, distillers grains, into the feed lot supply chain, to the extent that distillers grains substitute for corn or sorghum, the number of miles traveled by grain trucks serving feed yards may remain unchanged. However, traffic is likely to be very heavy on routes from ethanol plants to nearby feed yards.

Ethanol plants currently planned or in progress are all located in communities on rail lines. However several factors could limit actual rail use. It may cost less to haul corn by truck than by rail in some areas of southwest Kansas. For those communities on short line railroads, the rail may not have the physical capacity to haul tanks of finished ethanol. Finally, even in communities with access to Class I railroads, lack of coordination between ethanol plant developers and railroads may place the facilities at sites where rail access is difficult.

1.5 CONCLUSIONS AND RECOMMENDATIONS

Based on the information provided above and the calculation of the truck VMT associated with the meat processing and related industries in southwest Kansas, the research team comes to the following conclusions:

1. The total daily and annual truck VMT is high in the study area, indicating that there is a need to look for other modes, in addition to trucking, to transport items for the meat processing and related industries.
2. If truck VMT continues to increase, there could be an increase in the amount of damage to highways and bridges, possibly causing a need for maintenance work earlier than projected.

3. The main obstacle for meat processing facilities to ship boxed beef by rail is that there is no infrastructure near the meat plants. Also, these facilities do not have enough freezer capacity to hold enough boxed beef in storage to transport by rail.
4. Other problems with using the railroad to transport time-sensitive goods is that rail takes longer than trucks do and customers of the meat processing facilities are usually not located on rail lines.
5. There is a large amount of truck VMT on highways 50/400 and 54 and could cause rapid deterioration of these highways and potentially higher accident rates if truck VMT continues to increse. Also, if the meat processing facility in Hooker, OK is built, it will increase the truck VMT on these roads.
6. Even if the East Asian market was reopen, it would have little impact on the amount of truck VMT for the shipment of boxed beef in the southwest Kansas.
7. Upgrades need to be made on short line railroad lines, since they are limited in their load capacity and speed, in order to increase the use of short line railroads and in turn decrease the cost to use the short lines.
8. There are new business developments in the study area including dairy farms, milk processing plants, and ethanol plants that will require more trucks on the roads unless an alternative transportation mode exists.
9. If purposed ethanol plants are built, then it will cause an increase in the amount of grain shipped into the region.
10. The transport of ethanol may cause traffic safety concerns.
11. Fuel costs does not change the transportation mode used to ship items in the meat processing and related industries.
12. The truck driver shortage will continue because of the hard lifestyle associated with the trucking business and it is assumed to continue even with an increase in wages for drivers.

The results of this research also lead the researchers to certain recommendations in order to improve the transportation infrastructure that supports the processed meat and related industries. Based on the researchers' results, the following recommendations are made:

1. When new facilities are being planned (meat processing plant, ethanol plant, milk processing plant, etc.) rail should be considered as part of the facility from the earliest planning stage.
2. There needs to be an increase in investments for short line railroads' infrastructure in order for businesses in the area to have the option to use the short line railroads instead of, or in conjunction with, trucks for freight movements.
3. Rail lines need to be upgraded so that they will be used more and not abandoned since short line railroads have a broad economic impact on a community.
4. With the possibility of more grain being imported into the area, short line railroads should concentrate on bringing in grain, in addition to taking out grain (mostly wheat).
5. There is a need to study the entire state of Kansas rail service for the flow of freight in order to identify future congestion problems which may restrict the flow of freight in Kansas.
6. Every organization in a community needs to come together to develop a regional economic plan to utilize transportation modes most effectively.
7. As the Asian markets reopen, decisions to use the railroads to transport frozen boxed beef should be reconsidered.
8. If there is an increase in exports, either in the meat processing or other industries, there will be a need to study the feasibility of building an intermodal facility in the region.
9. There is a need to study damage and safety issues of highways and bridges due to truck traffic not only in the region, but also statewide.
10. There is a need to study the effects of new business (e.g., dairy and ethanol) on highway and rail infrastructure for all of Kansas.

11. There should be location studies as to the best places to establish these new businesses in order to best utilize all transportation modes available in a given area.

Chapter Two - INTRODUCTION

2.1 PROBLEM STATEMENT

Kansas is one of the nation's leaders in meat production. It ranks second in the nation in cattle and calves on farms and third in red meat production. Traditionally, processed meat (beef, chicken, and pork), meat byproducts, and other industry related products are transported using large trucks (tractor-trailers) from southwest Kansas to their final destinations. Also, feed grain is shipped into the region from local producers, other parts of Kansas, and other Midwest states. Because of the regional concentration of the industries, as well as the long-haul movement of products, tractor-trailer shipments may not be the most efficient, cost effective, and economically sound means of transportation.

Kansas ranks in the top ten in the United States in railroad mileage with a total of 4,776 miles of rail as of December 2006. There are four Class I carriers (description in next chapter) that operate a total of 2,790 miles of rail and 17 Class III carriers (description in next chapter) that operate a total of 1,986 miles of rail in Kansas (see Figure 1.1.1). In southwest Kansas, there are two Class I carriers, the Burlington Northern Santa Fe (BNSF) and Union Pacific (UP), and four Class III carriers, the Boothill and Western (BH&W), Cimarron Valley Railway (CVR), Garden City Western Railway (GCW), and Kansas & Oklahoma (K&O) (see Figure 1.1.2 Southwest Kansas Railroad Map). In addition to railroads, major highways in the area include, from east to west, 50, 51, 54, 56, 156, 160, and 400; and from south to north, 23, 25, 27, 83, and 283 (see Figure 1.1.3). Because of the vast highway and railroad networks in southwest Kansas, the economically superior shipping methods for the meat producing industry may not only be highway transportation but also railroad and/or intermodal transportation, depending on the conditions of the shipment. Intermodal transportation involves a combination of rail-truck freight movement. Using this type of shipment a truck typically picks up a shipper's freight at the origin and brings it to a nearby freight rail yard where it is then put on a train. The train handles the long-haul distance of the move and then turns the container over to a truck at a rail yard near the freight's final destination. Then the truck transports it to the door of its final destination. There are many positive aspects of rail-truck intermodal transportation; among them are fuel efficiency, safety, and environmental friendliness. Also, using intermodal transportation would reduce highway and bridge damage since fewer trucks would be on the highways.

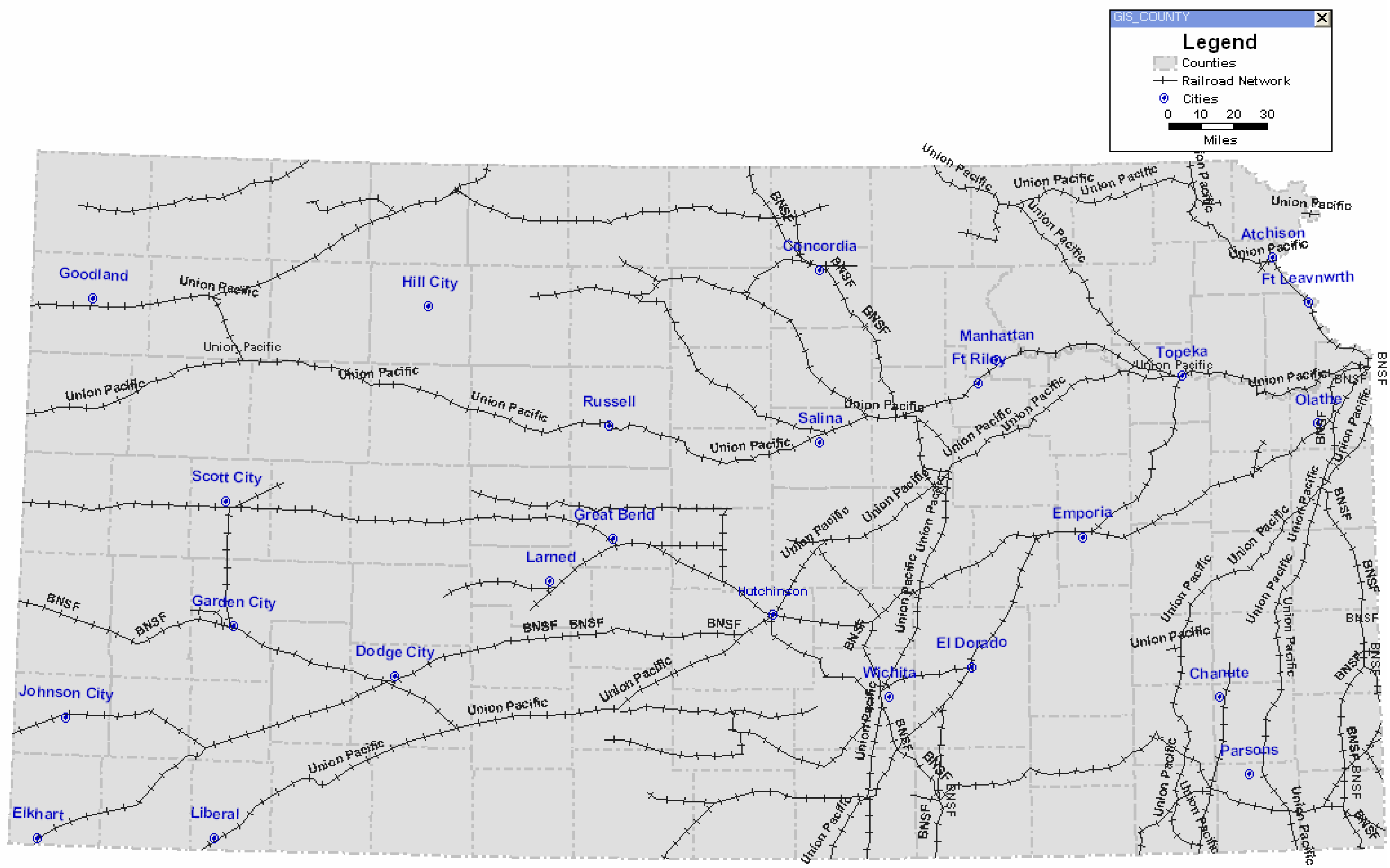


Figure 2.1: Kansas Railroad Map

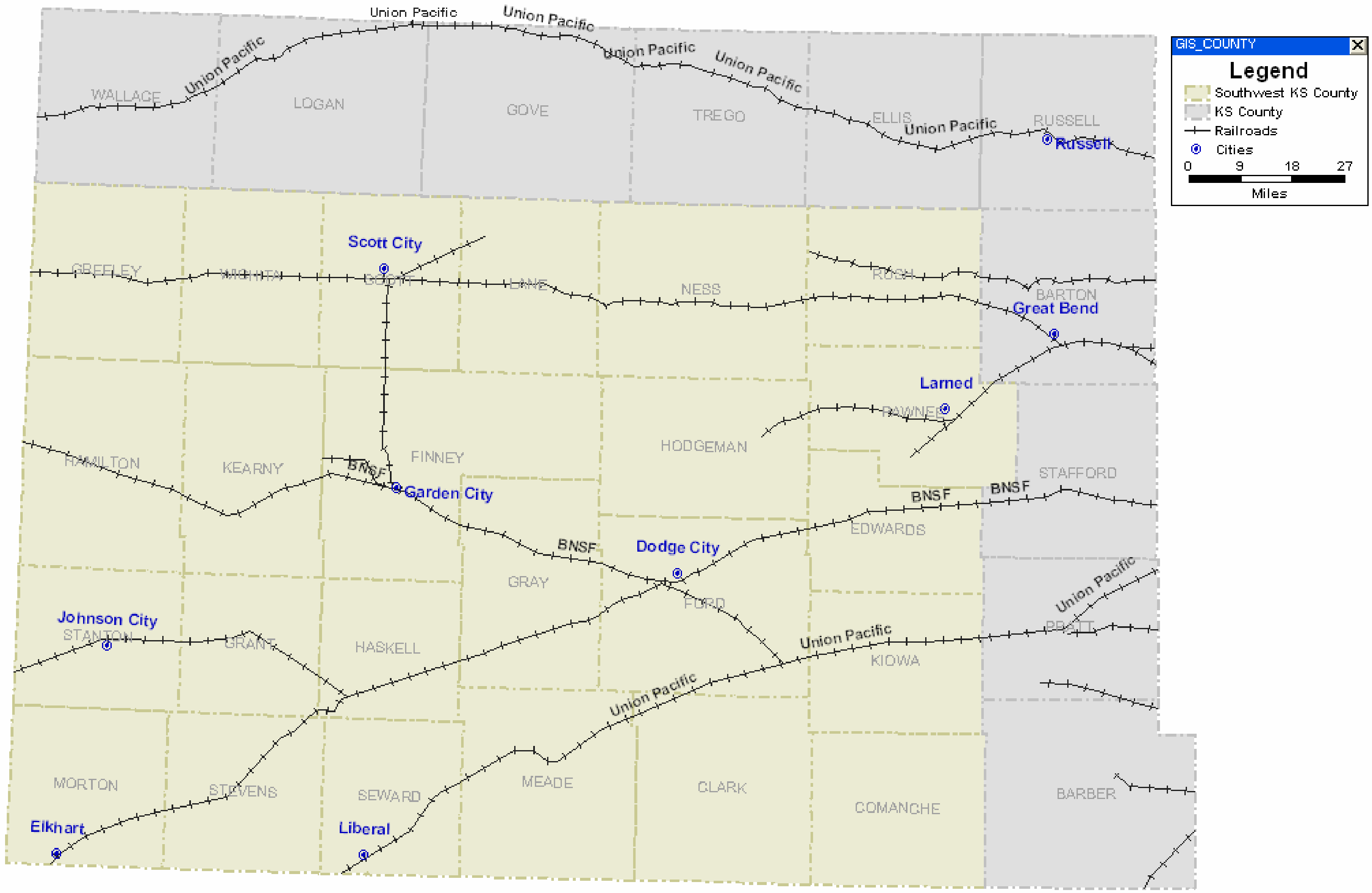


Figure 2.2: Southwest Kansas Railroad Map

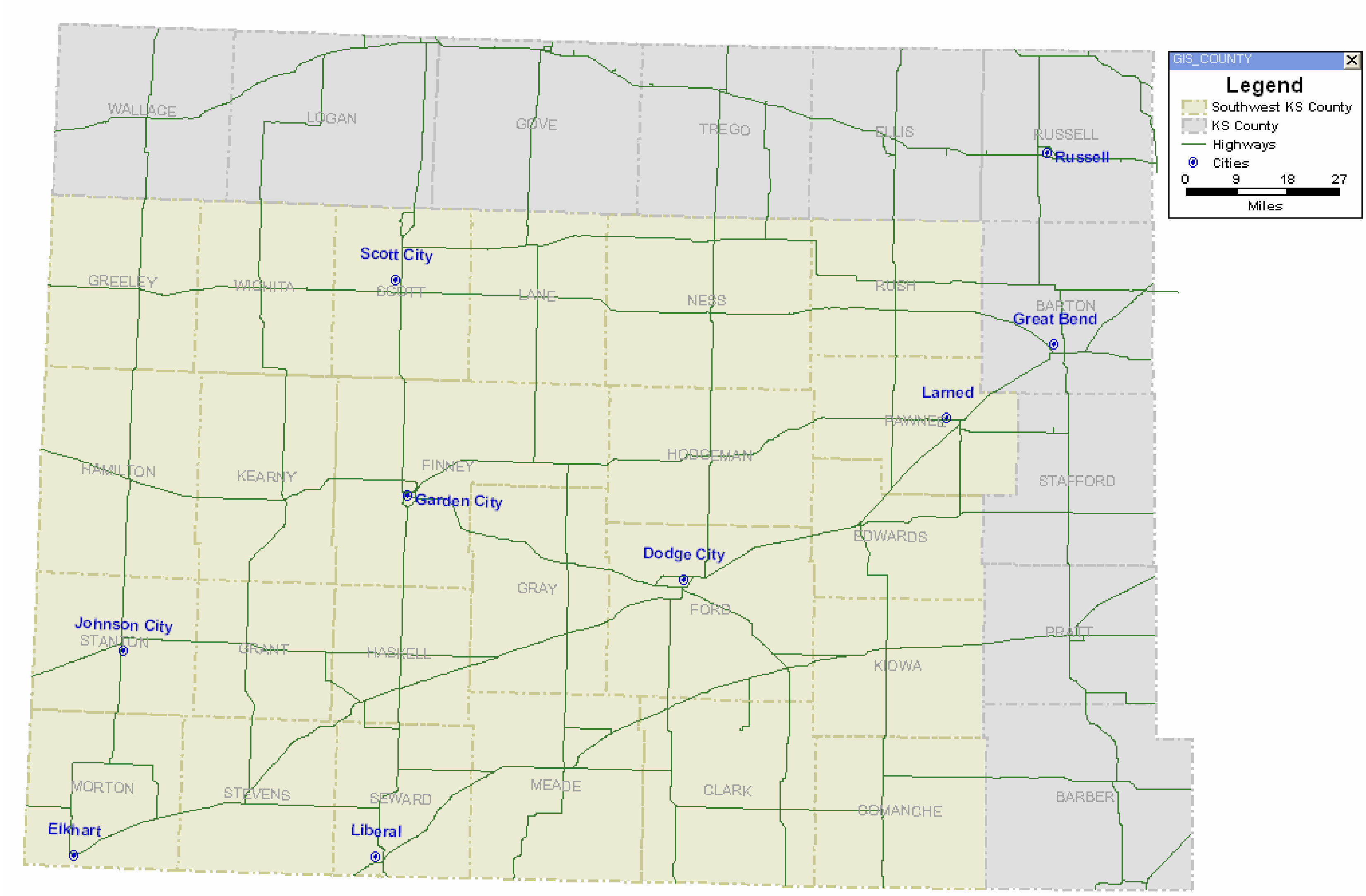


Figure 2.3: Southwest Kansas Highway Map

Beef cattle are raised all over the United States, with Texas, Nebraska, and Kansas being the leaders in the industry. According to the Kansas Livestock Association (KLA), the advantages of feeding cattle in southwest Kansas include: (1) Kansas ranks near the top in the nation for the production of most high quality grain (corn, milo, and wheat); and (2) a moderate climate and access to roughage allow for predictable cattle performance. Many experts predict that the processed meat and related industries in the southwest Kansas region will continue to grow. To support the growth of this industry, there will be more trucks on the highways to transport goods and products for the processed meat industry.

With the increase in tractor-trailer transportation, highways can become overburdened. This can lead to increased traffic congestion, highway and bridge maintenance costs, frequency of highway bridge and roadway replacement, air pollution, fuel consumption, accidents, and travel times for road users. Because of these reasons, there is a need to study the transportation modes (truck, railroad, and intermodal) available for the industries to ship their products, and to determine which one is more efficient, and cost effective, resulting in the long-term sustained growth of the industries and positive impacts on the local and regional economies.

2.2 RESEARCH OBJECTIVES

The objectives of this research are to study the transportation modes, their utilizations for the processed meat and related industries in Southwest Kansas, and their impacts on local economic development.

2.3 RESEARCH SCOPE AND METHODOLOGY

There are many feed yards and processed meat plants in Kansas. To keep the research scope reasonable, this study concentrated on the processed meat (beef) industry and related industries in the southwest Kansas region. This region includes the counties of Clark, Comanche, Edwards, Finney, Ford, Grant, Gray, Greeley, Hamilton, Haskell, Hodgeman, Kearny, Kiowa, Lane, Meade, Morton, Ness, Pawnee, Rush, Scott, Seward, Stanton, Stevens, and Wichita.

To achieve the research objectives, the research team conducted the following tasks including:

1. **Literature review:** The research team determined the current state of practice for the transportation of the processed meat, meat byproducts, feed grain, and industry-related products. The pros and cons of transportation modes were also identified. Literature includes, but was not limited to, journals, conference proceedings, periodicals, theses, dissertations, special reports, government documents, and other sources. In addition, the research team searched for information posted on the Internet.
2. **Facility identification:** The research team used the TransCAD software program to map the feed yards and processed meat industry of Kansas and confined the locations to the southwest Kansas region.
3. **Data collection:** The research team collected data from state and federal government agencies, trucking and railroad companies, processed meat plants, feed yards, trade organizations, local economic development offices, and web sites. In order to gather first hand information, researchers conducted two site visits to southwest Kansas, two visits to trade organizations, and telephone interviews.
4. **Data analyses:** The research team estimated the vehicle miles of travel generated by the processed meat and related industries in southwest Kansas, determined the shortest paths for shipping goods and products from different origins, and forecasted future growth and its impacts on the transportation infrastructure.

5. **Conclusions and recommendations:** Based on the results of the data analyses, the research team identified the most economic mode of shipment under the current freight transportation structure and recommended needed improvements to these transportation modes for continued or future use by the processed meat and related industries along emerging industries in southwest Kansas.

2.4 REPORT ORGANIZATION

This report is organized into the following chapters:

- Chapter 1 – Introduction. This chapter presents background information, research objectives, and the research scope and methodology.
- Chapter 2 - Literature Review. This chapter reviews background information on the current state of practices of the processed meat and related industries in southwest Kansas, transportation modes (truck, railroad, and intermodal), and highway and bridge maintenance.
- Chapter 3 - Data Collection. In this chapter researchers discuss the data collection procedure, site visits, personal and telephone interviews, and other data sources.
- Chapter 4 - Data Analysis. Researchers present the results of the data analyses in this chapter including the vehicle miles of travel generated by the processed meat and related industries in southwest Kansas, and the shortest paths for shipping goods and products from different origins.
- Chapter 5 - Future Demand on the Transportation Infrastructure. Researchers estimate the future growth of the processed meat and related industries, predict new business developments in southwest Kansas, and forecast their impacts on the transportation infrastructure.
- Chapter 6 - Conclusions and Recommendations. In this chapter researchers summarize the findings of the research effort and recommend future improvements.

Chapter Three - LITERATURE REVIEW

3.1 STATE OF PRACTICES OF MEAT PROCESSING AND RELATED INDUSTRIES

Beef cattle are raised throughout the United States with Texas, Nebraska, and Kansas being the leaders in the industry. According to the National Agricultural Statistics Service (NASS), there were 6.65 million head of cattle in Kansas, of which 2.55 million were on feed for slaughter, as of January 1, 2006 (USDA, 2006a). Kansas ranked first nationwide in number of cattle slaughtered, second in total number of cattle, and third in the number of cattle on feed and in red meat production by commercial slaughter plants in 2004 (USDA, 2005). The intention of this chapter is to explore the practices of the meat processing industry and related industries. Initially, it is necessary to become acquainted with the sequence of the processed meat industry that is shown below in Figure 3.1 (Sequence of the Kansas Meat Industry).

The two main inputs of feed yards are feed grains (primarily corn and sorghum, and occasionally wheat) and feeder cattle. The transport mode for feed grain is truck and/or railroad. Feeder cattle must be moved only by truck due to regulations governing the transport of live animals. Cattle are fattened at finishing feed yards in southwest Kansas and other neighboring states. Once they reach a certain weight they are then moved to the meat processing plants by truck. Thereafter, boxed beef and beef byproducts from the meat processing plants are transported via trucks or rail-truck intermodal to customers in the United States and other countries.

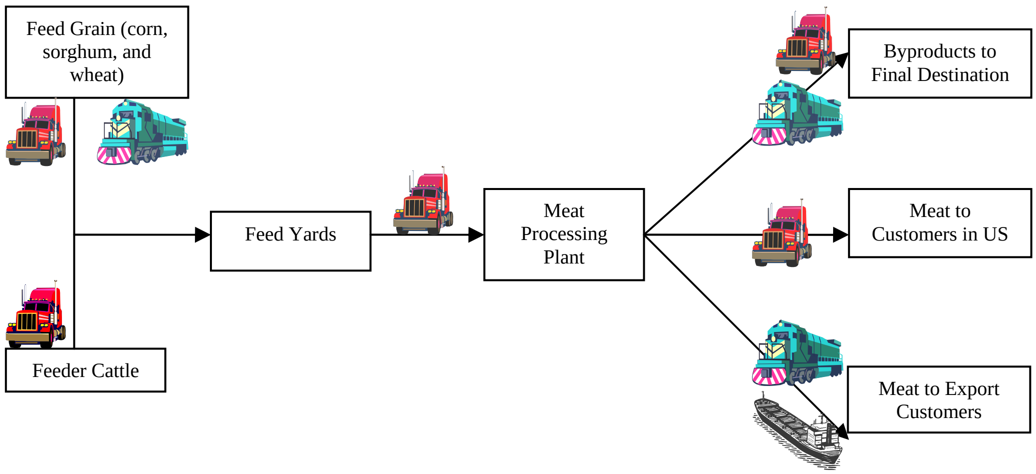


Figure 3.1 Sequence of the Kansas Meat Industry

In order to become more familiar with all of the stages of the meat processing industry, the research team conducted interviews in Kansas with feed yards (Irsik & Doll (I&D) and Cattle Empire LLC (CE)), grain suppliers (Wind River Grain LLC (WR)), meat processors (Excel Corporation (EC) and National Beef (NB)), value-added meats providers (Tyson Prepared Foods (TPF)), trucking companies (Kindsvater Trucking and National Carriers), railroad companies (Cimarron Valley Railroad (CVR), Garden City Western Railway (GCW), Burlington Northern Sante Fe Railway (BNSF), and Union Pacific (UP)), industry related organizations (Kansas Livestock Association (KLA), Kansas Motor Carriers Association (KMCA)), and state government agencies (Kansas Department of Transportation (KDOT) and Grant County Chamber of Commerce). With these discussions and interview excerpts the background of the processed meat industry in southwest Kansas is laid out.

3.1.1 VARIOUS STAGES IN THE MOVEMENT OF CATTLE

After calves have been weaned, they are put up for auction and sold to feed yards. Occasionally, some calves may be kept on a cow-calf operation longer to do background feeding (Pollan, 2002). Backgrounding is a beef production system that uses pasture and other forages from the time calves are weaned until they are placed in a feed yard (Comerford et al., 2001). During backgrounding calves are taught how to eat from a trough and fed a “warm up” ration, a mixture of grain and/or silage, in order to accustom the calf to its full growing ration (Pollan, 2002; USDA, 2006c). Backgrounding is generally done for calves that are below weight, to increase the calves weight before they are marketed (Comerford et al., 2001). Another reason calves may be backgrounded would be if the price of cattle is low and the rancher prefers to wait to sell the calves in order to obtain a better price at a later date (USDA, 2006c). Once the cattle have reached an ideal weight of around 700 pounds they will be sold to a finishing feed yard (USDA, 2006c).

According to John Petz, President and CEO, and Jon Heiman, Cattle Risk Manager of I&D in Cimarron, KS, feeder cattle from central Texas, New Mexico, Oklahoma, Missouri, Kentucky, Tennessee, California, and Oregon move in by trucks to Kansas to finish feeding. The largest numbers come from Texas, Missouri, and Oklahoma, with fewer numbers being brought in from areas farther out (Petz and Heiman, 2005).

3.1.2 CATTLE FEEDING INDUSTRY

The Kansas cattle feeding industry is a major supplier of the U.S. meat packing industry. The cattle feeding industry is also a major part of the Kansas economy and ranks third nationwide in the number of cattle on feed, accounting for 17.9% of all cattle on feed in the U.S (USDA, 2005). Kansas is an ideal location to feed cattle because the region produces large quantities of grain and silage. Also, Kansas has ideal weather to enhance cattle performance and is home to four of the largest meat packing facilities in the nation. The following section describes in detail the cattle feed industry and the local grain supply in Kansas.

3.1.2.1 BASIC FEED REQUIREMENTS

Cattle are finished at feed yards in southwest Kansas, where they are fed specific rations of grain, roughage and supplements. The industry standard is around 150 days on feed (Petz and Heiman, 2005). Based on the industry average, finishing cattle consume about 28 pounds of feed per head per day (Dhuyvetter, 2006). The amount of water that cattle drink depends upon the weather, but in general cattle will drink from 5.5 to 9.5 gallons of water per day in the winter and from 14.5 to 23 gallons of water per day in the summer, depending on the air temperature and the weight of the cattle (Griffin, 2002). Grains, such as corn and sorghum, and protein/nutrient supplements like soybean meal, vitamins, salt, minerals, and rumensin (to aid digestion) are fed to the cattle. Roughage such as alfalfa hay, prairie hay, corn silage and sorghum silage are also fed to the cattle. Feed mixing is the science that sets a feed yard apart from the rest. Each feed yard has its own formula to create high quality Kansas beef. In general, 75% of feed is grain (corn and sorghum) and 5-10% is a protein source (Kinsley, 2005). While there are many different formulas for feed rations, Table 3.1 presents basic feed requirements for finishing beef cattle (Dhuyvetter, 2006).

Table 3.1: Basic Feed Requirements

Alfalfa Hay (Lbs./day)	Corn (Lbs./day)	Grain Sorghum (Lbs./day)	[a]Supplements (Lbs./day)	Total (Lbs./day)
3.4	14.4	9.6	0.8	28.2

[a]Supplements include soybean meal, vitamins, salt, minerals, and rumensin or equivalent.
Source: Dhuyvetter, 2006.

3.1.2.2 SUPPLEMENTS

Proteins, vitamins, salt, and minerals for use in feed yards can be obtained in many ways. One of the supplements that is used as a protein source in feed can be obtained from the liquid supplement plant called PerforMix High Plains, which is a state of the art facility that was built three years ago in Garden City, KS (Petz and Heiman, 2005). Since customers are within a 200 mile radius of the facility, liquid feed products are transported to feed yards by truck (Petz and Heiman, 2005).

There is also cane molasses, a byproduct from Archer Daniels Midland's (ADM) corn syrup production, which comes in by rail in tanker cars (Petz and Heiman, 2005). Molasses is used for added flavor in feed to optimize cattle performance. Medications are also brought in and some operations even have a full time veterinarian on site.

3.1.2.3 LOCAL GRAIN SUPPLY

After World War II, the fast growth of cattle feed yards was the result of irrigated grain fields, especially in the southwest Kansas region (Wood, 1980). The percentage of cattle on feed in large Kansas feed yards (1,000 head capacity or more) rose from 26.7% in 1960 to 97.5% in 2006, while around the same time the total number of cattle on feed increased from about 450,000 to approximately 2.55 million in 2006 (Wood, 1980; USDA, 2006b). Figure 3.2 shows the increase in the number of cattle on feed from 1965-2006.

Source: USDA, 2006c.

Figure 3.2: Kansas Cattle on Feed (1965 – 2006)

Kansas crops produced for feed include corn, sorghum, alfalfa hay, and occasionally wheat. According to Cory Kinsley, Risk Management Director of CE in Satanta, KS, 50%-70% of grain used for feeding cattle in the region, comes from outside of southwest Kansas. Grain is taken from the field to local grain elevators by farm truck. An average Kansas elevator has a capacity of about 1.5 million bushels (Kinsley, 2005). Grain elevators purchase the grain which is then sold to feed yards and shipped out by truck or rail. Later the feed yards will have the local grain picked up and brought to the yards by trucks that generally only travel about 50 miles or less (Kinsley, 2005). Local grain that is not used in the area, mostly wheat, is shipped from local grain elevators by shuttle train. There are 7 main shuttle stations in southwest Kansas: Right Coop Association, Wright, KS; Dodge City Coop Exchange, Ensign, KS; Collingwood Grain, Inc., subsidiary of ADM, Dodge City, KS; Wind River Grain, Garden City, KS; The

Scoular Company, Coolidge, KS; Collingwood Grain, Plains, KS; and Farmers Coop Association, Haviland, KS. It is also important to mention Bartlett Grain Company, Scott City, KS; Collingwood Grain, Leoti, KS; and Perryton Equity Exchange, Liberal, KS. Even though these are not shuttle facilities, they are large enough grain elevators that they are capable of handling shuttle trains for grain transport (BNSF, 2006). Furthermore, the future grain production estimated by statistical predictions of past data for Kansas (1946-89) shows an increasing trend for the following products (Eusebio and Rindom, 1990):

Wheat – From 435.5 million bushels in 1994 to 579.5 million bushels in 2019, with an annual average increase of 1.3 %.

Soybeans – From 49.6 million bushels in 1994 to 77.1 million bushels in 2019, with an annual average increase of 2.2 %.

Corn – From 174 million bushels in 1994 to 248.5 million bushels in 2019, with an annual average increase of 1.7 %; among which Haskell, Gray and Finney are predicted to be the top three corn producing counties in Kansas and of which are in the southwest Kansas region (Eusebio and Rindom, 1990). Corn is brought in by rail about seven months out of the year and therefore the local corn lasts about five months out of the year (Hale, 2005).

Milo – From 296.5 million bushels in 1994 to 439.1 million bushels in 2019, with an annual average increase of 1.9 %.

The above estimates clearly indicate that grains essential for feeding cattle adequately meet the needs of Kansas feed yards. However, the predicted grain estimates will not be entirely dedicated to feed grains. According to Victor Eusebio and

Stephen Rindom, Research Analysts at KDOT, based on past data (1946-1989) the number of cattle in Kansas feed yards is predicted to increase considerably from 1,723,000 head in 1995 to 2,654,000 head by 2020, an annual average increase of 2.2%. The top five counties with the most number of cattle on feed are Finney, Scott, Ford, Wichita and Grant. These counties are also predicted to produce the most grains in the state. However, these production predictions are highly dependent on variable conditions such as weather and changes to government programs (Eusebio E., Rindom J., 1990).

3.1.2.4 GRAIN IMPORTS

Grain is also shipped to Kansas grain elevators via rail shuttle trains from various locations in Iowa, Nebraska and Minnesota (Kinsley, 2005). At that point, the feed grains are trucked to the feed yards. According to Charlie Sauerwein, Grain Merchant, and Kammi Schwarting, Financial Manager of WR in Garden City, KS, corn is shipped in from Iowa, Minnesota, and Nebraska, and is then moved within Kansas. Corn is also moved by trucks within a 30 mile radius to its destination using independent freight companies that work on a contractual basis (Sauerwein and Schwarting, 2005). Another type of feed that is used to feed cattle is soybean meal, which is shipped in from Emporia, KS and Nebraska (Hale, 2005). According to Hale, General Manager of CVR in Satanta, KS, on average it transports 15 tons of soybean meal per week, most of which is unloaded in Hugoton (Hale, 2005).

3.1.3 MEAT PROCESSING INDUSTRY

Meat processing companies purchase fattened cattle from various feed yards. Each week, processing companies visit feed yards to survey cattle and make bids. The cattle are sold on a live weight contract base and the processing companies arrange the freight since the packing manager needs to be in control of the efficiencies of the plant. Sometimes processing companies pick up half a load at one yard and go to the next yard to pick up another half (Petz and Heiman, 2005). Fattened cattle are moved to processing plants in Liberal, KS; Holcomb, KS; Dodge City, KS; Emporia, KS; Guymon, OK; and Dumas, TX by truck (Kinsley, 2005). Cattle shipped in and out almost daily in order to serve the needs of the four major packing plants located in southwest Kansas. Once live cattle are slaughtered, their meat is processed and packaged for shipment.

With the rise of cattle feeding and the building of processing plants in Kansas between 1975 and 2003, employment nearly doubled in the meat processing industry in Kansas, with a majority of the growth occurring in the southwest Kansas region (United States Department of Commerce, 1999). This growth accounted for population growth and increased prosperity in the southwest Kansas region (Broadway, 2000).

Ultimately, Kansas is at the heart of the cattle belt with five major processing plants in the state with a combined daily kill capacity of 27,600 (Hoskinson, 2006; Westerman, 2006; King, 2006; Emporia, Kansas at AllExperts, 2006). Four of the five major meat (beef) processing plants are located in the southwest Kansas region and in total have a combined daily kill capacity of 23,600. These plants are National Beef in Dodge City and Liberal, KS; Excel Corporation in Dodge City, KS; and Tyson Fresh Meats in Holcomb, KS. Even though these plants have a combined daily kill capacity of 23,600, it is observed that these plants do not run at full capacity the entire year because of market conditions. Even so, these plants will ship boxes of refrigerated beef all over the United States year round.

3.2 TRANSPORTATION MODES

The various means established for the transportation of freight are termed as transportation modes. In general there are three modes of transportation – land (road, railways, and pipelines), water (maritime shipping) and air (aviation) (Rodrigue et al, 2006). However, among these modes roads and railways are the most prevalent transport modes and, apparently, roads are more conventional compared to railways. Further classifying, 'trucks' have been universally recognized as the predominant vehicles of freight transport on the road. On the other hand, railways have established dominance through containerization linking to road as well as maritime modes (Rodrigue et al, 2006)

3.2.1 TRUCK & TRUCKING INDUSTRY DEVELOPMENT

The trucking industry has become a key player in the movement of freight and America's economy. One reason is that truck transportation has been successful in establishing nationwide coverage. The market share of freight by truck is approximately 5.8 billion in total tons and $6.9 trillion in total value as per 1998 data (Penne, 2005). A Transportation Research Board (TRB) report states that in 2003, "almost 69% of all freight tonnage transported in the U.S. traveled on a truck at some point before reaching the final destination (TRB, 2006)." Fiscally, the trucking industry accounted for an 86.9% share of the total amount spent on freight transportation (TRB, 2006). Additionally, U.S. trucks hauled 9.1 billion tons of freight which in turn created revenue of $610 billion for the trucking industry in 2003. The industry operated 24 million trucks, with 3 million drivers during the same year (TRB, 2006). Additionally, according to the 2006 TRB Trucking 101 report, that an additional workforce of 5.6 million was employed in truck-related errands. According to Leo Penne, Program Director for the Intermodal and Industry Activities of the American Association of State Highway and Transportation Officals (AASHTO), the probable annual growth scenario of trucks from 2000 to 2020 will be 2.5% based on 1998 data (in ton-miles).

According to the 2004 Annual Survey of North American Trailer Production, the largest 30 truck trailer manufacturers of North America increased their production by approximately 31% in 2004 compared to 2003. Deducting the two Canadian and two Mexican trailer manufacturers, and rebuilt trailers, the U.S. total new truck trailer production is 201,400 trailers by 25 manufacturers. Of these, the largest producers accounted for an 87.6% share of the U.S. market in 2004 (Schenck, 2006). According to a 2005 US Department of Labor report, trucking still dominates the transportation of perishables and time sensitive goods (US DOL, 2005).

Every year the industry comes up with new technology to meet the needs of U.S. businesses. But, the evolution of the trucking industry was not instantaneous. When the trucking industry started in 1899 there were many causes that led to its development (Wren and Wren, 1979). Initially, quicker service, durability and lower prices were the reasons for the transportation of goods by truck. With its ability to deliver goods door to door, the short-haul movement of many products such as vehicles, furniture, and textiles were shifted from rail to truck. Eventually, trucks rose in number and became a vital part of all sectors of the economy, but keeping goods fresh while transporting them to distant locations was yet another task for the industry to conquer. This led to the concept of ‘refrigeration’ which was introduced in the 1930s and created new avenues in truck transportation (Wren and Wren, 1979). Trucks were used extensively for transporting perishables and time sensitive goods with this innovative technology. Additionally, the semi-trailer/tractor-trailer (a type of trailer that has wheels only at the rear, the front end being supported by a tractor) enabled only one man (e.g., the tractor driver) to couple and uncouple the automatic trailer that originally required three men with jacks to lift the trailer (American Trailer Exchange, 2006). Various trailer sizes enabled a variety of applications across all sectors of freight. With its extensive usage, trailer production continued to grow for long-distance hauling. In 1960, the concept of 'piggybacking', shipping highway trailers on railroad flatcars, was evolving rapidly and creating new avenues in freight transportation (Wren and Wren, 1979).

Overall, innovative technologies such as refrigeration and piggybacking helped to guide the evolution of trucking. On the other hand, the construction of interstate highways fueled the progress of the freight industry and, more specifically, the trucking industry. "The construction of interstate highways changed the nature of the trucking industry so dramatically that nothing was left the same," according to Robert Gallamore, Director of Northwestern University's Transportation Center in Elmhurst, IL (Harps, 2004). Furthermore, improvements in the Interstate Highway System were another reason for the industry's prosperity. Some of the improvements included categorization of highways, lane-separation (i.e., four lanes), and no traffic lights (Harps, 2004). With the existence of interstates, trucking companies extended their services across the U.S. instead of only shipping freight at the local level (Harps, 2004). It is estimated that the wages in the trucking and warehousing industry are projected to increase by 23% from 2002 through 2012, when compared with the projected increase of 16% for all industries combined (US DOL, 2005). However, deregulation and regulation are always issues in the trucking industry.

3.2.1.1 TRUCKING INDUSTRY STRUCTURE

The operation of a trucking business is a very big task. The trucking industry adopts different trucking carrier services for different types of commodities. The industry can be categorized into three segments (US DOT, 2000; US DOL, 2005):

1. Market served
2. Load operated
3. Type of freight

The different types of trucking carriers meeting the neeeds of the above three divisions can be seen in Figure 3.3 (Classification of Trucking Industry Structure). It must be observed that this is the broad (nationwide) classification of trucking carriers according to the United States Department of Transportation (US DOT) and the United States Department of Labor (US DOL) reports in 2000 and 2005 respectively (US DOT, 2000; US DOL, 2005).

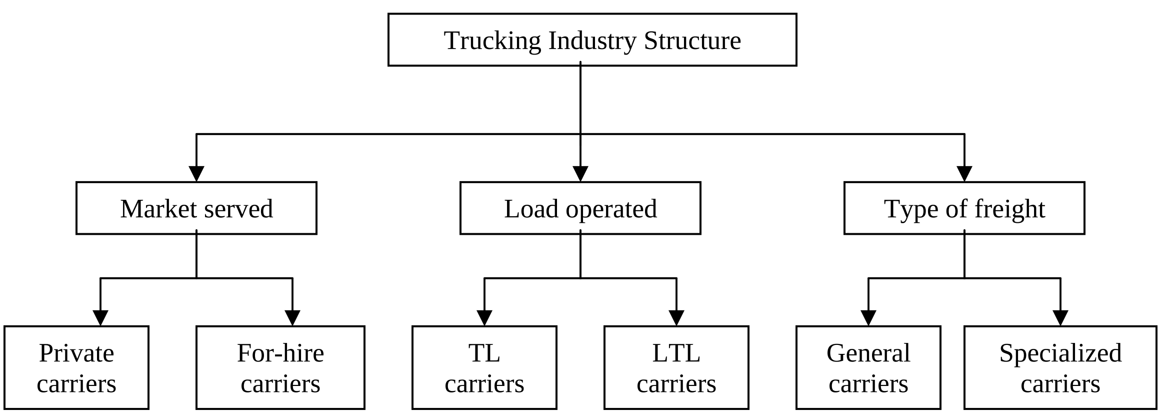


Figure 3.3: Classification of Trucking Industry Structure

A brief description of the different types of trucking carriers follows.

(1) Private and For-hire carriers:

Private carriers deploy their businesses internally – operating their own truck fleet and logistics division. Grocery stores, retail chains, and food processing companies are a few examples of private carriers (US DOT, 2000). For-hire carriers, on the other hand, primarily transport commodities for others as their main business (US DOT, 2000).

Private carriers accounted for more tons transported, approximately 4.2 billion, compared to for-hire carriers which accounted for 3.6 billion. A total of 7.8 billion tons were transported by the trucking industry as a whole (which includes private, for-hire or a combination of both) in 2002. However, the value of freight handled by private carriers was $2.4 trillion, which is $1.4 trillion lower than for-hire carriers (Census Bureau, 2002). Private carriers have the propensity of having fewer numbers of trucks as compared to for-hire carriers (TMW Systems, 2002). It is estimated that there are nearly 26,000 private carriers with 10 or more vehicles in their fleet (TMW Systems, 2002). Together, the 26,000 private carriers operate approximately 1.6 million trucks with more than 400,000 tractors and more than 835,000 trailers (description of truck, tractor and trailer will be provided below) (TMW Systems, 2002). Private carriers operate 27.6% of the total number of trucks, 7.3% of the total number of tractors, and 14.8% of the total number of trailers (TMW Systems, 2002). TMW Systems, Inc. gives a breakdown according to the industry for the 26,000 private carriers of which 4,500 carriers are associated with food manufacturing and distribution.

(2) Truckload (TL) and Less-than-truckload (LTL) carriers:

In general, TL carriers pick up a load in a truck and transport it directly to the consignee in the same vehicle (US DOT, 2000). On the other hand, LTL carriers focus on handling smaller freight shipments, generally between 250 lbs. and 12,000 lbs. (US DOT, 2000).

(3) General and Specialized carriers:

General trucking carriers mainly transport freight locally (i.e. within a single city) by road. Localized freight transport generally involves small delivery rounds within a city such as picking up or driving back a loaded truck to a warehouse on the same day (MarketResearch, 2005). The goods delivered may or may not be time sensitive and this type of trucking is not equipped with special features that may be necessary to carry time sensitive goods. According to the Bureau of Labor Statistics, local trucking consisted of 28,000 trucking firms in 2002 (US DOL, 2005). Specialized trucking carriers on the other hand, mainly transport freight over long-distances and carry goods which, because of size, weight, shape, or other intrinsic characters, need special equipment like flatbeds, tankers, or refrigerated. Special trucking carriers can also transport local freight and is not solely dedicated for long-haul transport. These carriers also incorporate the intermodal aspect encompassing freight transcontinentally. According to the Bureau of Labor Statistics, the specialized freight trucking segment consisted of 45,000 firms in 2002 (US DOL, 2005).

Thus, it is apparent that different types of trucking carriers suit different purposes. For instance, perishables or time-sensitive goods are mostly transported by ‘specialized trucking carriers’ that offer refrigerated trailers to sustain the quality of the product while transporting them to their final destinations.

Kansas Trucking Industry:

According to Gary Davenport, Director of Safety and Risk Management for the Kansas Motor Carrier Association (KMCA) in Topeka, KS, as of June 2006 there were

9,409 carriers in Kansas. Nationwide trucking carriers are categorized according to the market served as private and for-hire carriers and account for a major share of the Kansas trucking industry. However, there are two other types of Kansas based carriers and one type of non-Kansas based carrier (descriptions below) (Davenport, 2006).

1. Kansas based interstate exempt carriers
2. Kansas based interstate and private exempt carriers
3. Non-Kansas based interstate and private exempt carriers

It is often hard to count which carriers are private carriers since any company with vehicles over 10,000 lbs. are considered private carriers (Davenport, 2006). There are approximately 6,604 private carriers, which include construction trucks, trucks used for lawn care, or trucks used to transport property. On the other hand for-hire carriers (also called common carriers) haul mostly general goods and are the main haulers of livestock (Davenport, 2006).

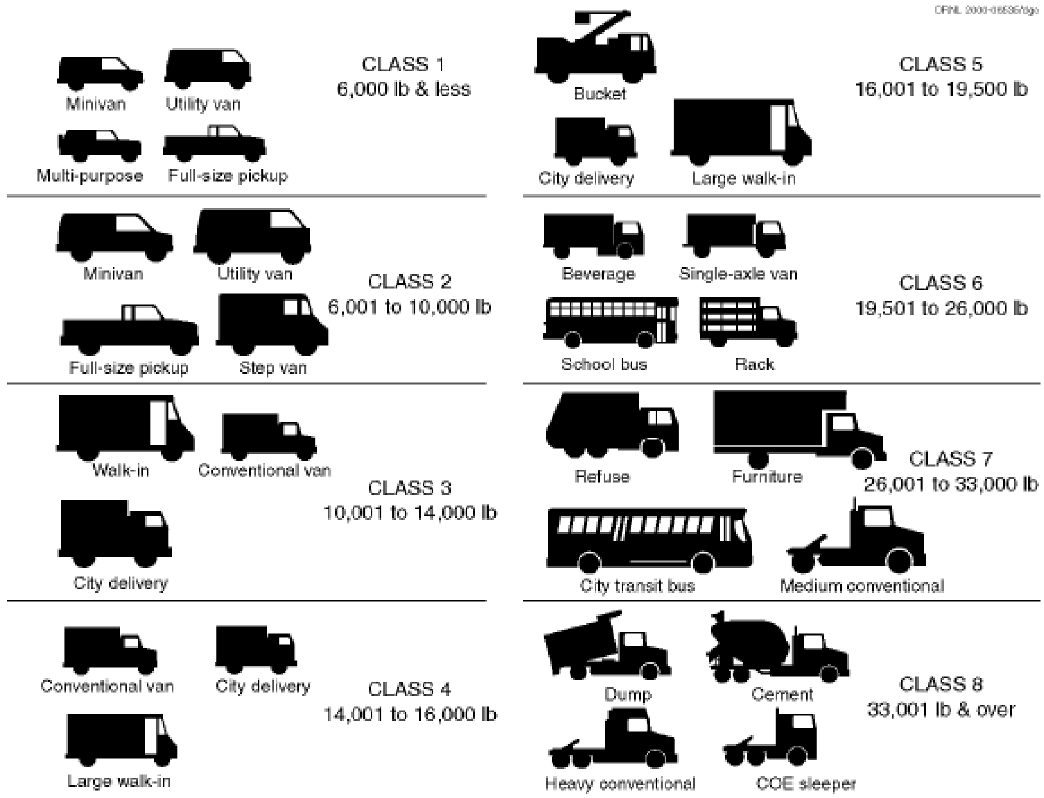
Kansas based interstate exempt carriers are carriers which haul commodities in and out of Kansas, but do not have single state Federal Highway Administration authority (Kansas Corporate Commission, 2006). There are 413 Kansas based interstate exempt carriers (Davenport, 2006). Kansas based interstate and private exempt carriers are the carriers that operate in or out of Kansas hauling property or passengers by commercial vehicle and are not a for-hire motor carrier. In total, there are 1,499 carriers of this type in Kansas. There are 466 non-Kansas based interstate and private exempt carriers that are carriers basically operating in Kansas. There is yet another classification of carriers according to the number trucks a carrier operates: large, medium, small and very small categories. According to Gary Davenport, Director of Safety and Risk Management for KMCA in Topeka, KS, among Kansas' 9,409 carriers, 47 of them are in the large category (100 or more trucks); 325 in the medium category (20-100 trucks); 837 in the small category (7-19 trucks) and the majority of the carriers, 7,693, are in the very small category (1-6 trucks). Accordingly, the nationwide figures of the trucking carriers also indicate that there are more carriers that fall in the very small category than any other category. Among the 686,797 carriers-nationwide, 556,344, or 81%, fall into the very small category (Davenport, 2006).

According to the American Transportation Research Institute (ATRI), the following are some facts about the Kansas trucking industry (Davenport, 2006):

- In 2003, the trucking industry drove 1.5 million miles on Kansas roads, representing 5% of all roadway traffic in the state.
- In 2004, the trucking industry provided about 92,000 jobs in Kansas, with total trucking industry wages exceeding $3.4 billion and an average annual trucking industry salary of $37,181.
- In 2004, the trucking industry paid about $410 million in federal and state roadway taxes and fees, which amounts to 43% of all taxes and fees paid by all motorists.
- Trucks transported about 80% of total manufactured tonnage in the state in 2003.
- In the U.S. there are 12 million drivers with a commercial driving license (CDL), with 158,000 of them in Kansas.

3.2.1.2 TRUCK CONFIGURATION

In addition to the various trucking carrier types, there are many types of trucks and semi trailer combinations designed to meet the needs of different industries. A brief outline of the most common truck classifications according to the Gross Vehicle Weight (GVW) can be seen in Figure 3.4 (Classification of trucks by GVW). GVW is the fixed weight of the vehicle including the equipment, gas, body, payload, driver, etc. on the basis of an individual unit, such as a truck or tractor (Roadway Express, 2005; General Motors, 2006).



(Source: Bradley, 2005)

Figure 3.4: Classification of trucks by GVW

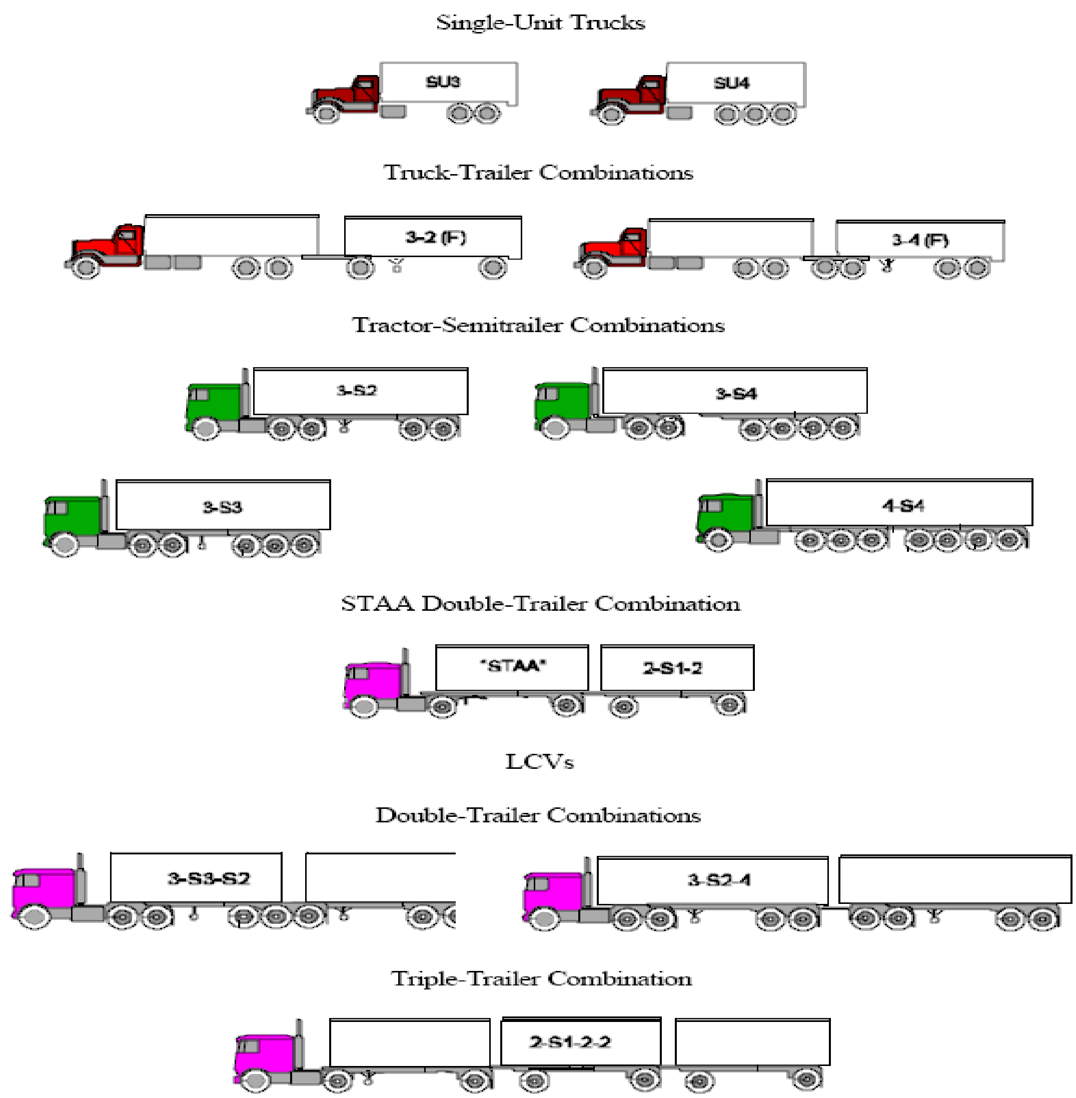
Most of the specialized trucking carriers use Class 8 type trucks among which the heavy conventional truck is mostly used for the transportation of processed meat and related products (Bradley, 2005; Wikepedia, 2006).

Trucks are also classified according to the configuration of the fleet. Basically there are five configurations (US DOT, 2000):

- Single-unit trucks
- Truck-trailer combinations
- Tractor-semitrailer combinations
- Double-trailer combinations

- Triple-trailer combinations

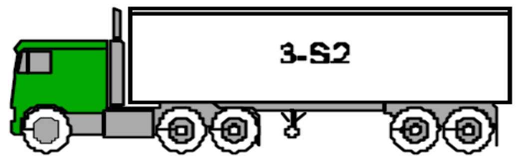
In order to better understand these configurations, the fundamental differences between ‘truck’ and ‘tractor’ must be understood. In general, a truck is a single unit vehicle which cannot be detached from its freight bed and is comprised of a single motorized device with more than two axles or more than four tires (McCracken, 2005). On the other hand, a tractor is a vehicle designed preliminarily for pulling a trailer/semi-trailer which cannot be propelled on its own. Various combinations of truck fleets can be seen in Figure 3.5 (Illustrative Truck Fleet Configuration). Among the various configurations, the tractor-semitrailer combinations account for more than 82% of all combinations of trucks on U.S. highways (US DOT, 2000).



Source: U.S. Department of Transportation (US DOT), 1996.

Figure 3.5: Illustrative Truck Fleet Configuration

Among the tractor-semitrailer combinations, the type 3-S2 (description below) is the most widely deployed for the transportation of processed meat and related products based on data collected through the two site visits to the southwest Kansas region. This type of truck configuration is illustrated as 3-S2 which denotes 'S' to be classified as a 'semitrailer' and the number following 'S' denotes the number of axles (US DOT, 1996). The number preceding the 'S' denotes the number of axels on the tractor. A typical tractor-semitrailer combination can be seen in Figure 3.6 (Tractor-Semitrailer Combination Type 3-S2).



Source: US DOT, 2000

Figure 3.6: Tractor-Semi trailer Combination of Type 3-S2

There has been an average growth of 2.5% in the number of semitrailer combinations for every year between 1982 and 1994 (US DOT, 2000). Semitrailer lengths usually undergo changes every 10 to 12 years. In 1994, the 53-foot semitrailer, which offered an increased cubic capacity of 18% compared to the 45-foot semitrailer, accounted for 30% of the market share (US DOT, 2000).

3.2.1.3 TRUCKING SHIPMENT COST

In general, the trucking cost structure reflects direct and indirect costs. However, for the purposes of this report we are mainly concerned with the truck shipment costs that account for transportation charges alone. This cost structure excludes indirect cost elements such as terminal costs, administrative staff, maintenance costs, interest due to investments in buildings and yards. The following are some of the direct cost elements used in this report's cost structure (Batts et al, 1982; NetTOM, 2006; Barnes and Langworthy, 2003):

(1) Fixed costs – Includes the licenses (excise and operator's) for drivers, vehicle insurance, and depreciation of the vehicle.

(2) Fuel cost –Is the total dollar amount spent on the number of miles the freight is transported. According to Carey Hoskinson, Vice President and General Manager of

National Beef in Dodge City, KS, an increase in fuel prices tremendously affects the industry. Many small independent carriers cannot remain competitive with the rising cost of fuel. Jane Westerman, Fleet Manager of Excel Corporation in Dodge City, KS, discusses two scenarios encountered by truckers when fuel costs increase: (1) if truckers increase the price they would loose too much business and/or (2) if truckers keep the same price they do not make enough money to stay in business. There will also be an increase in insurance costs and replacement parts (Westerman, 2006). Gas and insurance cost account for about 10-12% and 3% respectively over total cost (Mull, 2006).

(3) Driver cost – Is the total dollar amount spent on a driver for transporting freight including the fuel surcharge, which is usually behind the actual price. For boxed beef, drivers are paid in dollars per mile, while for livestock they are paid by dollars per ton-mile (Westerman, 2006). Driver cost accounts for 35-40% of total cost (Mull, 2006).

(4) Loading & unloading cost – Is the total dollar amount spent for loading and unloading the freight. Typically, the sender and receiver of the shipment pay for the loading and unloading of the shipment and not the trucker/carrier (Kindsvater, 2006). However, according to Fred Mull, Livestock Division Manager for National Carriers in Liberal, KS, if the loading and unloading takes longer than 1½ hours, the carrier will have to pay the driver by the hour while he waits for the truck to be loaded/unloaded, but the carrier will usually have the overtime billed back to the owner of the shipment (Mull, 2006). Actually, the loading and unloading costs vary on carrier type and are negotiable. According to Mike King, Head of Transportation for National Beef in Liberal, KS, they will pay an unloading fee of up to $110, but they will not pay a loading fee because that price is included in the quote that is negotiated with the carrier (King, 2006).

(5) Road user taxes – The taxes accrued for using the highway fall into the category of road user taxes.

(6) Freight maintenance cost – The freight that is transported must not only reach the destination on time but also in good condition. So the additional costs in maintaining the freight such as, refrigeration, thermometers, oil, and lubricants fall into this category.

(7) Vehicle maintenance cost – Vehicles must be in proper condition for transporting freight long distances. Maintenance costs including repair, tires, and tubes, due to the movement of freight are accounted for in this category.

3.2.1.4 ADVANTAGES AND DISADVANTAGES

Based on research regarding the truck transportation mode on topics concerning its evolution, developments, growth, industry structure, truck types, configurations of fleet, and its influence on the economy, it is apparent that trucks are well established for transporting different types of freight. However, there are some disadvantages associated with this mode of transportation such as safety and air pollution. Following are some of the advantages and disadvantages of truck transportation:

3.2.1.4.1 ADVANTAGES

- **Promptness:** Time is one of the basic concerns in any business. Expedited delivery coupled with door to door service has always made the trucking industry stand apart from other modes of transportation.
- **Supervised Nature:** A majority of the livestock and processed meat products are transported exclusively by trucks. This is because it is believed that the transportation of these manifests cannot be accommodated by the unsupervised (no driver) nature of rail and intermodal container transportation (US DOT, 2000)
- **Refrigeration Concept:** Processed meats require high levels of services, the most important being the monitoring of refrigerated temperature, which is not readily available through railroad service (US DOT, 2000).
- **Effective Tracking:** Most of the trucks are equipped by Radio Frequency Identification (RFID) tags that provide for an effective tracking mechanism for the assets.

3.2.1.4.2 DISADVANTAGES

- **Congestion:** Congestion is a growing issue on U.S. highways and is projected to become more significant in the next two decades because of the changing needs of truckers (Harps, 2004). The economic productivity of the industry decreases by approximately $100 billion per year because of congested freeways (Lowe, 1994).

- **Freight Traffic:** Truck deployment by various industries increased to such an extent in recent years that there has been a tremendous growth in truck traffic. In 1994, tractor-semitrailers accounted for about 53% of the total truck vehicle miles traveled (VMT) or 89.6 billion VMT (US DOT, 2000). David J. Forkenbrock, Director of the Public Policy Center at the University of Iowa and Jim March, Leader of the Industry and Economic Analysis Team in FHWA's Office of Policy, note that the estimated freight truck vehicle miles traveled will increase by more than 70% by 2020 (Forkenbrock and March, 2006). It is also observed that rail needs an annual public investment of $2.6 billion, which if not met will eventually result in a growth of 31 billion truck VMT on highways by the year 2020 (Penne, 2005).

- **Smooth Movement:** Currently, many highways and other roads used by tractor-trailers do not account for these truck's wide turning radius, hampering the movement of freight from highways and local roads. According to the Central Transportation Planning Staff (CTPS) of Freight Transportation at Boston Region MPO, the interstate and arterial highway network should allow for efficient connectivity to major freight destinations and must be designed to handle the wide turns of these trucks (CTPS, 2006).

- **Safety Concerns (due to tractor-trailer):** Tractor-trailer trucks have different sizes, weights, and acceleration capabilities to suit different purposes that at times form a hazardous combination on the nation's roads (Aurelio and Newman, 1997). It is estimated that in 2005 442,000 tractor-trailers or semis were involved in traffic accident, among which semi-trailer associated accidents accounted for 4,932 fatalities (NHTSA, 2006).
- **Increased Costs:** The use of semi-trailers by various industries has accounted for a majority of the damage to county and state roads. Studies have estimated the additional average cost incurred due to increased truck traffic as $0.075 per ton-mile on county roads and $0.05 per ton-mile on state roads (Prater, 1998). County roads account for higher costs since these are the routes which are the most heavily traveled by large trucks used by processing plants, agricultural productions farms, and other industries prone to high truck traffic. These poorly maintained county roads result in increased time travel and increased costs for the commuters such as increased accident rates, vehicle maintenance costs, and fuel costs (Prater, 1998). Conversely, if the annual public investment needed for rail is not met there could be a $21 billion increase in costs to highway users by 2020 (Penne, 2005).
- **Fuel Costs:** The VMT shows the huge amounts of fuel consumed by the trucking industry. It has been estimated that Class 8 trucks consume 18 billion gallons of fuel per year, which far exceeds the amount used by commercial trucks in any other GVW classification (Bradley, 2005).
- **Increased External Costs:** External costs are the costs incurred due to air pollution generated by trucks that negatively affect other people rather than those who

produce it (Forkenbrock, 1999). It has been estimated that the total external cost and the user charge underpayment is 1.11 cent per ton-mile which is considerably higher compared to the external costs of freight rail which is 0.24 – 0.25 cent per ton-mile (Forkenbrock, 1999).

- **Driver Shortage:** According to the American Trucking Associations (ATA), trucking companies are short by 20,000 truck drivers in meeting the current demand (Railway Age, 2005). It is also estimated that the shortage could increase to 110,000 by 2014. Thus, it is one of the major limitations for motor carriers in freight hauling (Railway Age, 2005).
- **Increased Bridge Damage:** Besides causing adverse effects to highways, trucks also damage bridges (Wilner, 1998). It is estimated that approximately 95% of all wear on bridges is derived from tractor-trailers (Lowe, 1994).

3.2.2 RAILROAD

'Railroad' is the union of two basic transportation modes – rail and road. Freight in this mode is transported by carloads, containers, and trailers. A brief description of these types of shipments follows:

Carload freight: This is the most common type of freight transport used by railroads. This type of freight is carried via rail alone (i.e. directly loaded at the point of origin) which means the shipment starts on rail and ends on rail at its final destination (Willet, 2005). According to an Association of American Railroads (AAR) Report, U.S. Class I railroad (description below) carload freight reached its highest weekly level since 1998 during the week of May 27, 2006 when 340,653 cars were loaded, which was 2.5% above the total in the same week the year before (Berman, 2006).

Container and Trailer freight: Both of these units are used for transporting intermodal containers and trailers (description in next section). However, both of these units have minor variations in their deployment. Containerization is best suited for storing smaller loads of freight since these are mostly smaller in size but have the advantage of having ground level access. Containers are extensively used for international trade due to the concept of identity preservation or "traceability", which offers the potential for addressing any questions associated with process issues of the freight (inputs and methods adopted for containerization) (Maine Trailer, 2006). According to the North Dakota Strategic Freight Analysis (2002), "most identity preserved (IP) shipments are smaller quantities with higher values," which explains the convenience of the container's small size. Also, containerization provisions provide for the reliability to meet both ends of the consignment (i.e., the shipper and the receiver) (Berwick et al, 2002). It is also estimated that along with the growth of IP freight, container traffic will also grow (Berwick et al, 2002). Class I container traffic was 8.71 million containers in 2005, a 7.9% increase compared to 2004, according to preliminary data from AAR (AAR, 2006d).

Trailers on the other hand have considerably more storage capacity and can be moved even if fully loaded. Furthermore, the trailer can be placed onto a flat railcar in order to transfer freight long distances (Maine Trailer, 2006). This is often termed as 'piggybacking' and is famed for its large haulage capacity and efficiency. According to an AAR Report, preliminary 2005 Class I railroad trailer traffic increased to approximately 2.98 million trailers compared to 2.63 million trailers in 2004 (AAR, 2006d).

3.2.2.1 RAIL AND RAIL LINES

U.S. rail service started operating in 1833 with a meager 380 miles of track (AAR, 2006a). True commercial rail transportation came into existence in the early 19th century during the industrial era and played a major role in the development of North America and consequently led to improvements in the transportation of freight (Rodrigue et al, 2006). The number of rail miles was gradually increasing when the "golden age" of railroad began in 1865, during which the national rail network grew from 35,000 miles to a peak of 254,000 miles in 1916 (AAR, 2006b). However, these developments were not only because rail transport's ability to carry heavy loads over long distances, but also due to its enhanced travel time. According to the 2005 Infrastructure Report Card issued by the American Society of Civil Engineers (ASCE), rail is a vital component of the nation's freight transportation system.

Rails distribute weight uniformly, permitting greater loads per axle/wheel than in road transportation. With the smooth and hard surface feature of rail, the wheels of the train roll with minimum friction proving to be the most energy proficient means of transporting products via land transport. Like any other mode of transport, rail transportation has a crucial connection with space and geography. Its unique field of double-tracked rail line deploys efficient use of space, which carries more loads of freight compared to the traditional two or four-laned transportation system of road (Farlex, 2005).

Competition from other modes of transportation has always challenged the railroad industry. However, the deregulation of the railroad industry from 1900–1940 fueled the expansion of the railroad industry (AAR, 2006a). Despite this, the railroad industry streamlined its operational structure and was accompanied by reduced shipment costs in the 1970s and early 1980s. Keeping the above trends in mind, it was predicted that the railroads would not be able to keep up with the demand of the growing freight industry by expanding its network, while still maintaining their profits (ASCE, 2005). Later the Staggers Rail Act of 1980 basically reduced the Interstate Commerce Commission's jurisdiction over railroads, which stirred competition and in turn promoted technology upgrades along with a restructuring of the industry. This act led to the creation of hundreds of new shortline and regional railroads (AAR, 2006a).

In general, rail is the preferred transport mode for shipments that have flexible time constraints. Nevertheless, rail transportation is flexible to accommodate a variety of rolling stock such as (Rodrigue et al, 2006):

- Hopper cars for freight such as grain or fertilizers;
- Triple hopper cars for freight such as sand or coal;
- Flat cars for freight such as wood or agricultural tools;
- Tanker cars for freight such as petroleum products;
- Box cars for freight such as manufactured goods;
- Gondola cars for freight such as scrap metals and aggregates.

Rail transportation can satisfy a very wide variety of needs (Rodrigue et al, 2006). Also, rail transportation is not affected as much by the adverse weather conditions as compared to road transportation.

There are various elements to consider when operating a rail transport system. It is only achieved by creating and implementing a long-term plan (Farlex, 2005). Rail lines are established to set up access to resources through local trade and territorial control. Early on, railway companies dealt in point to point projects, however today the freight railways have mutual associations that have created a more progressive and efficient means of transportation (Rodrigue et al, 2006).

3.2.2.2 FREIGHT RAILROAD SYSTEM

Freight railroads play a vital role in the U.S. economy. However, freight railroads received huge grants from governments for their construction and development (AAR, 2006e). According to an AAR Report (2006b), "from 1980 through 2005, Class I railroads (description below) spent approximately $360 billion – approximately 45% of their operating revenue – on capital expenditures and maintenance expenses related to infrastructure and equipment".

The Surface Transportation Board (STB) has been responsible for the economic regulation of railroads since 1995 (STB, 2006) and has classified the U.S. freight railroad system into four categories according to the revenue they generated annually (AAR, 2006b):

Class I Railroads: Railroads whose annual revenue is at least $289.4 million are classified as Class I railroads (AAR, 2006b). These railroads are line-haul (point to point) railroads operating in various states primarily focusing on long-haul, high-density intercity traffic lanes (AAR, 2006b). Initially there were 12 Class I freight railroads but with the most recent mergers there are currently seven of them operating according to a 2006 AAR Report (US EPA, 1998; AAR, 2006d). The seven U.S. Class I railroads are: BNSF Railway, CSX Transportation, Grand Trunk Corporation, Kansas City Southern (KCS) Railway, Norfolk Southern (NS) Combined Railroad Subsidiaries, SOO (South Old Oaks) Line Railroad (Operated by Canadian Pacific Railway), and Union Pacific (UP) Railroad (AAR, 2006d). Class I railroads control a majority of the track mileage in the U.S., about 70% of all track miles operated in the U.S. (AAR, 2006b). Also, as of 2005, Class I railroads had 22,779 locomotives in service (AAR, 2006d).

According to the AAR, the commodity group that was most heavily transported was coal, which contributed 42.4% of the total tonnage transported by Class I railroads, which in turn generated 20.1% of the total gross revenue generated by all Class I railroads in 2005 (AAR, 2006d).

Class II (Regional Railroads): Railroads whose annual revenue lies between $40 million and $289.4 million or with at least 350 route miles are classified as Class II Regional Railroads (AAR, 2006d). In total, there are 31 regional railroads operating 15,641 miles (excluding trackage rights), generating freight revenue of $1.41 billion as of 2004 (AAR, 2006d).

Class III (Local Short line Carriers): Railroads whose annual revenue is below $40 million per year are classified as local short line carriers (AAR, 2006b). As the name designates, these railroads, unlike the Class I railroads mostly deal in local hauling and deploy point to point services over short distances. As of 2004, there were a total of 314 local line-haul carriers operating over 20,753 miles (excluding trackage rights), generating freight revenue of $0.98 billion (AAR, 2006b). According to the AAR, “Most of the carriers operate less than 50 miles of road (approximately 20% of them operate 15 or fewer miles) and serve a single state (AAR, 2006b).”

Switching and Terminal (S&T) carriers: These railroads do not have any considerations on the revenue generated and render switching and/or terminal services. These railroads also function as pick up and delivery carriers instead of point to point transportation over a specified region connecting one or more line-haul carriers. As of

2004, there were 204 S&T carriers operating 6,356 miles (excluding trackage rights), generating freight revenue of $0.64 billion (AAR, 2006b).

3.2.2.3 FREIGHT RAIL CARRIERS IN KANSAS

There were a total of 19 freight railroads operating in Kansas in 2005, among which there were four Class I railroads, 13 Class III railroads, and 2 switching railroads.. These carriers operate 4,776 miles (excluding the trackage rights) with a total traffic of 6,274,881 carloads and approximately 362 million tons of freight in Kansas (KDOT, 2005). Table 3.2 presents in detail information about the four Class I railroad companies in Kansas. Among the four Class I railroads mentioned, BNSF and UP cover a majority of Kansas and are the only Class I railroads in the southwest Kansas region. A summarized description including but not limited to topics such as facts, freight type, and the developments of these railroads are discussed below.

Table 3.2: Class I Freight Rail Carrier Information - Nationwide

Class I Freight Rail Carrier	BNSF	KCS	NS	UP
Plant & Equipment				
Miles of road operated	32,150	3,072	21,336	32,616
Miles of road owned	23,984	2,905	16,766	27,123
Freight cars in service	104,700	14,287	108,218	143,512
Locomotives in service	5,677	510	3,628	7,575
Net investment, as reported	$25,646,708,000	$1,409,862,000	$19,948,485,000	$30,755,978,000
Net investment, revenue adequacy	$17,994,909,000	$960,501,000	$11,141,510,000	$21,266,619,000
Financial				
Operating revenue	$10,857,363,000	$635,678,000	$7,311,869,000	$12,179,614,000
Operating expenses	$9,237,879,000	$526,774,000	$5,814,294,000	$11,013,882,000
Net railway operating income	$1,013,911,000	$78,668,000	$1,273,097,000	$929,920,000
Return on shareholders' equity	6.39%	5.23%	10.89%	4.55%
Return on investment, revenue adequacy	5.84%	8.30%	11.64%	4.54%
Total capital expenditures, road and equipment	$1,856,828,000	$122,725,000	$1,012,276,000	$1,758,176,000
Traffic				
Carloads originated	8,237,466	414,915	5,524,545	7,831,823
Tons originated	483,296,128	29,790,024	319,014,426	503,052,146
Ton-miles	568,926,119,000	21,219,536,000	198,305,860,000	546,321,004,000

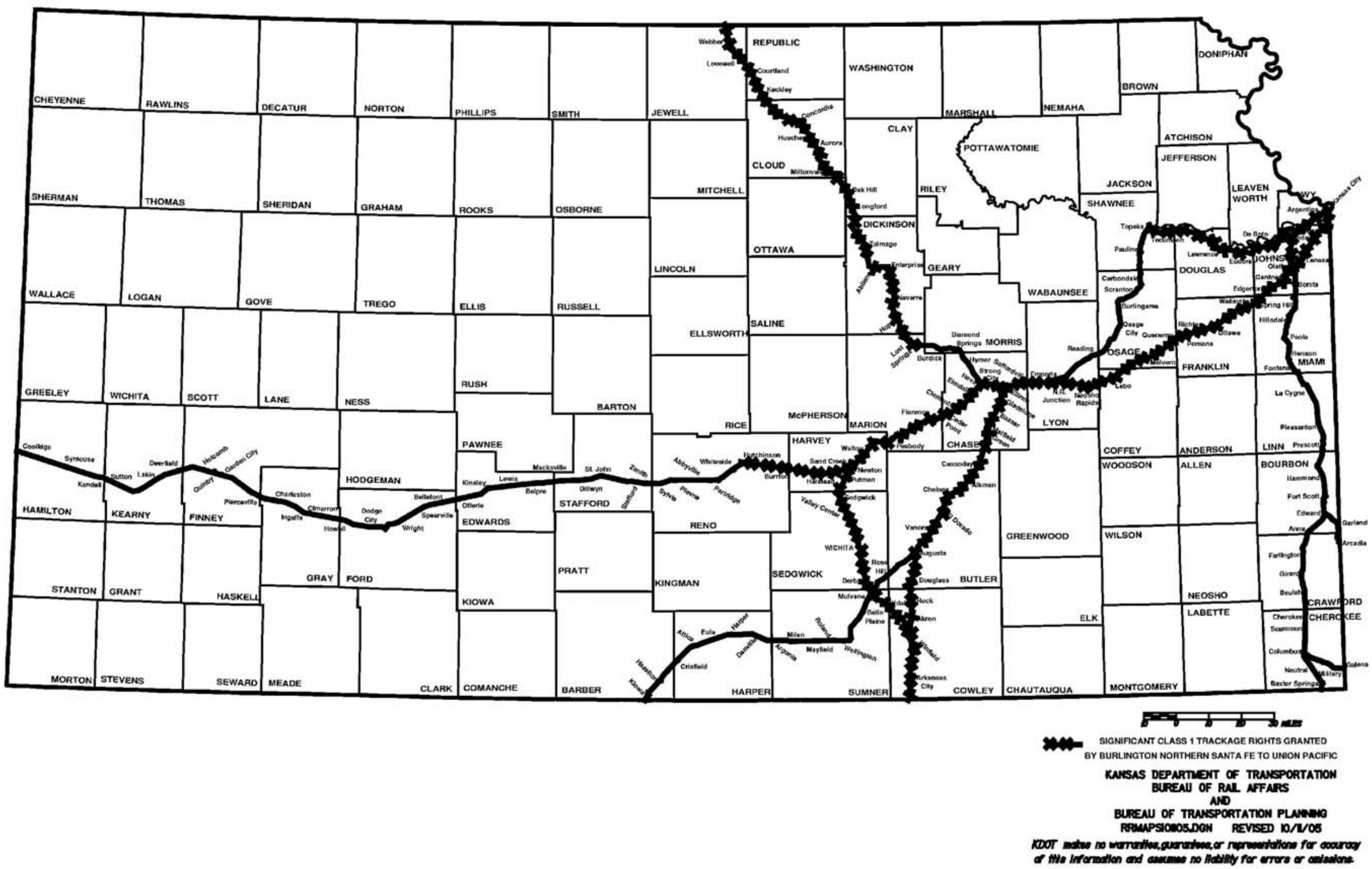
Table 3.2 (Continued): Class I Freight Rail Carrier Information

Class I Freight Rail Carrier	BNSF	KCS	NS	UP
Employment				
Total wages	$2,597,743,000	$160,935,000	$1,696,915,000	$3,321,628,000
Average number of employees	37,507	2,670	28,163	49,511
Hours paid for	104,029,908	7,320,195	66,916,478	130,385,813

Source: AAR, 2006d.

3.2.2.3.1 BNSF Railway:

Figure 3.7 shows the rail mileage of BNSF. BNSF operates a total of 1,237 miles in Kansas, transporting a variety of products and commodities (KDOT, 2005). BNSF partners with trucking companies and short line railroads, creating a fast and seamless movement of freight (Miller, 2005). BNSF also has 443 miles of trackage rights. In 2005 more than five million intermodal shipments (truck trailers or containers) were transported on BNSF's rail lines (BNSF Media, 2006). The average intermodal train transports the equivalent of what 220 trucks can (BNSF Media, 2006). According to BNSF Media, BNSF is one of the biggest grain-hauling railroads in the U.S. It is estimated that in 2005 BNSF transported more than 900,000 carloads of agricultural products among which approximately half were corn and wheat shipments (BNSF Media, 2006).



Source: KDOT, 2006.

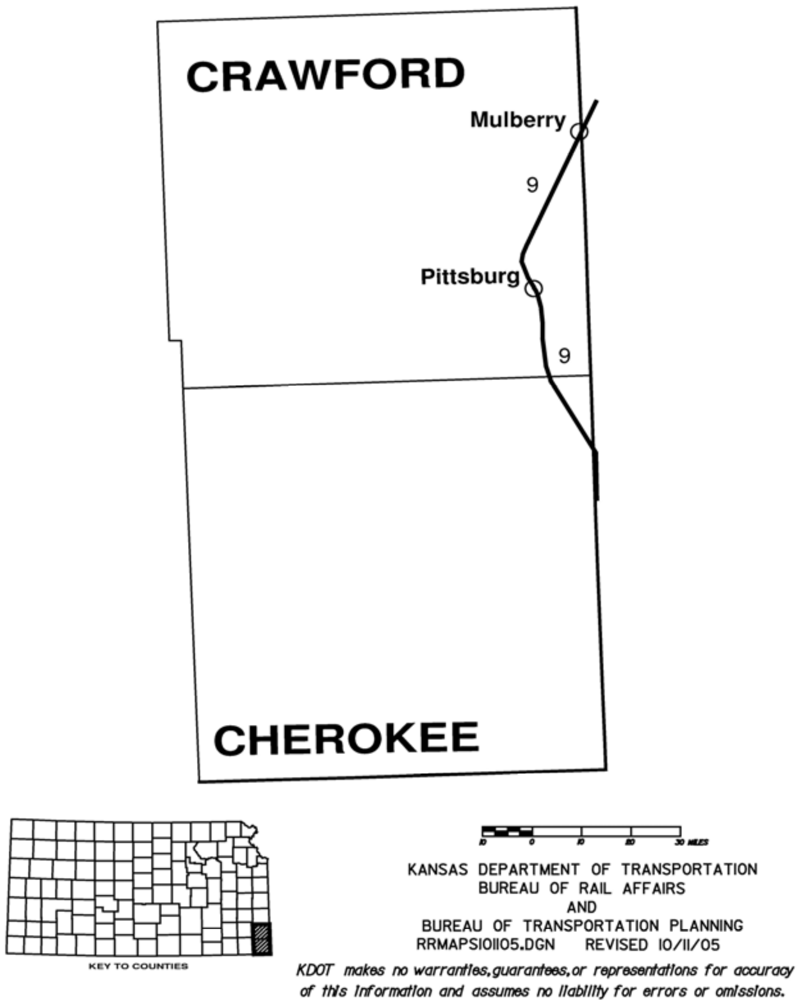
Figure 3.7: Burlington Northern Santa Fe Corporation

According to Stephen Muncy, Sr. Trainmaster/Road Foreman for BNSF in Dodge City, KS, the following are some of the developments taking place at BNSF (Muncy, 2006):

- Five years ago BNSF started to replace their old railcars with new super reefer cars that are about 90’ in length and contain global positioning system (GPS) which provides accurate location information.
- There has been an increase in the amount of corn transported into southwest Kansas. In June 2006, there were three 110-car unit trains that brought corn into the area, the majority of which is dedicated for feeding livestock.
- BNSF plans to expand its transcontinental line in Kansas along with another mainline that goes through Emporia, KS. However, there are no plans for expansion in the southwest Kansas region.

3.2.2.3.2 Kansas City Southern (KCS):

Figure 3.8 shows the KCS Railway Co. rail mileage KCS has only 18 miles of track in the state. Most of the shipments involve products like coal, chemicals/petroleum, and forest products however, commodities like grain or food products also have a significant share (KDOT, 2005).

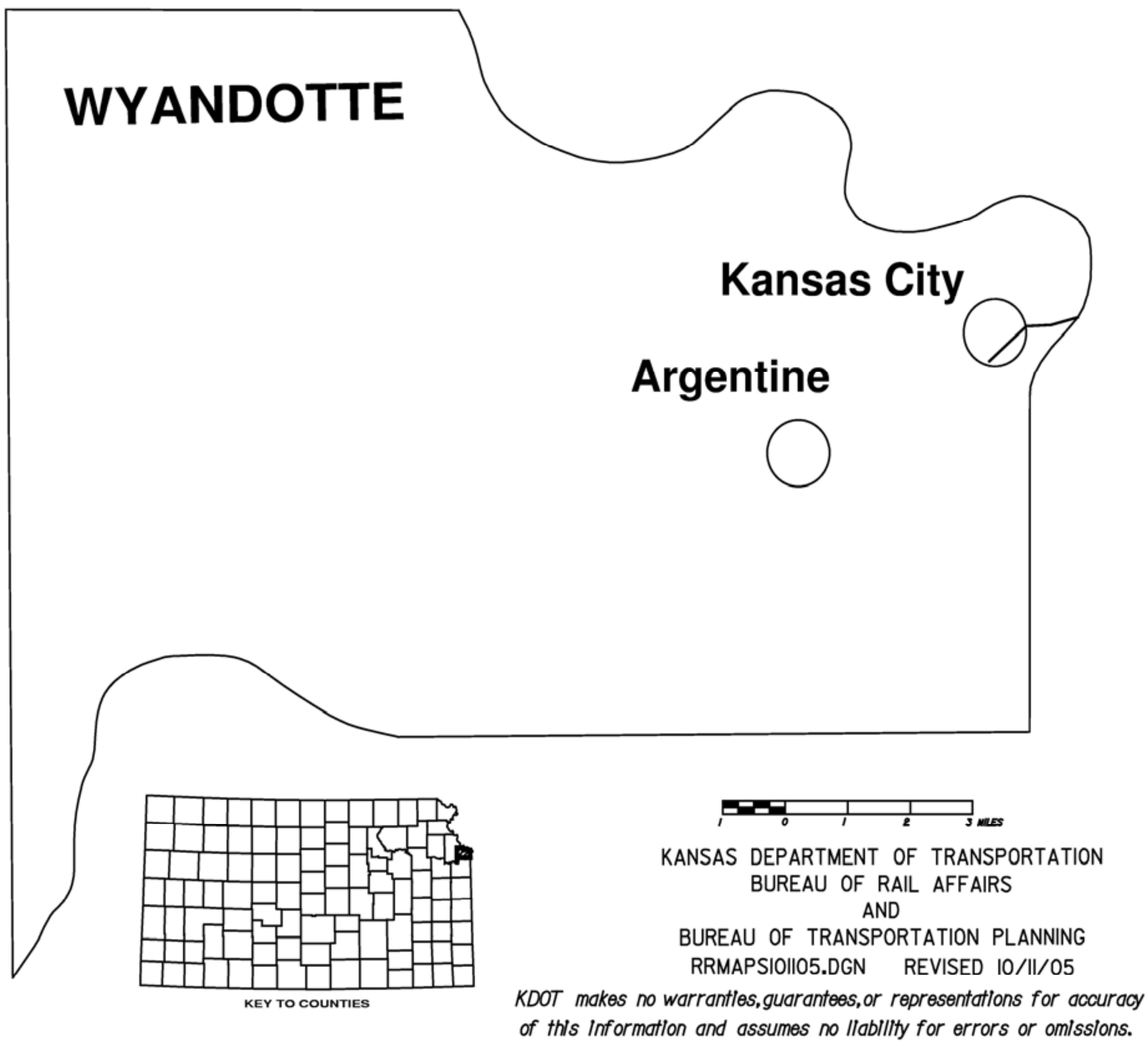


Source: KDOT, 2006.

Figure 3.8: Kansas City Southern Railroad Map

3.2.2.3.3 Norfolk Southern (NS) Corporation

Figure 3.9 shows the trackage rights of NS Railroad. NS Corporation has trackage rights of approximately three miles in the state of Kansas. However, it connects customers throughout the world.

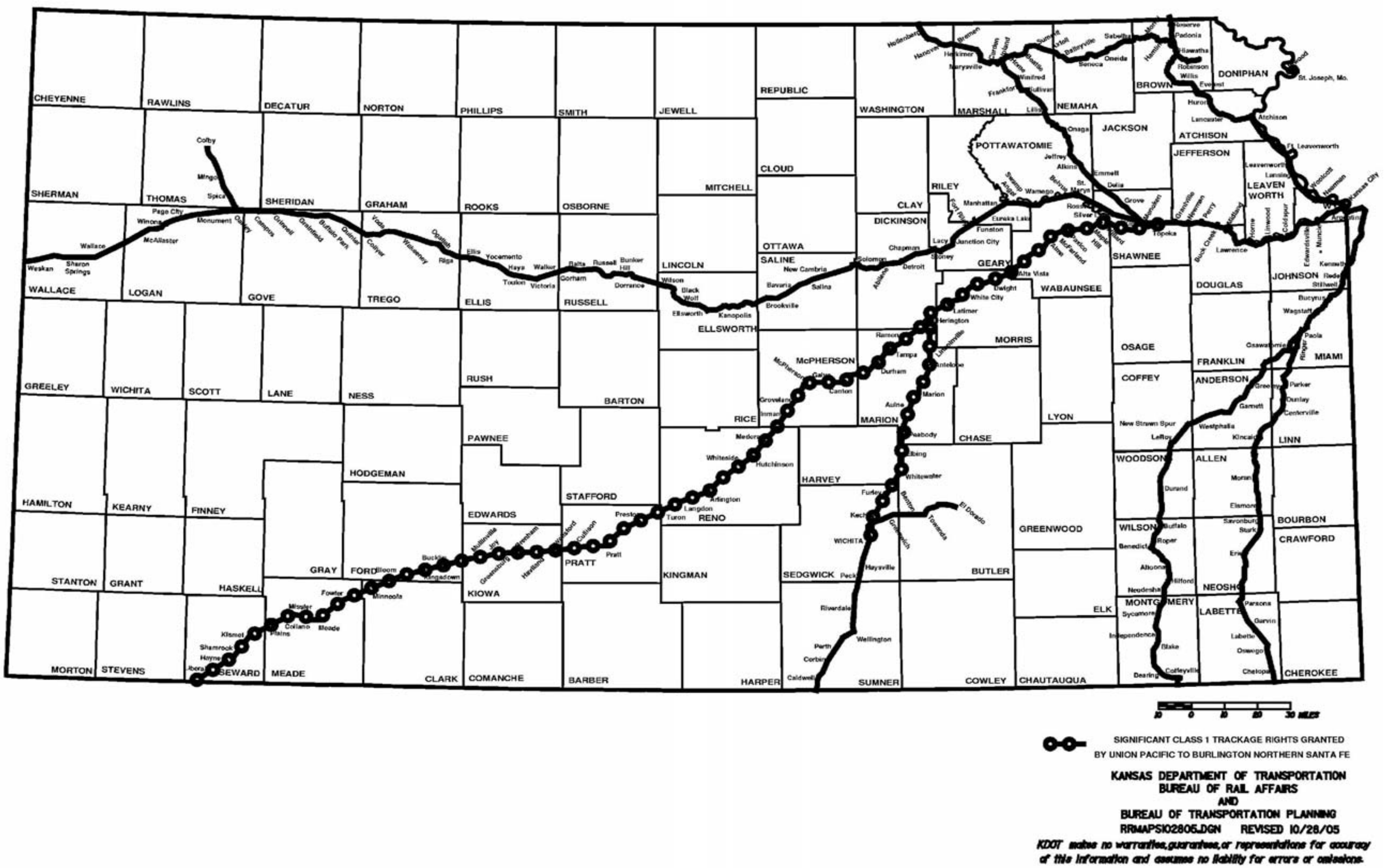


Source: KDOT, 2006.

Figure 3.9: Norfolk Southern Railroad Map

3.2.2.3.4 Union Pacific (UP) Corporation:

Figure 3.10 shows the rail mileage of UP. Apart from operating a total track length of 1,535 miles in Kansas as well as 862 miles of trackage rights. UP also operates a major freight switching yard in Kansas City (KDOT, 2005).



Source: KDOT, 2006.

Figure 3.10: Union Pacific Railroad Map

According to Mark Davis, Director of Regional Public Relations for UP in Omaha, NE, the following are some facts about UP and some of their future ventures:

- UP's total miles of rail cover all four quadrants of Kansas equally well. It ships approximately five or six different commodities nationwide. In Kansas UP ships out large quantities of grain, particularly wheat, but it also brings some corn into Kansas.
- Recently there has been resurgence in UP's frozen car business, so much that UP has upgraded their refrigerated fleet which had not been upgraded since the 1970's. These newer refrigerated cars handle more capacity, are more energy efficient, and reduce the number of incidents (i.e. spoilage) because of high-tech GPS and the two-way technology that can monitor products from the time that they are loaded until they reach their final destination.
- Like any other railroad, UP also works with short line railroads. Short line railroads are like branch lines for major railroads. Short line railroads are a win-win situation for everybody involved. They not only benefit the railroad industry, but also the community by keeping the rail line in operation which can help them with possible business opportunities.
- UP plans on expanding some of their current rail lines. On average UP spends about $1.3 billion to maintain their total miles of track. Currently UP is working on a $400 billion capacity project to double the capacity on their rail line from El Paso, TX to Los Angles, CA. When this project is done this rail line will be able to carry 45 trains per day, including the 15 that come from the track that goes through Liberal, KS. This added capacity will make it faster to transport commodities to the West coast.

3.2.2.4 RAILROAD ABANDONMENTS IN KANSAS

If a rail line is abandoned it is abandoned for a reason, usually because it is no longer profitable (Davis, 2006). The railroads that are generally at risk are the light density lines which carry less than one million gross ton-miles per mile (KDOT, 2005). However, the primary contribution to abandonment comes from the extreme competition by the highway motor carriers.

According to the Kansas Rail Plan 2004-2005 by the Kansas Department of Transportation (KDOT), 1,156 miles of track were abandoned in the period between 1991 and 2004. These tracks fall into the category of Class III which implies that the abandonment application was filed with the Surface Transportation Board (STB) for abandonment (STB is responsible for all the issues related to rail affairs). Currently, a total of 45.9 rail miles are in the process of abandonment (KDOT, 2005). Abandoned rail lines will rarely be re-established (Davis, 2006). And in order to build a new rail line it will cost about $1.2 million per mile to build and that is without the cost of purchasing the land (Davis, 2006). So in order for any railroad to build a new line it would have to be profitable enough to cover the high building costs. Rural Kansans mostly rely on multimodal (short-line and/or major rail line and/or road) transportation that is achieved by the branch lines (short-line railroads) of the major railroads.

3.2.2.5 RAILROAD SHIPMENT COSTS

A railroad shipment involves any one type of commodity using different types of railroads that is either railroad-owned/leased or privately-owned/leased by means of single mode involving rail from point of origin to point of destination. The AAR gives a shipment cost index for Class I railroads which is termed as the Railroad Cost Recovery

Index (RCR). This index is comprised of ten cost components which include fixed charges (interest) in addition to nine categories for freight operating charges. Railroad shipment costs are the total costs accrued in transporting freight that is a ‘freight operating cost’. The following are the nine costs categories in detail:

(1) Labor cost – It reflects all the wages paid to the laborers including benefits and paid vacations and holidays.

(2) Fuel cost – It is the original purchase price of fuel charges for railroad operating expenses (including federal excise taxes, transportation, and handling charges) during the middle month of the quarter.

(3) Materials and supplies – It is the amount charged for about 38 items such as forest products, metal products, and other products including the four functional categories such as maintenance of products in transport, freight car items, locomotive items, and all other items. Similar to the fuel cost established above, this category reflects the price during the middle of a three-month quarter.

(4) Equipment rent cost – Rental costs due to the hiring or leasing of equipment.

(5) Purchased services – The change in any one of the following categories are indexed as railroad inputs for purchased services - index of material prices, wage rates and benefits combined, excluding fuel.

(6) Depreciation – It is the amount of depreciation for roads, locomotives, freight cars, and other equipment. It is calculated on a quarterly basis for Class I railroads.

(7) Interest – This data is supplied by the Class I railroads in quarterly surveys.

(8) Taxes, Other Than Income and Payroll – It is reflected as the amount of a price change on the property taxes and is calculated as the amount of such taxes per mile of track operated. The tax data is supplied by all Class I railroads.

(9) Other expenses – Other expenses include casualties and insurance, loss and damage, and general and administrative expenses. AAR uses an average quarterly index of these items.

3.2.2.6 ADVANTAGES AND DISADVANTAGES

Keeping in mind the literature about railroads, it is apparent that rail infrastructure has a universal perspective to serve both passengers and freight. As of 2005 Kansas ranks in the top 10 in the U.S. in the total number of rail miles covering 4,776 miles (excluding trackage rights) (AAR, 2006f). October 2005 marked the 25th anniversary of the Staggers Rail Act of 1980, which led to the deregulation of railroads and in turn improved the financial performance of railroads by investing millions of dollars in infrastructure and equipment (AAR, 2006e). The total number of local line-haul carriers and regional railroads more than doubled because of this act. The following are some of the advantages and disadvantages of railroads:

3.2.2.6.1 ADVANTAGES

- **Low fuel consumption:** According to a 2006 AAR Report, railroads are approximately three times more fuel-efficient compared to trucks (AAR, 2006c). During the last 20 years railroads have been improving their fuel efficiency. In 1980, railroads moved a ton of freight approximately 275 miles per gallon of fuel. However, 2004 saw an improved fuel efficiency of about 410 ton-miles per gallon. Further, if 10% of the current truck freight volume is directed to rail, 1 billion gallons of fuel can be saved every year (AAR, 2006c). To be more precise, the Kansas City MO- KS area would save 177 million gallons of fuel annually by 2025 (Cox, 2006).

- **Refrigeration:** The availability of refrigerated cars also provides for railroad efficiency in the transportation of processed and frozen goods. About 5 years ago BNSF railroad replaced their old rail cars with new super reefer cars that are about 90' long and which can be tracked by a Global Positioning System (GPS) (Muncy, 2006).

- **Efficient means for huge volumes:** With the provision of carload, container, and trailer freight systems, railroads can ship huge volumes making fewer trips. In general, one rail car is equivalent to 3-4 truckloads (Chopp, 2005). According to Stephen Muncy, Sr. Trainmaster and Dennis Mustoe, Superintendent of Operations for BNSF in Dodge City, KS, one hopper car of grain equals about 8 semi trucks and each train usually consists of 110 cars. It is also claimed that the intermodal sector (description in next section) has been one of the most significant contributors to rail traffic. The numbers have been increasing substantially for intermodal containers and trailers from about 3.1 million in 1980 to a massive number of 11.7 million 2005 (AAR, 2006b).

- **Environmentally friendly:** In terms of emission values, railroads have been proven more proficient over other modes of transportation. According to the US Environmental Protection Agency (US EPA), railroads account for barely 9% of nitrogen oxides (NO_x) emissions and 4% of transportation related particulate emissions (AAR, 2006c).

- **Low external costs:** It has been observed that external rail costs which include costs generated by – accidents like fatalities, injuries, and damages to property;

emissions such as air pollution and greenhouse gases; and noise is 0.24-0.25 of a cent (US) on a per ton-mile basis which is far less compared to 1.11 of a cent for trucking freight (Forkenbrock, 1999). The overall train accident rate according to a 2006 AAR Report shows a significant reduction of 62% and employee casualty rate by 77% (AAR, 2006a).

3.2.2.6.2 DISADVANTAGES

- **Huge investments:** Though deregulation has allowed for some reduction in costs, railroads need huge investments for laying infrastructure elements, especially rail (ASCE, 2005).
- **Scheduled operation:** The rigid and scheduled services of the seven large Class I freight rail carriers sometimes forms a drawback for transporting freight by rail (Rodrigue et al, 2006).
- **Double-stack shipment:** The railroads have always been famous for shipping huge amounts and in turn making fewer trips. However, with major changes taking place at some corridors in the rail industry such as double-stack container shipments over long distances, shipments by rail can prove to be a risky option because of the lack of appropriate highway bridge clearance along the existing railroad freight right-of-ways (CTPS, 2006).

3.2.3 INTERMODAL TRANSPORTATION

In general, 'intermodal' is a combination of two words. The first half inter denotes more than one and the second half mode implies means of transportation. All modes of transportation have their own advantages and disadvantages, but the concept of intermodal works in logistically linking the advantages of each type of mode (truck, rail, water, air) for a seamless distribution of freight from origin to destination (Rodrigue et al, 2006). However, there are several meanings for intermodal and in fact it is based on the definer's perspective and the context of the research. To further add, definitions are also based in regards to the shipment form implemented for commodities shipped at the international or national level that are in containers or trailers respectively (Jones et al, 2006).

In 2002, intermodal traffic reached a record high of 9.35 million intermodal containers/trailers transported, which accounted for approximately 1.4 trillion ton-miles and a growth of 0.5% compared to the year before (White, 2003). According to a 2006 Freight Railroad Administration (FRA) Report, the fastest growth in intermodal traffic is in the category of rail with the number of trailers and containers increasing significantly from an average of 3.4 million loadings in the 1980's to 11.0 million in 2004 (FRA, 2006).

3.2.3.1 OVERVIEW OF INTERMODAL (TRUCK-RAIL)

In this research, intermodal is defined as the combination of more than one transport mode (truck-rail) for accomplishing seamless shipment of meat to customers in the U.S. It implies that the commodity is initially shipped by truck from the origin (a meat processing plant) to the (local) rail intermodal facility that encompasses the shipment of the commodity in trailers or containers to the intermodal facility near its final destination wherein it is then shipped locally to the final destination by truck. According to Edward Morlok of the Department of Systems Engineering at the University of Pennsylvania in Philadelphia, PA, and Lazar Spasovic of the School of Industrial Management and Center for Transportation Studies and Research at the New Jersey Institute of Technology in Newark, NJ, the rail-truck intermodal concept can also be viewed as (empty) trailer transport with the basic intermodal unit being shipped from the intermodal yard to the customer's facility in exchange for a loaded trailer which is then returned to the original intermodal yard for rail movement to the final intermodal yard from where it eventually goes on a truck to be distributed locally. In brief this is termed as 'piggybacking' when trailers are shipped on railroad flat cars (TOFC: Trailers On Flat Cars) (Rodrigue et al, 2006). 'Containerization' is another form of shipment which is famous for its double-stacking of containers while either transporting by ship (maritime) or on rail flat cars (COFC: Container On Flat Cars) (Rodrigue et al, 2006). Later on, the empty trailers/containers can be returned to (local) intermodal terminals from the final destination (Morlok and Spasovic, 1994). Therefore, it is concluded that intermodal transportation incorporates some of the advantages of these two separate modes – truck's swiftness of hauling the commodity locally along with rail's lower shipping charges (Berwick et al, 2002). All of these intermodal units require lift services for placing the container/trailer onto the rail car. However, Norfolk Southern Rail Company developed a unique type of intermodal unit that uses rail bogies attached to trailers, effectively turning it into a railcar (Rodrigue et al, 2006).

The cost characteristics of trucking and rail are quite different. Likewise, the intermodal cost structure is unique in its own way. It reflects the sum of internal and external costs due to the intermodal facility that is (Isis, 2006):

Internal costs: This includes the administrative costs, salary of the personnel, any investment/depreciation, maintenance and repair, insurance, taxes, other expenses, loading and unloading depending on the duration of service (Isis, 2006 ; Morlok and Spasovic, 1994).

External costs: Costs resulting from accidents, noise, congestion, air pollution, fuel consumption, and climate changes accrue for external costs (Isis, 2006).

3.2.3.2 ADVANTAGES AND DISADVANTAGES

Keeping in view the disadvantage scenarios of the two modes in the previous sections, intermodal seems to ease the drawbacks encountered from these modes. The deployment of rail-truck intermodal service makes use of the truck's increased security concerns about the assets accompanied by the rail's economic feature. Additionally, there will be an increase in returns from public and private infrastructure investments (Berwick et al, 2002). The following are some of the advantages and disadvantages of an intermodal facility:

3.2.3.2.1 ADVANTAGES

- **Overcome Driver Shortage:** It is hard for people to adjust to life as a truck driver of continuously being on the road and away from home for extended periods of time. This has been seen as one of the primary reasons for the driver shortage (Morlok and Spasovic, 1994). This problem can be solved by facilitating an intermodal service at both ends of the origin and destination of the shipment, which eventually reduces the burdens of long driving. Thus the driver spends less time driving because he/she will only travel locally either between the origin intermodal terminals or the final intermodal terminals.
- **More Constant Rates:** The rates of truck and railroad shipping charges always vary depending on fuel costs, and the other factors discussed in the cost structure section. However, intermodal rates are more constant. Moreover, due to the various pool of reasons like driver scarcity or due to heavy (seasonal) demand trucks might not be ready for freight shipment, but trains run most of the time thus the intermodal option is always open (Piatak, 2002).
- **Increased Containerization:** The concept of double-stacking containers on rail flat cars not only revolutionized the industry by increasing the productivity of the mode, but also accounted for increased volumes of container shipments. Thus, shippers view double-stacking as a high quality service with reduced shipping costs along with parallel investments from trucking and shipping companies for container fleets (Morlok and Spasovic, 1994). This has resulted in huge quantities of freight shipment by intermodal (truck-rail) containerization.

- **Environmentally Friendly:** It is apparent that compared to the unimodal transportation of truck or rail, intermodal utilizes advantages offered by different modes to effectively distribute commodities including the reduced emssions of using railroads for the major of the transport of freight (Morlok and Spasovic, 1994; Berwick et al, 2002).

3.2.3.2.2 DISADVANTAGES

- **Slower:** Considering the straight truck or rail option, most shippers believe that an intermodal option would sometimes increase the delivery time depending on the destination (Piatak, 2002). Additionally, according to Stephen Muncy, Sr. Trainmaster/Road Foreman for BNSF in Dodge City, KS, companies typically receive better and faster service from the trucking companies (Muncy, 2006).
- **Location Factors:** Sometimes the intermodal loading facility is a considerable distance from the origin or destination of the shipment and often results in insufficient railroad alternatives and/or accessibility to the National Highway System. An intermodal facility located on a Class I railroad line would be ideal (Berwick et al, 2002).
- **Huge Investments:** After considerable research on the building of an intermodal facility, it is important that there must be enough demand to meet the constantly staffed services of an intermodal facility (Muncy, 2006). Huge investments are made on providing the intermodal facility. The operational costs and lift services (for lifting the container) are also expensive (Berwick et al, 2002). These facilities are very large with a lot of technology instituted into them, and the overall returns depend on the amount of traffic/demand (Muncy, 2006). Furthermore, in order for an intermodal facility to benefit

a region it must have an uninterrupted flow of traffic in order to obtain enough capital funding and operating revenues to maintain consistent service (Berwick et al, 2002).

3.3 HIGHWAY AND BRIDGE MAINTENANCE

3.3.1 Fundamentals of Highway and Bridge Maintenance

"Highway maintenance" is defined as the function of preserving, repairing, and restoring a highway and keeping it in condition for safe, convenient, and economical use. "Maintenance" includes both physical maintenance activities and traffic service activities. The former includes activities such as patching, filling joints, and mowing. The latter includes painting pavement markings, erecting snow fences, removing snow, ice, and litter. Highway maintenance programs are designed to offset the effects of weather, vandalism, vegetation growth, and traffic wear and damage, as well as deterioration due to the effects of aging, material failures, and construction faults (Wright and Dixon, 2004).

Commonly identified pavement distress associated with heavy vehicles can be characterized as fatigue cracking and rutting. On rigid pavements, damage exposes itself as transverse cracking, corner breaking, and cracking on the wheel paths. Flexible pavements and granular roads are mostly susceptible to rutting. In all cases, cracking and rutting increases pavement roughness and leads to poor pavement performance and reduces pavement life.

Trucking has become the most popular mode of freight transportation because of its efficiency and convenience, but has resulted in increased highway maintenance costs nationwide. Better understanding the problem of pavement and bridge damage caused by heavy vehicles helps to mitigate governmental budgetary concerns. So far, a majority of research has been devoted to the study of the pavement and bridge damage associated with heavy vehicles. Ten studies are summarized in this section as shown in Table 3.3.

Table 3.3: List of Research Projects on Highway and Bridge Maintenance

No.	Researcher(s)	Study Subject	Data Scope	Funding Agency
1	Castaneda	Causes of excessive damage to bridge decks	Alabama	Alabama Department of Transportation
2	Owusu-Ababio et al.	Effects of heavy loading on concrete pavement	Wisconsin	Wisconsin Department of Transportation
3	Phares et al.	Impacts of heavy agriculture vehicles on pavements and bridges	Minnesota	Minnesota Department of Transportation
4	Mrad et al.	Literature review on issue of vehicle/road interaction	N/A	Federal Highway Administration
5	Sebaaly et al.	Impact of agricultural equipment on low-volume roads	South Dakota	South Dakota Department of Transportation
6	Wang et al.	Road fatigue damage analysis using traffic data	Florida	Florida Department of Transportation
7	Salgado et al.	Effects of super-single tires on subgrades	Indiana	Indiana Department of Transportation
8	Elseifi et al.	Pavement responses to a new generation of single wide-base tires	Virginia	Virginia Department of Transportation
9	Freeman et al.	Pavement maintenance associated with different weight limits	Virginia	Virginia Department of Transportation
10	Roberts et al.	Economic impact of overweight permitted vehicles	Louisiana	Louisiana Department of Transportation and Development

Castaneda (1997) conducted a study to determine the causes of excessive damage to Alabama bridge decks that required early bridge replacements. Possible causes of the damage could be due to the use of slender decks, heavy truck loadings, and service load stresses. To assess the significance of these causes, five damaged decks and five reasonably undamaged decks were investigated. These bridge decks were analyzed using condition surveys, weigh-in-motion surveys, finite-element analyses, and load tests. The researcher found that measured axle group loads for damaged decks were significantly higher than those for undamaged decks, and thus truck loading was determined to be a major cause of deck damage. In addition, damaged decks had higher slenderness ratios than undamaged decks, which indicated that excessive slenderness was another major cause.

In 2001, the Wisconsin Department of Transportation District 7 filed a Report of Early Distress for a 6.5-mile stretch of USH 8 and an 8-mile stretch of USH 51 near Rhinelander, WI (Owusu-Ababio et al. 2005). An investigation of the causes for the premature failures concluded that overloaded logging trucks were a key factor leading to the early failure of the doweled jointed plain concrete pavements (JPCP). Based on the recommendations from this report, Owusu-Ababio et al. (2005) developed design guidelines for heavy truck loading on concrete pavements in Wisconsin.

Over the past few decades, as the number of larger farms has increased and farming techniques continuously improve, it is common throughout the nation to have single-axle loads on secondary roads and bridges that exceed normal load limits during harvest cycles (typical examples are grain carts and manure wagons). Even though these load levels occur only during a short period of time during year, they may still significantly damage pavements and bridges. Phares (2004) conducted a synthesis study to identify the impacts of heavy agriculture vehicles on Minnesota highway pavements and bridges. The researchers synthesized the technical literature on heavy-vehicle pavement impact provided by the Minnesota Department of Transportation (Mn/DOT) Research Services Section, which included pavement deterioration information and quantitative data from Minnesota and other Midwestern states. Based on the literature synthesis, the researchers found that the performance characteristics of both rigid and flexible pavements were adversely affected by overweight implements, and the wide wheel spacing and slow moving characteristics of heavy agricultural vehicles further exacerbated the damage on roadway systems. The researchers also found that two structural performance measures including bending and punching were used in the literature for evaluating the impact of agricultural vehicles on bridges. The comparison between the quantified structural metrics of a variety of agricultural vehicles and those of the bridge design vehicle showed that 1) the majority of the agricultural vehicles investigated created more extreme structural performance conditions on bridges when considering bending behavior, and 2) several of the agricultural vehicles exceeded design vehicle structural performance conditions based on punching.

Many studies have been done to understand the interaction between trucks and pavement damage. Mrad (1998) conducted a literature review on these studies as a part of the Federal Highway Administration (FHWA) Truck Pavement Interaction research program on truck size and weight. This review focused on the study of spatial repeatability of dynamic wheel loads produced by heavy vehicles and its effect on pavement damage. The review included several studies identifying the effects of the environment, vehicle design, characteristics and operating conditions on pavement damage. According to the review, suspension type and characteristics, as well as tire type and configuration, were major contributors to pavement deterioration. The literature review also made remarks on the relationship between spatial repeatability of dynamic wheel forces, suspension type, and road damage.

Different types of vehicles cause different types of damage to pavements. Vehicle loading on a particular highway pavement or bridge is highly related to axle weight and configuration. Sebaaly (2003) evaluated the impact of agricultural equipment on the actual response of low-volume roads. In this evaluation process, a gravel pavement section and a blotter pavement section were instrumented in South Dakota and tested under agricultural equipment. Each section had pressure cells in the base and subgrade, and deflection gauges to measure surface displacement. Field tests were carried out in 2001 in different conditions. Test vehicles included two terragators (specialized tractor used to fertilize crops), a grain cart, and a tracked tractor. The field testing program collected the pavement responses under five replicates of each combination of test vehicle and load level, and compared with those responses under the 18,000-lb single-axle truck which represented the 18,000-lb equivalent single-axle load (ESAL) in the American Association of State Highway Transportation Officials (AASHTO) design guide. Data were examined for repeatability, and then the average of the most repeatable set of measurements were calculated and analyzed. Results indicated that agricultural equipment could be significantly more damaging to low-volume roads than an 18,000-lb single-axle truck, and the impacts depended on factors such as season, load level, thickness of crushed aggregate base of roads, and soil type. The study recommended that an agency could effectively reduce this impact by increasing the thickness of the base layer and keeping the load as close to the legal limit as possible.

Heavy trucks also affect the service life of highway bridge superstructures. Bridge damage typically occurs in the bridge deck and in the main superstructure elements. Wang (2005) conducted a study to synthesize truck traffic data collected through weight-in-motion (WIM) measurements in order to establish live-load spectra and to perform fatigue damage analysis. In this study, six multi-girder steel bridges with spans ranging from 35 ft. to 140 ft. were analyzed. Three-dimensional nonlinear mathematical models of typical trucks with significant counts were developed based on WIM data. Road surface roughness was simulated as transversely correlated random processes using the autoregressive and moving average model. The dynamic impact factor was taken as the average of 20 simulations of good road roughness. Then live-load spectra were obtained by combining static responses with the calculated impact factors. Fatigue damage analysis was performed according to Miner's linear damage rule. A case study of the normal traffic from a specific site on interstate 75 was illustrated. Static analysis indicated that truck traffic-induced flexural stress at the midspan and shear at the entrance end vary with bridge span length. Several of the heaviest truck types generated more loading on bridge structures than the AASHTO standard design truck HS20-44. The comparison of fatigue damage accumulation demonstrated that four types of trucks contributed the most to the fatigue damage, typically ones with either 4 or 5 axels.

Recently, super-single tires have gradually been replacing conventional dual tires due to their efficiency and economic features. However, earlier studies on previous generations of single wide-base tires have found that the use of super-single tires would result in a significant increase in pavement damage compared to dual tires. Salgado (2002) investigated the effects of super-single tires on subgrades for typical road cross-sections using plane-strain (2D) and 3D static and dynamic finite-element (FE) analyses. The analyses focused on the sand and clay subgrades rather than on asphalt and base layers. The subgrades were modeled as saturated in order to investigate the effects of pore water pressures under the most severe conditions. By comparing the difference of strains in the subgrade induced by super-single tires with those induced by dual tires for the same load, the effects of overlay and subgrade improvements were investigated. Several FE analyses were done by applying super-heavy loads (those which occurred in Texas during the 1990s) to the typical Indiana pavements using elastic-plastic analyses in order to assess the performance of the typical pavements under the super heavy loads. The analyses examined that super-single tires caused more damage to the subgrade and the current flexible pavement design methods were inferior considering the increased loads by super-single tires. In addition, the researchers addressed several recommendations to improve the pavement design method that would decrease the adverse effects of super-single tires on the subgrades.

Elseifi (2005) measured pavement responses to a new generation of single wide-base tire compared with dual tires. The new generation of single wide-base tires has a wider tread and a greater load-carrying capacity than conventional wide-base tires, which therefore have been strongly supported by the trucking industry. The primary objective of this study was to quantify pavement damage caused by conventional dual tires and two new generations of wide-base tires (445/50R22.5 and 455/55R22.5) by using FE analysis. Fatigue cracking, primary rutting, secondary rutting, and top-down cracking were four main failure mechanisms considered in this pavement performance analysis. In the developed FE models, geometry and dimensions were selected to simulate the axle configurations typically used in North America. The model also considered actual tire tread sizes and applicable contact pressure for each tread, and incorporated laboratory-measured pavement material properties. The researchers calibrated and validated the models based on stress and strain measurements obtained from the experimental program. Pavement damage was calculated at a reference temperature of 77 F and at two vehicle speeds (5 and 65 mph). Results indicated that the new generations of wide-base tire would cause the same or relatively greater pavement damage than conventional dual tires.

Since heavy trucks cause more damage to highways and bridges, it is of interest to federal and state legislatures whether the current permitted weight limit reflects the best tradeoff between trucking productivity and highway maintenance cost. A study (Freeman et al. 2002) was mandated by Virginia's General Assembly to determine if pavements in the southwest region of the state under higher allowable weight limit provisions had greater maintenance and rehabilitation requirements than pavements bound by lower weight limits elsewhere. This study included traffic classification, weight surveys, an investigation of subsurface conditions, and comprehensive structural evaluations, which were conducted at 18 in-service pavement sites. Visible surface distress, ride quality, wheel path rutting, and structural capacity were measured during 1999 and 2000. Subsurface investigation was conducted at each site in October 1999 to document pavement construction history and subgrade support conditions. In addition, a survey consisting of vehicle counts, classifications, and approximate measurements of weights was carried out to collect site-specific information about traffic volume and composition. The results were used to estimate the cost of damage attributed only to the net increase in allowable weight limits. The study concluded that pavement damage increased drastically with relatively small increases in truck weight, which was consistent with similar studies. The cost of damage to roadway pavements in those counties with a higher allowable weight limit was estimated to be $28 million over a 12-

year period, which did not include costs associated with damage to bridges and motorist delays through work zones, etc.

In Louisiana, Roberts (2005) completed a study to assess the economic impact of overweight permitted vehicles hauling timber, lignite coal, and coke fuel on highways and bridges. First, researchers identified that approximately 1,400 control sections on Louisiana highways carried timber, 4 control sections carried lignite coal, and approximately 2,800 bridges were involved in the transport of both of these commodities. Second, a calculation methodology was developed to estimate the overlays required to support the transportation of these commodities under the various gross vehicle weight (GVW) scenarios. Three different GVW scenarios were selected for this study including: 80,000 lbs., 86,600 lbs. or 88,000 lbs., and 100,000 lbs. Last, the methodology for analyzing the effect of these loads on pavements was developed and it involved determining the overlay thickness required to carry traffic from each GVW scenario for the overlay design period. The method for analyzing the bridge costs was developed by 1) determining the shear, moment and deflection induced on each bridge type and span, and 2) developing a cost of repairing fatigue damage for each vehicle passage with a maximum tandem load of 48,000 lbs. This analysis showed that 48-kip axles produced more pavement damage than the current permitted GVW for timber trucks and caused significant bridge damage at all GVW scenarios included in this study. The researchers recommended that the legislature eliminate the 48-kip maximum individual axle load and keep GVWs at the current level, but increase the permit fees to sufficiently cover the additional pavement costs produced by these present overweight vehicles.

3.3.2 Maintenance Level of Service

Highway agencies spend large sums of money to maintain their facilities. It is important to ensure the long-term operation of these investments not only from a cost-effectiveness standpoint, but also from the standpoint of providing an efficient infrastructure for normal traffic flow. Pavement performance evaluation is central to a Pavement Management System (PMS) supporting the maintenance decision-making processes. The highway maintenance level of service (LOS), expressed as a pavement serviceability rating system, provides definite criteria for maintenance work to define the way a highway should look or function as a result of the maintenance efforts for the various levels. Generally, all the roadways or sections are classified into different service levels based on their physical conditions and operational/delay experience. Many states use different letters or numbers to describe different LOS, for example, the Washington Department of Transportation uses a scale of “A” through “F” to represent a very high LOS to a very low LOS.

The measurement of pavement serviceability has increased in importance since the concept was developed at the AASHO Road Test (1956-1960). This is because the pavement condition relates directly to the road users experience and the costs associated with travel including vehicle operation, delay, and crash expenses. Currently, the two most popular measures of the pavement condition ratings include: the Present Serviceability Index (PSI) and the International Roughness Index (IRI). They provide universal ways to quantify pavement conditions. The PSI, used in the Present Serviceability Rating (PSR) system, is a subjective rating index based on a scale of 0 to 5. The IRI measures the cumulative deviation from a smooth surface in inches per mile and was adopted by the Federal Highway Administration (FHWA) in 1993 because of its objectiveness and worldwide popularity. The following section focuses on developments related with these measurements and the studies reviewed are listed in Table 3.4.

Table 3.4: List of Research Projects on Level of Service

No.	Researcher(s)	Study Subject	Data Scope	Funding Agency
1	Gulen et al.	Statistical models of PSI and IRI correlation	Indiana	Indiana Department of Transportation
2	Al-Omari and Darter	Relationships between PSR, IRI and pavement condition	Six states	N/A
3	Liu and Herman	New PSI model applying psychophysical law to describe the human response	Texas, Canada etc.	N/A
4	Liu and Herman	New model linking roadway profile and vehicle response	United States	N/A
5	Yu et al.	IRI threshold values for local roads with various speed limits	N/A	N/A
6	Mok and Smith	Relationship between Pavement Condition Index (PCI) and PSR	California	Metropolitan Transportation Commission
7	Boriboonsomsin et al.	New pavement performance index combined ride quality with surface distress.	Ohio	Ohio Department of Transportation

Previous research showed that subjective ratings such as PSI could be reasonably predicted from IRI. Gulen (1994) conducted a study to search statistically realistic models for PSI and IRI correlation. Ten randomly selected subjects rated one-mile-long test sections at three roughness levels for both concrete and asphalt pavements. Two nearly identical cars were used for the PSI rating and each subject rated the 20 test sections as a driver and as a front-seat passenger. Each rater assigned a PSI value between 0 and 5 for each test section and marked whether the ride was acceptable. The IRI of each test section was measured by a van equipped with non-contact laser sensors. The statistical analyses indicated that the PSI rating observations were normally distributed, the variances were homogeneous, and the position of the rater in the car was not significant. Then the average PSI ratings and IRI values of the test sections were used for model searches. Simple linear and exponential models were obtained to fit the data with R^2 values ranging from 0.8 to 0.95. The models could simplify the prediction of PSI values from collected IRI data.

Al-Omari and Darter (1994 and 1995) conducted studies to determine the relationships between PSR, IRI, and pavement condition. The first phase of these studies concentrated on the development of a relationship between IRI and PSR for pavement types included in the Highway Performance Monitoring System (HPMS) database. A predictive model for PSR as a function of profile IRI was developed for flexible, rigid, and composite (asphalt over concrete) pavements, using the data from Louisiana, Michigan, New Jersey, New Mexico, Indiana and Ohio. After entering the data into a Statistical Analysis System, a nonlinear model was found by using regression analysis to best fit the boundary conditions and actual data. The second phase of this study focused on the relationship between IRI and various pavement distress types. In this phase, data from the Long-Term Pavement Performance (LTPP) database, including IRI and pavement distresses, were analyzed to determine the relationships of key distress types to IRI and critical levels for rehabilitation. These results were helpful in the HPMS analytical process to achieve improved and consistent estimates of the current conditions and to meet future highway pavement rehabilitation needs.

PSI can be expressed on a scale of 0 to 5 as the sum of a logarithmic function of slope variance, a quadratic function of mean rut depth, a square root function of cracks and patches, and a random error term using the AASHO road test data. These functional forms have been used widely although they yield intercept values for PSI over

5 and some other nonphysical results for both rigid and flexible pavement. To overcome these limitations, Liu and Herman (1996) proposed a new methodology dealing with the test data by applying Fechner's psychophysical law, which was obeyed by many of the functional relationships describing human responses to external physical stimuli. The new PSI model was for both rigid and flexible pavements in terms of simple summations of the logarithms of roadway surface variables and the results were encouraging from both physical and analytical points of view. The validation of the model was confirmed by applying it to explain various types of data sets, e.g., AASHO road test data, Texas road test data, Canadian road test data, and the international road roughness (IRRE) experiment.

PSI, with various names such as serviceability index (SI) and riding comfort index (RCI), has been an important subject for a long time. Other dynamic indexes characterizing a roadway such as the IRI, averaged rectified slope (ARS), and averaged rectified speed (ARV) have been proposed and studied. However, the roles played by these indexes in the interaction between road, vehicle, and human ratings have not been made clear. Liu and Herman (1997) presented a unified physical model linking the static profile of a roadway and the dynamic response of a vehicle to the profile of the serviceability index of the roadway. After analytical expressions for jerk index, acceleration index, ARV, ARS, and IRI were derived from the developed model in terms of the physical parameters for the roadway and the dynamic characteristics of a vehicle, a linear model relating the PSI to the logarithm of the jerk index was developed. This model was later linked to a roadway profile and vehicle dynamics in response to the profile of the human ratings. It was shown that in a moving vehicle the user-sensitive quantity was the vertical jerk experienced by users in the vehicle. The linear functional form of PSI was verified by applying a total of 74 profile datasets collected for an NCHRP project (1988). Other dynamic indexes were analyzed with the same method and the results indicated that the model correctly predicted and explained the human rating of ride quality and the jerk experienced by raters in a moving vehicle.

As a road roughness index, IRI has been used on highways for nearly two decades, but it is not applicable to local streets. Since vehicle speeds are lower on local streets, a comfortable ride can still be achieved at higher IRI values. Yu (2006) conducted a study to determine the acceptable IRI threshold values for local streets with various speed limits. The researchers found that human ratings depended linearly on the logarithm of the rate of change of the vertical acceleration, namely jerk or jolt, experienced by the raters. By analyzing the IRI records in the LTPP database and the corresponding calculated jerks, the authors found that jerk was linearly proportional to IRI of a given speed and approximately linearly proportional to the travel speed for a given IRI. By further assuming that the same jerk would lead to the same ride quality and interstate highways were operated at 120 km/h (75 mph), the researchers used the jerk corresponding to the IRI thresholds set by FHWA for highways to develop speed-related ride quality thresholds at different travel speeds. Such IRI threshold values would be useful for local pavement management officials to objectively compare the ride quality of streets with different speed limits.

Instead of the national basis, specific pavement performance measures need to be identified by highway agencies in order to meet specific policy goals or objectives. The Bay Area pavement condition index (PCI) is the primary condition measure in the

PMS used by the San Francisco Bay Area Metropolitan Transportation Commission (MTC) in Oakland, CA, which is based on distress types, severities, and quantities. However, the local agencies that use the Bay Area PMS have to frequently submit PSR data for a sample of their network as well as for use in the HPMS, a database used by FHWA, to support the decision-making process on highway matters on a nationwide level. Mok and Smith (1997) conducted a study to develop mathematical models to relate the PCI used in the Bay Area PMS to the PSR for FHWA's HPMS reports. Regression equations were developed to predict the PSR values from Bay Area PCI values and subcomponents of the PCI. These equations had R^2 values that showed moderate to strong relationships between the HPMS PSR and the MTC PCI. They provided reasonable values at or near the boundaries of the PSR scale. The local agencies using the Bay Area PMS could use these equations to estimate a PSR value from the PCI data without inspecting pavement sections a second time.

Some states have started using a combination of visible surface distress and ride quality, instead of being based on only one of them, to better rate pavement conditions. Boriboonsomsin (2006) developed a new performance index that incorporated aspects of ride quality together with surface distress. The proposed index, named the Pavement Quality Index (PQI), combined the IRI and the Pavement Condition Rating (PCR). The latter was based on surface distress and had currently been used by the Ohio Department of Transportation (ODOT) for project selection. The new index was a natural extension of a growing trend that transportation agencies have been placing increased emphasis on customer satisfaction and introducing performance-based specifications. Another advantage of this new index was that, it did not require any new measurements or methods; rather, it simply utilized procedures that were already in place and well established in Ohio.

3.3.3 Maintenance Costs

A total of about 4,000,000 miles of roads, including 46,572 miles of Interstate highways and over 100,000 miles of other national highways, form the backbone of the United States highway infrastructure. Careful planning considerations and wise investment decisions are necessary for the maintenance of the nation's massive infrastructure to support the level of operations and provide a satisfied degree of serviceability. Studies have found that trucks place heavy loads on pavement, which leads to significant road damage, therefore resulting in increased highway maintenance costs nationwide. Several studies addressing this issue are summarized in this section, as listed in Table 3.5.

Table 3.5: List of Research Projects on Maintenance Costs

No.	Researcher(s)	Study Subject	Study Scope	Funding Agency
1	Boile et al.	Infrastructure costs associated with heavy vehicles	New Jersey	New Jersey Department of Transportation
2	Martin	Road wear cost for thin bituminous-surfaced arterial roads	Australia	Austroads (association of state and federal road agencies)
3	Hajek et al.	Pavement cost changes in new regulations of truck weights and dimensions	Ontario, Canada	N/A
4	Babcock et al.	Road damage costs related to the abandonment of shortline railroads	Western and central Kansas	Kansas Department of Transportation
5	Lenzi et al.	Road damage costs resulting from drawdown of the lower Snake River.	Washington	Washington Department of Transportation
6	Russell et al.	Road damage costs related to the abandonment of railroad branchline	South and western Kansas	Kansas Department of Transportation
7	Tolliver et al.	Road damage cost associated with the loss of rail service	Washington	Washington Department of Transportation

Boile (2001) conducted a study on infrastructure costs attributable to heavy vehicles. The first objective of this study was to review literature and determine the availability of methods for estimating highway maintenance costs attributable to bus and truck traffic in New Jersey, along with the availability of existing data. The second objective was to determine the existence and availability of methodologies to estimate the impact of different types of buses on the highway infrastructure. Two broad areas of related literature were reviewed in the study: the first , highway cost allocation studies, dealt with estimating highway related costs attributable to heavy vehicles; and the second dealt with the development of models to estimate pavement deterioration as a result of vehicle-pavement interactions. The currently existing highway cost allocation studies can be categorized into four groups: cost-occasioned approaches, benefit-based approaches, marginal cost approaches, and incremental approaches. A federal, as well as several state highway cost allocation studies, were reviewed in this research and all of them used cost-occasioned approaches. The approaches used in these studies varied in data requirements, ease of use and update, and output detail. Regarding pavement deterioration estimation, several types of models have been developed for flexible and rigid pavements including statistical models, subjective models, empirical deterioration models, mechanistic/empirical models, and mechanized models. The authors reviewed several new models and software packages in the following subsections to demonstrate how pavement deterioration models work. After the review on these two broad subjects, the researchers then further reviewed the literature addressing bus impact on pavements. Finally, the researchers concluded that: 1) performing a cost allocation study would be highly recommended since it could help develop a clear picture of the cost responsibility of each vehicle class and decide whether changes need to be made in order to charge each vehicle class its fair share of cost responsibility. 2) Two of the statewide cost allocation approaches might provide useful guidelines in developing a relatively easy to use and updated model. This research also presented a proposed method for estimating bus impacts on New Jersey highways, which was based on estimates of ESALs with a step-by-step guide on how to apply this method.

The load-related road wear is considered to be an approximation for the marginal cost of road damage. Due to their high axle loads, heavy vehicles are considered to be primarily responsible for road wear. Martin (2002) estimated the road wear cost for thin bituminous-surfaced arterial roads in Australia were based on the following two approaches: 1) a statistical relationship between the road maintenance costs and a heavy-vehicle road-use variable; and 2) a pavement deterioration model that estimated the portion of load-related road wear based on pavement deterioration predictions for thin bituminous-surfaced granular pavements. The data used in this study were collected from the following sources covering all Australian states: 1) 255 arterial road samples, composed of 171 rural and 84 urban samples, varying in average length from 30 km (18.6 miles) (rural) to 0.15 km (0.09 miles) (urban); 2) three years of maintenance expenditure data in estimating the annual average maintenance cost at each road sample; and 3) estimates of road use at each road sample. The study found that the recent estimates for road wear cost varied from 55% to 65% attributable to heavy vehicles for the average level of traffic loading on the bituminous surfaced arterial road network of Australia. The researchers suggested that the fourth power law-based ESAL road-use variable could be used for attributing the road wear costs.

Hajek (1998) developed a marginal cost method for estimating the pavement cost from proposed changes in regulations governing truck weights and dimensions in Ontario, Canada. The procedure was part of a comprehensive study undertaken by the Ontario Ministry of Transportation in response to government and industry initiatives to harmonize Ontario's truck regulations with those in surrounding jurisdictions. The study investigated the individual impacts of four proposed alternative regulatory scenarios. The differences between the scenarios were relatively small and were directed only at trucks with six or more axles. The procedure for assessing pavement costs consisted of three phases: 1) identification of new traffic streams; 2) allocation of new traffic streams to the highway system; and 3) cost impact of new traffic streams on the pavement network. The marginal pavement cost of truck damage was defined as a unit cost of providing pavement structure for one additional passage of a unit truckload (expressed as ESAL). The marginal pavement costs were calculated as annualized life-cycle costs and expressed as equivalent uniform annual costs (EUACs). The study concluded that: 1) the marginal cost method could be used to quantify relatively minor changes in axle weights and pavement damage caused by any axle load, or axle load arrangement for both new and in-service pavements; and 2) the highway type (or truck volumes associated with the highway type) had a major influence on marginal cost.

Babcock (2003) conducted a study to estimate the road damage costs caused by increased truck traffic resulting from the proposed abandonment of shortline railroads serving western and central Kansas. The study area included the western two-thirds of the state. The four shortlines assumed to be abandoned were: the Central Kansas Railroad (CKR), the Kyle Railroad, the Cimarron Valley Railroad (CVR), and the Nebraska, Kansas and Colorado Railnet (NKC). Their objective was achieved in three steps. First, a transportation cost model was developed to compute how many wheat car loadings occurred at each station on each of the four-shortline railroads in the study area. Then, the shortline railroad car loadings at each station were converted to truckloads at a ratio of one carload equal to four truckloads. Finally, a pavement damage model presented by Tolliver (2000) was employed to calculate the additional damage costs for county and state roads attributable to the increased grain trucking due to shortline abandonment. The study also used a time decay model and an ESAL model to examine how increased truck traffic affected pavement service life. Pavement data inputs required by the models used in this study included designation as U.S., Kansas, or Interstate highway, transportation route number, beginning and ending points of highway segments by street, mile marker, or other landmarks, length of pavement segment, soil support values, pavement structural numbers, annual 18-kip traffic loads, and remaining 18-kip traffic loads until substantial maintenance or reconstruction. These data were obtained from the KDOT CANSYS database. The road damage cost resulting from abandonment of the study area short line railroads could be divided into two parts: phase I impact generated by truck transportation of wheat from farms to county elevators; and phase II impact as the road damage costs of truck transportation of wheat from county elevators to shuttle train stations and terminal elevators. The study found that the shortline railroad system in the study area annually saved Kansas $57.8 million in road damage costs.

In eastern Washington, grain shippers were utilizing the Lower Snake River for inexpensive grain transportation. However, the longer truck-barge grain transportation resulted in higher damage costs for the principal highways in this geographical area. Lenzi (1996) conducted a study to estimate the deduction of the state and county road damage costs in Washington from a proposed drawdown of the Lower Snake River. The researchers proposed two potential drawdown scenarios. Scenario I assumed that the duration of drawdown was from April 15 to June 15; and scenario II assumed that the duration of the drawdown was from April 15 to August 15. During the drawdown, trucking would be the only assumed shipping mode to the nearest elevators with rail service. Since the average length of haul for a truck was estimated as 15 miles compared with 45 miles for truck-barge movements, the shifting from truck-barge mode to truck-only mode would result in less truck miles traveled and thus would cause a significant reduction of highway damage. Based on a series of assumptions suggested by similar studies, the total road damage costs before the Lower Snake River drawdown was estimated as $1,257,080. The road damage cost after the scenario I drawdown was calculated in a similar manner as $459,770, or 63% less than the pre-drawdown cost. For scenario II, the drawdown was estimated to be able to reduce road damage costs by $1,225,540, or 63% than the pre-drawdown costs which was estimated as $3,352,240. The researchers concluded that with adequate rail car supply, both drawdown scenarios would decrease the system-wide highway damage costs although certain roadways might experience accelerated damages.

Russell (1996) conducted a study to estimate potential road damage costs resulting from hypothetical abandonment of 800 miles of railroad branchline in south central and western Kansas. First, the researchers adopted a network model developed by Chow (1985) to measure changes in grain transportation due to railroad abandonment. The model contained 400 simulated farms. The objective function of this model was to minimize the total transport cost of moving Kansas wheat from the simulated farms to county elevators, then from county elevators to Kansas terminals, and then from Kansas terminals to export terminals in Houston, TX. The model was employed for both the base case (Truck and railroad wheat movements assuming no abandonment of branchlines) and the study case (after the abandonment of branchilines). Then the researchers measured the pavement life of each highway segment in ESALs using HPMS pavement functions. Finally, they estimated road damage in ESALs for each type of truck by using the AASHTO traffic equivalency functions. Results indicated that farm-to-elevator road damage costs before abandonment totaled $638,613 and these costs increased by $273,359 after abandonment. Elevator-to-terminal road damage costs before the abandonment were $1,451,494 and increased by $731,231 after the abandonment. Thus the total abandonment related road damage costs added up to $1,004,590.

Tolliver (1994) developed a method to measure road damage cost associated with the decline or loss of rail service in Washington. Three potential scenarios were assumed in the study: 1) the system wide loss of mainline rail services in Washington; 2) the loss of all branchline rail service in Washington; and 3) all growth in port traffic was diverted to trucks due to potential railroad mainline capacity constraints. The study used AASHTO procedures to estimate pavement deterioration rates and HPMS damage functions to measure the pavement life of highway segments in ESALs. The research objective was achieved in the following steps: 1) defining the maximum feasible life of an impacted pavement in years, 2) determining the life of a pavement in terms of traffic by using a standard measurement of ESALs, 3) computing the loss of PSR from a time decay function for a typical design performance period, 4) calculating an average cost per ESAL, and 5) computing the avoidable road damage cost if the railroads were not abandoned. For scenario 1), the researchers estimated that the incremental annual pavement resurfacing cost would be $65 million and annual pavement reconstruction cost would be $219.6 million. For scenario 2), the study found that the annual resurfacing costs ranged from $17.4 to $28.5 million and the annual reconstruction cost varied from $63.3 million to $104 million with different truck configurations. In scenario 3), the incremental annual pavement resurfacing costs would be $63.3 million and the annual reconstruction cost was $227.5 million.

3.4 CHAPTER SUMMARY

Chapter 2 is the literature review portion of this report. The purpose of this chapter was to become acquainted with the meat processing and related industries and the transportation modes used for these industries. It gives background information on the state of practices of the meat processing industry, feed yards, and grain components. The background information for these industries includes the basic inputs for the industries and how they are interconnected. This chapter also includes background information on the different transportation modes used in these industries, such as the railroad, trucking, and intermodal industries. The background in these sections includes a brief history, the components which make up each mode, and the advantages and disadvantages of each. The final section of the chapter is a review of highway and bridge maintenance. This section gives an overview of highway and bridge maintenance by reviewing past research projects on the causes of highway and bridge maintenance, differences between levels of service for highway and bridge maintenance, and the costs of highway and bridge maintenance. This chapter leads into Chapter 3 on data collection and gives the research team an idea of what information is needed to achieve the objectives of the project.

Chapter Four - DATA COLLECTION

4.1 DATA COLLECTION PROCEDURE

In order to thoroughly understand the meat processing industry, the research team conducted visits to the four major components of the industry. These industries are feed yards, meat processors, trucking carriers, and railroads. These industries are either direct participants in the preparation of the final products (i.e., beef and other meat related products) or are the transportation providers that are most widely utilized to transport these products.

The first site visit involved becoming familiar with the industry's background which prompted the need to account for the quantities of feed grain transported apart from considering the population of cattle, beef and beef byproducts transported in and out of the region. However, the second site visit involved acquiring more specific information from the packers and trucking carriers. Future growth projection trends were also researched by visiting the Grant County Chamber of Commerce in Ulysses, KS.

Apart from the two site visits to these industries, data collection also involved local site visits to the Kansas Livestock Association (KLA) and the Kansas Motor Carrier Association (KMCA), phone interviews with BNSF Railway, Union Pacific (UP), Kindsvater Trucking, and Tyson Fresh Meats and a literature search on websites, research reports, and other publications.

4.2 PRELIMINARY DATA COLLECTION

Prior to the two visits to the southwest Kansas region, feed yard information was collected by conducting a search over the Internet and from information received from the Kansas Department of Health and Environment (KDHE, 2006). Below is the feedyard information that was collected:

- Facility name;
- Location address;
- Location city;
- County;
- Latitude and longitude;
- Type of cattle – finished; feeder
- Type of operation – finishing feedlot, cow-calf, starter feedlot

Figure 4.1 presents feed yards in Kansas, while Figure 4.2 shows feed yards in southwest Kansas. Figures 4.3 and 4.4 indicate the highway and railroad network along with feed yards in the entire state of Kansas and the southwest Kansas region, respectively. The detailed description of feed yards is included in Appendix IV. The highway and railroad network data file covering the Kansas region shown in the figures was acquired through a database from KDOT.

The remainder of this chapter explains the data obtained from the two site visits in southwest Kansas, local site visits, and phone interviews which were later used for analyzing the traffic volumes due to the meat processing industry and related industries.

4.3 FIRST SITE VISIT

The first site visit involved interviewing officials from 9 different organizations. Table 4.1 describes the first site visit that was conducted between August 1 and 4, 2005. The first site visit was very informative for the research team. Data collected from these visits gave an estimation on the amounts of imports and exports (by rail and truck) in the southwest Kansas region in regards to the quantities used for feeding cattle along with issues on current transportation modes and projections for the future growth of these industries. See Appendix I for the first site visit minutes.

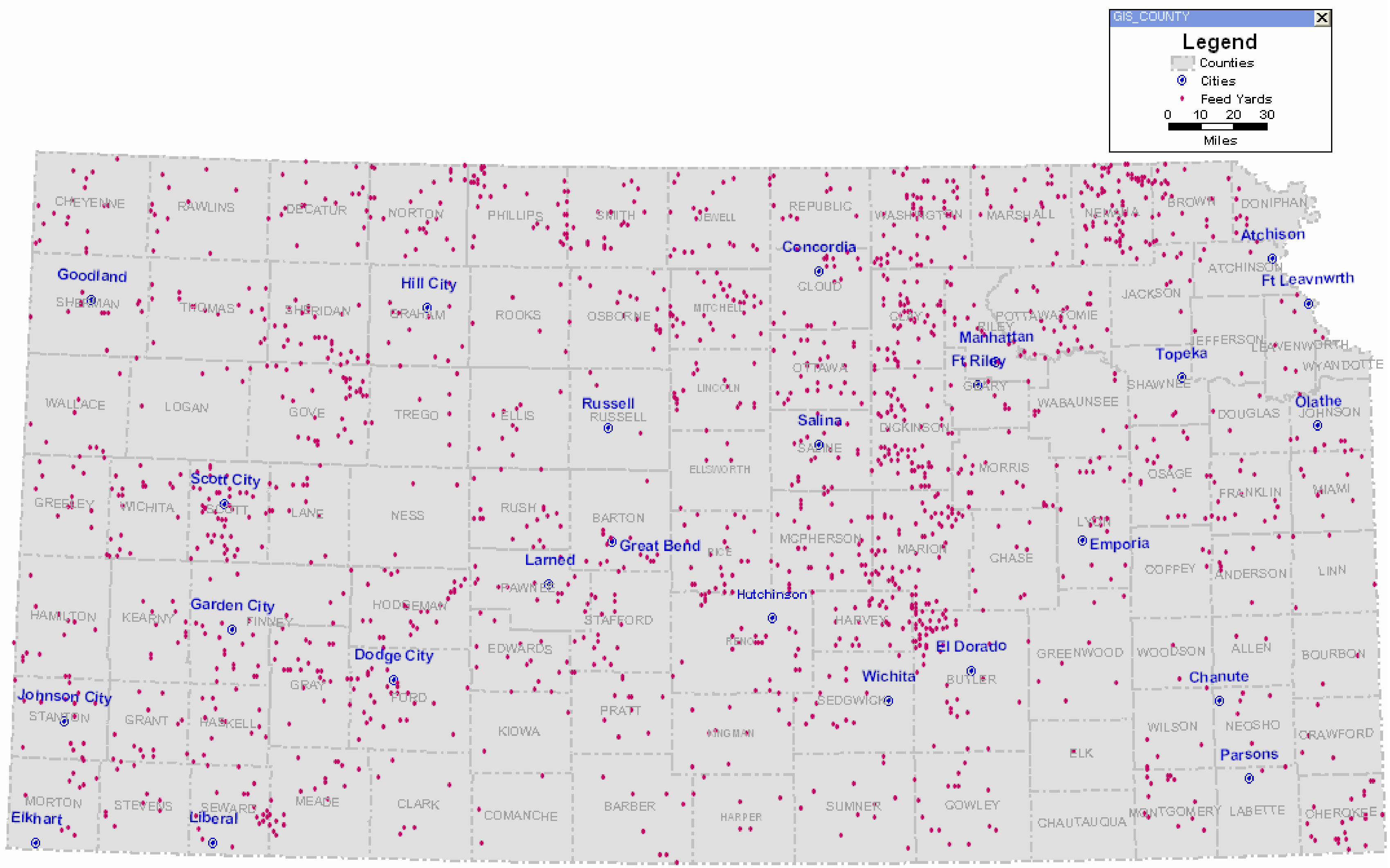


Figure 4.1: Feed Yards in Kansas

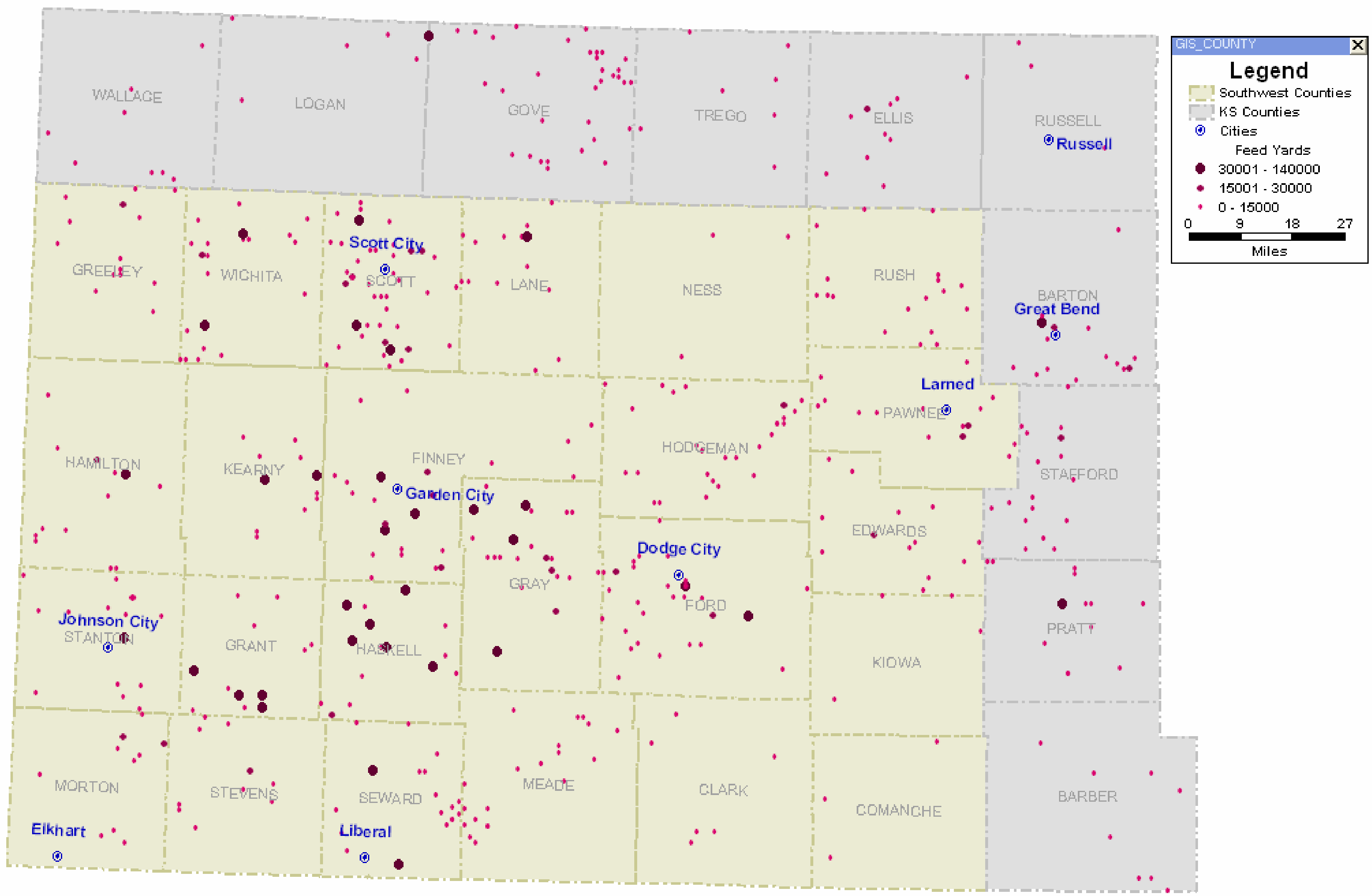


Figure 4.2: Feed Yards in Southwest Kansas

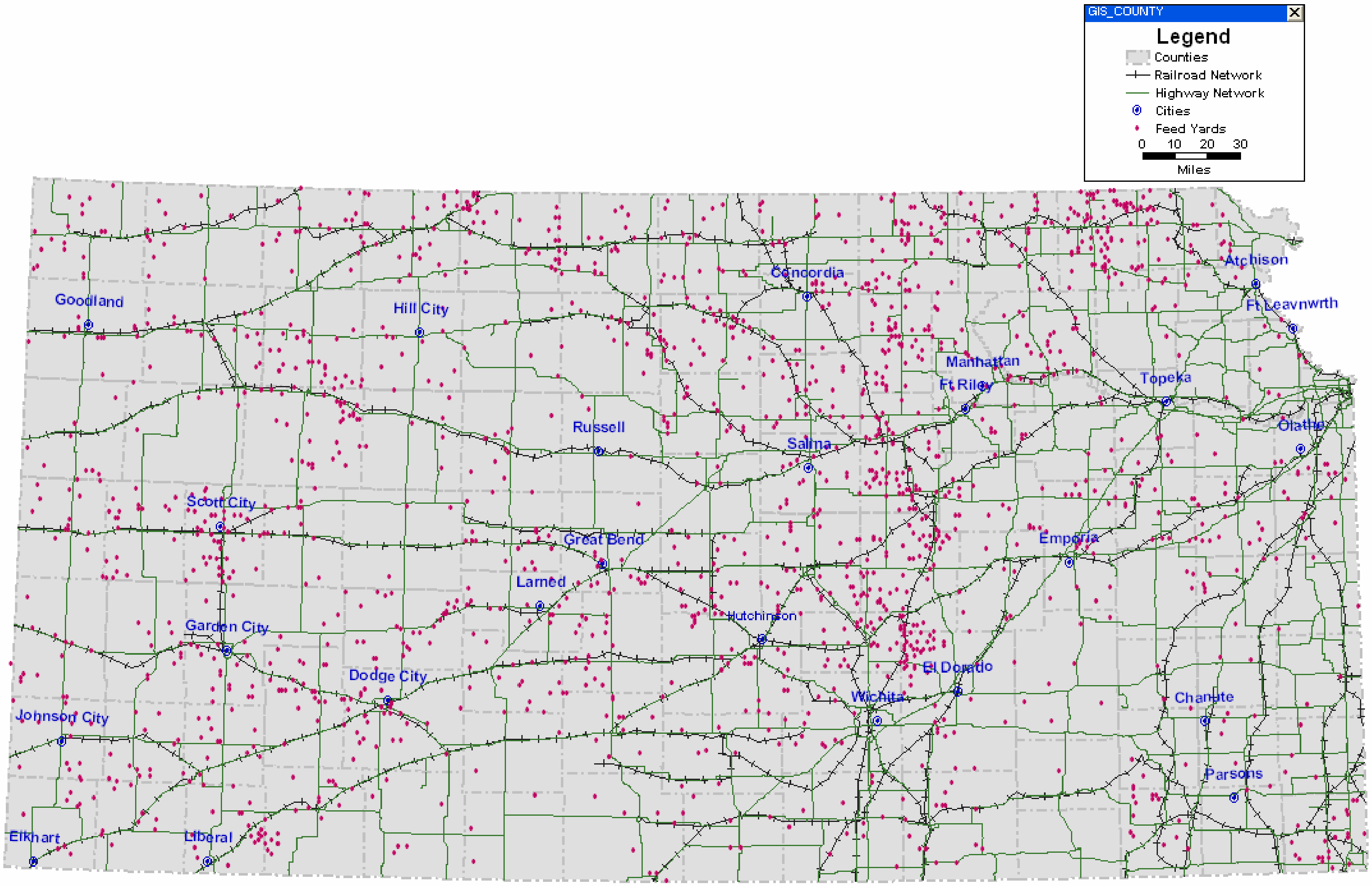


Figure 4.3: Highway and Railroad Network along with Feed Yards in Kansas

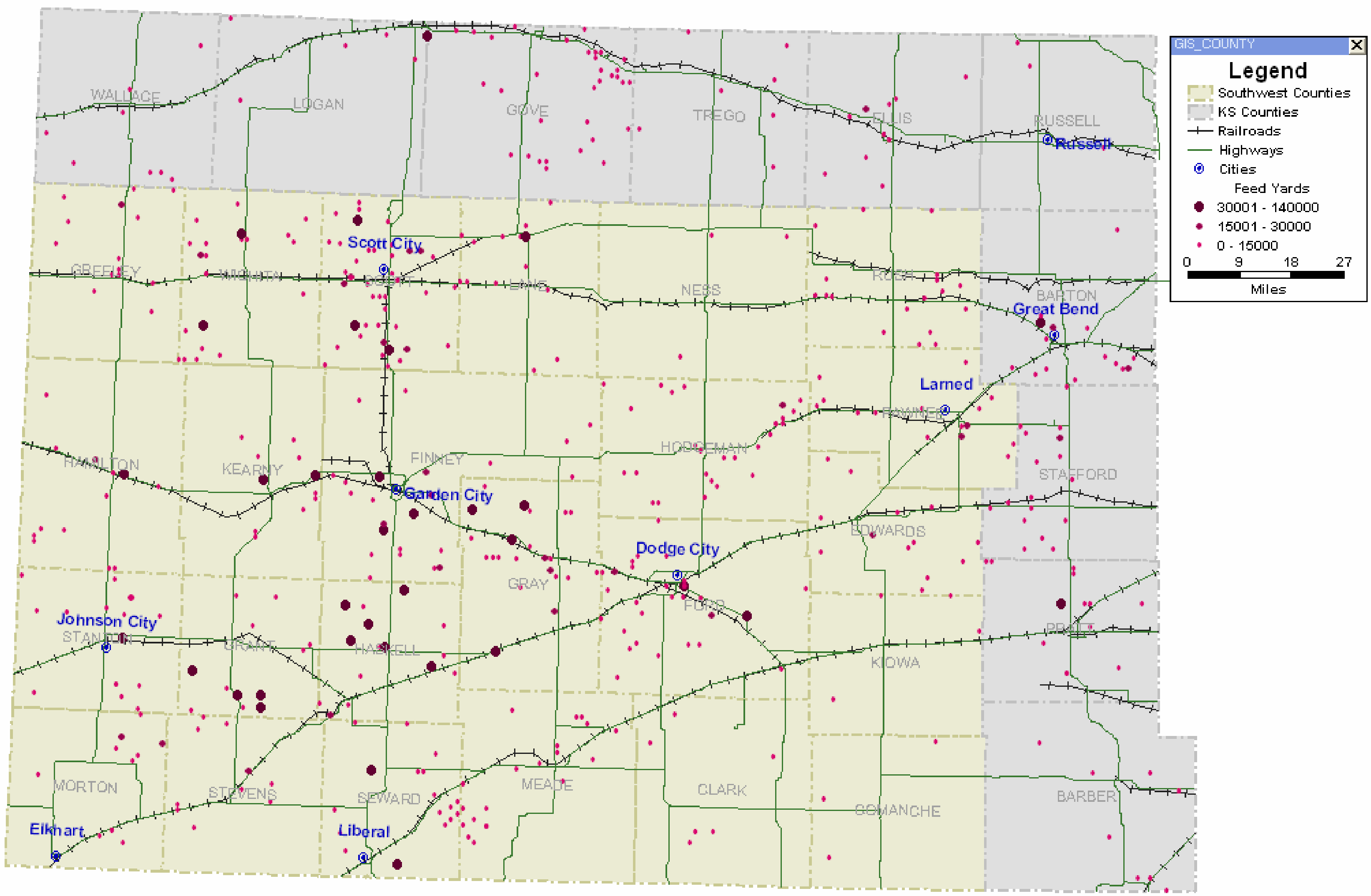


Figure 4.4: Highway and Railroad Network along with Feed Yards in Southwest Kansas

Table 4.1: First Site Visit to Southwest Kansas (Aug 1 – 4, 2005)

Company Name	Location	Contact	Date & Time
Tyson Prepared Foods (End Product Users)	Hutchinson	Ron Blank, Plant Manager	Aug 1 @ 2:00 pm
Cimarron Valley Railroad (Railroad)	Satanta	Henry Hail, General Manager	Aug 2 @ 12:30 pm
Cattle Empire LLC (Feed Yard)	Satanta	Cory Kinsley, Risk Management Director	Aug 2 @ 3:00 pm
KDOT, District 6	Garden City	Larry Thompson, Ron Hall, Dale Luedke, Kirk Hutchinson, Chuck Oldaker, Ron Berglund	Aug 3 @ 9:00 am
Garden City Western Railway (Railroad)	Garden City	Kelly Chopp, General Manager	Aug 3 @ 2:00 pm
WindRiver Grain LLC (Feed Yard)	Garden City	Charlie Sauerwein, Grain Merchant; Kammi Schwarting, Financial Manager	Aug 3 @ 4:30 pm
Irsik & Doll (Feed Yard)	Cimarron	John Petz, President & CEO; Jon Heiman, Cattle Risk Manager	Aug 4 @ 9:00 am
Excel Corporation (Processors)	Dodge City	Dan Schnitker, Vice President & General Manager	Aug 4 @ 1:30 pm
BNSF (Railroad)	Dodge City	Stephen Muncy, Trainmaster; Dennis Mustoe, Superintendent of Operations	Aug 4 @ 3:30 pm

4.4 SECOND SITE VISIT

The second site visit focused on acquiring approximate production rates at three of the four biggest meat processing facilities in the southwest Kansas region. This research focused on the four major meat (beef) processing facilities in the southwest Kansas region as mentioned in Section 1.3. Data collection also involved interviews with individuals in the trucking industry and at the Grant County Chamber of Commerce regarding any future industry developments in the southwest Kansas area. Table 4.2 presents a description of the second site visit that was conducted between May 22 and 24, 2006.

Table 4.2: Second Site Visit to Southwest Kansas (May 22 – 24, 2006)

Company Name	Location	Contact	Date & Time
National Beef (Procssor)	Dodge City	Carey Hoskinson, Vice President & General Manager	May 22 @ 10:00 am
Kindsvater Trucking (Trucking)	Dodge City	Dennis Kindsvater, Owner	May 22 @ 2:00 pm
Excel Corporation (Proceesor)	Dodge City	Jane Westerman, Fleet Manager	May 23 @ 10:00 am
National Carriers (Trucking)	Liberal	Fred Mull, Livestock Division Manager	May 23 @ 3:00 pm
National Beef (Processor)	Liberal	Mike King, Head of Transportation	May 24 @ 10:00 am
Grant County Chamber of Commerce	Ulysses	Gene Plughoft, Head of Economic Development for Grant County	May 24 @ 1:30 pm

The detailed minutes of the second site visit are presented in Appendix II. Table 4.3 presents an inventory of the data collected from the second site visit. The following is the general information that was collected from meat processors in the southwest Kansas region:

- The average number of finished cattle that can be accommodated in a truck (average weight of a truckload is 54,000 lbs.) is 45;
- The weight of cattle at the time of processing is approximately 1,200 lbs. with about 720 lbs. being red meat and 480 lbs. being byproduct;
- Most of the packers kill 6 days a week depending on the market conditions. However, the beef is transported 7 days a week;
- The typical size of a trailer is the same for incoming cattle and outgoing beef, which is 53 feet;

- The quantity of boxed beef loaded per truck is 40,000 – 42,000 lbs.
- The boxed beef calculations are calculated according to the number of trucks and the average load of boxed beef per truck.

Table 4.3: Raw Data Inventory from Second Site Visit

Item	National Beef, Dodge City	Excel Corp., Dodge City	National Beef, Liberal
Kill Capacity of Cattle per day	5,800	6,000	6,000
Trucks of Cattle per day (IN)	130	140	110
Head of cattle per truck	40	40	50
Pounds of Boxed Beef per day (OUT)	3,900,000	4,200,000	4,125,000
Trucks of Boxed Beef per day (OUT)	88	94	93
Trucks of Supplies per day (IN)	20	20	25
Trucks of Byproducts per day (OUT)	4	7	6
Railroad Cars (only byproducts) per day (OUT)	4	7	6

Note: Trucks of boxed beef = Boxed Beef (lbs.) / Average weight of a truckload (44,500 lbs.)

Apart from the data collected from the meat processors, the Grant County Chamber of Commerce in Ulysses, KS, anticipates increased traffic due to various developments taking place in the southwest Kansas region due to the thriving cattle feed industry. One of the developments may be an agriplex facility in Ulysses, KS, which will integrate one large ethanol plant with several small ethanol plants on local feed yards, a milk processing plant, and possibly a cheese factory.

- It is anticipated to have about 120 trucks of grain in and 150 trucks of distiller's grain and ethanol going out per day respectively with only about 30,000 lbs. of grain coming in on rail for the ethanol plant.
- With the rise of the dairy cattle industry, there will be a growth in the number of trucks transporting milk to the processing plant in turn elevating the truck traffic due to the transporting of milk products.

4.5 LOCAL SITE VISITS

The research team conducted a few interviews apart from the two site visits to the southwest Kansas region. The first interview conducted for the data collection task was with Dennis Kindsvater, Owner of Kindsvater Trucking. The interview was about general information with almost no exact data being discussed. However, the interview helped to direct the research team to possible sources for collecting data. Table 4.4 presents the description of the local site interview visits conducted.

Table 4.4: Interview Visits

Organization Name	Interview Type	Contact	Date & Time
Kansas Livestock Association (KLA)	Personal Visit in Topeka KS	Rich McKee, Senior Vice President	June 15, 2006 @ 2:00 pm
Kansas Motor Carrier Association (KMCA)	Personal Visit in Topeka KS	Gary Davenport, Director of Safety and Risk Management	July 6, 2006 @ 10:00 am

The following data was collected from KLA:

- In a given year there is approximately 5.3 million head of cattle on feed in Kansas, with turnover occurring about 2 – 2½ times per year;
- Typically cattle are put out to pasture at around 500 lbs. and are then sent to a feed yard at around 750 lbs.;

- Cattle consume 72% of the corn, 16% of the soybeans and 60% of the hay grown in Kansas.

4.6 PHONE INTERVIEWS

Table 4.5 presents the phone interviews that were conducted for this project.

Table 4.5: Phone Interviews

Company Name	Interview Type	Contact	Date & Time
Kindsvater Trucking (Truckers)	Phone Interview	Dennis Kindvater, Owner	July 15, 2005 @ 1:30 pm
Tyson Fresh Meats, Holcomb, KS (Processor)	Phone Interview	Paul Kardiainen, Plant Manager	June 29, 2006
BNSF (Railroad)	Phone Interview	Stephen Muncy, Trainmaster	July 6, 2006 @ 2:00 pm
Union Pacific (Railroad)	Phone Interview	Mark Davis, Public Relations	July 20, 2006 @11:00 am

The following data was collected from Tyson Fresh Meats in Holcomb, KS:

- Kill Capacity of Cattle per day: 5,800;
- Trucks of Cattle in per day: 112;
- Head of cattle per truck: 40;
- Boxed beef out per day (lbs): 2,604,000;
- Trucks of Boxed Beef out per day: 76;
- Trucks of Byproducts out per day: 15;

4.7 SUMMARY

This chapter specifies, first, the procedure adopted for collecting data; second, the preliminary data that was collected was listed in Appendix IV along with associated figures. Later, the chapter focuses on the data collected during the first and second site visits, local site visits, and phone interviews along with any raw data inventory collected at each visit. Appropriate general information that was collected was also described at the end of each section. Table 4.6 shows the organizations visited (personal or phone) in each industry category. Following the data collection is the data analysis that is presented in Chapter 5.

Table 4.6: Summary of Information Sources

Name of Industry	Site Visits in Southwest KS	Other Site Visits	Phone Interviews
Feed Yard	Irsik & Doll;Cattle Empire		
Grain Elevator	WindRiver		
Meat Packers	Excel Corporation; National Beef		Tyson Fresh Meats
Trucking Carriers	National Carriers; Kindsvater Trucking		Kindsvater Trucking
End Product User	Tyson Prepared Foods;		
Railroad	Cimarron Valley Railroad; Garden City Western Railway; BNSF		BNSF; UP
Government Agency & Other Organizations	KDOT; Grant County Chamber of Commerce	Kansas Livestock Association; Kansas Motor Carrier Association	

Chapter Five - DATA ANALYSIS

The main objective of this Chapter is to estimate the truck vehicle miles traveled (VMT) associated with business activities of the processed meat and related industries in southwest Kansas. Based on the sequence of the Kansas meat industry shown in Figure 3.1 (pp. 33), the process of estimating truck VMT is broken down into six components:

1. Truck VMT for transporting feeder cattle to feed yards in southwest Kansas
2. Truck VMT for transporting feed grain to feed yards in southwest Kansas
3. Truck VMT for transporting finished cattle to meat processing facilities in southwest Kansas
4. Truck VMT for transporting boxed beef to customers in the United States
5. Truck VMT for transporting meat byproducts
6. Truck VMT for transporting boxed beef to export customers

TransCAD software is utilized to calculate the shortest paths in miles that are used to estimate the truck VMT. The results of the truck VMT will help researchers to determine if there is a need to use other transportation modes (such as railroad and intermodal) to transport goods and products for the processed meat and related industries in southwest Kansas.

5.1 TRUCK VMT FOR TRANSPORTING FEEDER CATTLE TO FEED YARDS IN SOUTHWEST KANSAS

5.1.1 NUMBER OF CATTLE ON FEED IN 2005

Data on the number of cattle on feed in 2005 is considered for the analysis since the trend shown in Figure 3.2 (pp. 37) indicates that the population of cattle on feed has been increasing in general since 1965. Therefore, it can be concluded that there has been an increase in the business of feeding cattle from 1965-2005, with the possibility for increases in the future. The feed yard population for each county is tabulated in Table 5.1. Some of the feed yard populations for individual counties in the southwest Kansas region were estimated since not all counties are individually recorded by USDA for confidentiality purposes. It is known that among the 24 counties in the southwest Kansas region, 11 counties' data was missing. However, with the help of district data (a district includes several counties) recorded by USDA and with the county data from the KDHE, the district level data can be calculated and the missing counties' feed yard population can then be estimated. However, in order to estimate the data in the missing counties, the following assumption is considered in regards to the data from KDHE.

(1) Only the feed yards with a finished feed yard capacity of 1,000 head and above are studied.

This estimation process was done by prorating aggregate district numbers from USDA and data on feed yard capacities from the KDHE. The following equations were used to estimate the feed yard population in Table 5.1 (KDHE, 2006; USDA, 2006f):

Ratio for each district:

r = USDA cattle on feed for district/ KDHE feedlot capacity for district

Cattle on feed = KDHE feed yard capacity for county x r

Table 5.1: Estimated Feed Yard Populations in Southwest Kansas Counties without a Turnover Factor

No.	County	Feed yard Population
1	Clark	33,900
2	Comanche	800
3	Edwards	31,253
4	Finney	259,000
5	Ford	120,100
6	Grant	169,132
7	Gray	149,500
8	Greeley	10,700
9	Hamilton	65,700
10	Haskell	297,600
11	Hodgeman	32,900
12	Kearny	59,800
13	Kiowa	5,998
14	Lane	35,508
15	Meade	18,500
16	Morton	1,662
17	Ness	0
18	Pawnee	82,900
19	Rush	1,741
20	Scott	207,700
21	Seward	81,740
22	Stanton	42,632
23	Stevens	30,833
24	Wichita	120,926
Total		1,860,525

It should also be noted that the estimated population of cattle on feed in these southwest Kansas counties accounts for 76 % of the total cattle population in Kansas, which indicates that the cattle feeding industry is concentrated in the southwest portion of the state.

5.2 TRUCK CAPACITIES FOR TRANSPORTING FEEDER AND FINISHED CATTLE

Truck capacities for transporting feeder and finished cattle are estimated based on the information collected from the site visits. A semi-truck can hold nearly 75 feeder cattle each weighing approximately 675 lbs. resulting in a total truck capacity of 50,625 lbs. (Kinsley, 2006). Similarly, a semi-truck can accommodate nearly 45 finished cattle of approximately 1,200 lbs. each resulting in a total truck capacity of 54,000 lbs.

(Kinsley, 2006). This data is shown in Table 5.2 Truck Capacities for Transporting Feeder and Finished Cattle.

Table 5.2: Truck Capacities for Transporting Feeder and Finished Cattle

Cattle Type	Number of Cattle per Truck	Lbs. per Cattle	Truck Capacity (lbs.)
Feeder Cattle	75	675	50,625
Finished Cattle	45	1,200	54,000

5.3 REQUIRED TRUCKLOADS FOR TRANSPORTING FEEDER CATTLE

In order to estimate the truckloads of feeder cattle on an annual basis, a 'turnover factor' must be considered for the feed yards. 'Turnover Factor' is defined as the number of times the business of cattle feeding takes place on an annual basis at a particular feed yard. Cattle Empire, LLC has a 'turnover factor' of 2.1 turns per year, while the industry average is about 1.8 turns per year (Kinsley, 2005). For this research project, a turnover factor of 2.0 is used. Therefore, the total number of feeder cattle, annual truckloads, and quantity transported can be calculated for each county. For instance, using the Clark County data, researchers can calculate the following parameters:

Feeder cattle per year = Feed yard population x Turnover Factor
= 33,900 cattle x 2.0
= 67,800 cattle

Annual Truckloads = Feeder cattle per year / Number of Cattle per Truck
= 67,800/75
= 904 truckloads of cattle

Quantity transported = Feeder cattle per year x Lbs. per cattle
= 67,800 x 675 lbs.
= 45,765,000 lbs.

These parameters can be calculated similarly for the 24 counties in the Southwest Kansas region and are shown in Table 5.3.

Table 5.3: Estimated Annual Truckloads of Feeder Cattle in Southwest Kansas Counties for 2005

No.	County	Feed Yard Population	Turnover Factor	Feeder Cattle per year	Annual Truckloads	Quantity transported (lbs.)
1	Clark	33,900	2	67,800	904	45,765,000
2	Comanche	800	2	1,600	21	1,080,000
3	Edwards	31,253	2	62,506	833	42,191,550
4	Finney	259,000	2	518,000	6,907	349,650,000
5	Ford	120,100	2	240,200	3,203	162,135,000
6	Grant	169,132	2	338,264	4,510	228,328,200
7	Gray	149,500	2	299,000	3,987	201,825,000
8	Greeley	10,700	2	21,400	285	14,445,000
9	Hamilton	65,700	2	131,400	1,752	88,695,000
10	Haskell	297,600	2	595,200	7,936	401,760,000
11	Hodgeman	32,900	2	65,800	877	44,415,000
12	Kearny	59,800	2	119,600	1,595	80,730,000
13	Kiowa	5,998	2	11,996	160	8,097,300
14	Lane	35,508	2	71,016	947	47,935,800
15	Meade	18,500	2	37,000	493	24,975,000
16	Morton	1,662	2	3,324	44	2,243,700
17	Ness	0	2	0	0	0
18	Pawnee	82,900	2	165,800	2,211	111,915,000
19	Rush	1,741	2	3,482	46	2,350,350
20	Scott	207,700	2	415,400	5,539	280,395,000
21	Seward	81,740	2	163,480	2,180	110,349,000
22	Stanton	42,632	2	85,264	1,137	57,553,200
23	Stevens	30,833	2	61,666	822	41,624,550
24	Wichita	120,926	2	241,852	3,225	163,250,100
Totals		1,860,525		3,721,050	49,614	2,511,708,750

In summary, the total number of feeder cattle in 2005 is estimated to be 3,721,050 and the annual truckloads for transporting the feeder cattle are 49,614 with a total of two and a half billion pounds of weight being transported in the southwest Kansas region. For data analysis purposes, all feeder cattle are assumed to come to the region for feeding from other states and/or other parts of Kansas.

5.4 ESTIMATING DISTANCES BETWEEN COUNTY CENTROIDS AND FEED YARDS

As shown in Figure 5.2, there are approximately 369 feed yards located within the 24 counties of the southwest Kansas region (KDHE, 2006). Figure 5.1 shows the 24 counties of the analysis area with the centroids. For this analysis, centroid is defined as the center point of the county or a point close to the geometric center of the county. Additionally, the centroid for each county is located on a highway. Table 5.4 presents the numbers of feed yards in each county. It also indicates the total distances along with the average distances (in miles) traveled in each county. The total distance denotes the sum of the shortest paths (distance in miles) from the centroid of a county to each of the feed yards in the respective counties. For example, Clark County has a total distance of 88.92 miles which is the sum of the shortest distances from the centroid to each of the six feed yards.

The average distance is defined as the result of the total distance divided by the number of feed yards in the respective county. That is:

Average Distance = Total Distance / No. of Feed Yards

For example, the average distance is 14.82 miles (88.92 / 6) in Clark County. Thus, on average a truck travels 14.82 miles from the origin (considered to be the centroid of the county) to a feed yard in Clark County. Moreover, a truck transporting feeder cattle travels 12.83 miles on average from the centroid of a county to a feed yard in the respective county in the southwest Kansas region. Appendix V presents the shortest path maps for the 24 counties.

Table 5.4: Average Distance from County Centroids to Feed Yards

No.	County	No. of Feed Yards	Total Distance (miles)	Average Distance (miles)
1	Clark	6	88.92	14.82
2	Comanche	3	50.41	16.80
3	Edwards	13	189.04	14.54
4	Finney	23	363.79	15.82
5	Ford	28	334.33	11.94
6	Grant	12	153.39	12.78
7	Gray	22	228.43	10.38
8	Greeley	14	158.75	11.34
9	Hamilton	13	181.00	13.92
10	Haskell	15	169.75	11.32
11	Hodgeman	26	349.91	13.46
12	Kearny	11	102.20	9.29
13	Kiowa	3	55.01	18.34
14	Lane	13	145.93	11.23
15	Meade	19	273.05	14.37
16	Morton	10	107.55	10.76
17	Ness	3	51.70	17.23
18	Pawnee	15	195.53	13.04
19	Rush	17	217.26	12.78
20	Scott	41	460.81	11.24
21	Seward	17	245.70	14.45
22	Stanton	14	176.17	12.58
23	Stevens	10	115.20	11.52
24	Wichita	21	319.46	15.21
Totals		369	4,733	12.83

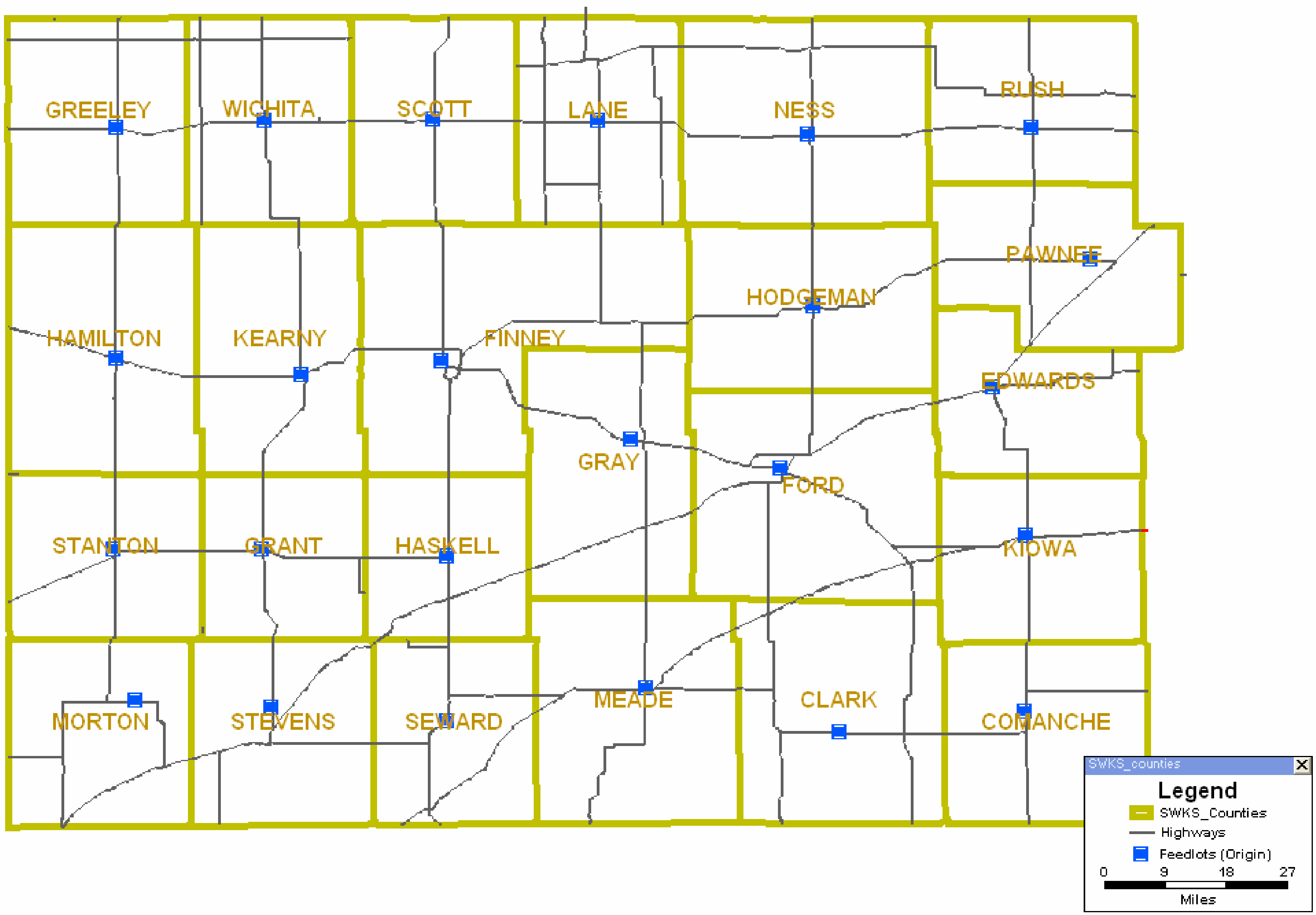


Figure 5.1: 24 Counties of the Analysis Area with the Centroids

5.5 TRUCK VMT FOR TRANSPORTING FEEDER CATTLE

In the data analyses, it is assumed that all cattle that are to be fed in southwest Kansas come from other states and/or other parts of Kansas outside of the southwest Kansas region. Since cattle come from different origins outside of southwest Kansas, there is a need to define entry points on the southwest Kansas boundaries (detail descriptions are presented later). It is further assumed that all entry points are on major highways for easy calculation. The truck VMT for transporting feeder cattle is calculated based on two steps. The first step is to determine truck VMT from entry points to county centroids. The second step is to calculate truck VMT from the centroid of a county to all feed yards in the county for all of the counties in the study area. The sum of steps 1 and 2 are the total truck VMT for transporting feeder cattle.

5.5.1 TRUCK VMT FOR TRANSPORTING FEEDER CATTLE FROM ENTRY POINTS TO THE COUNTY CENTROIDS

According to the estimations, and based on a turnover factor of 2.0, there are 3,721,050 cattle on feed per year in southwest Kansas counties. Based on the information collected from some of the feed yards in the southwest Kansas region, the following assumptions are made about the quantity of cattle coming from various directions – 30% of the cattle come from each of the north, south, and east and 10% of the cattle come from the west. In addition, the southwest Kansas region was divided into four zones; Zone I, Zone II, Zone III and Zone IV, as shown in Figure 5.2**.**

Thus, the number of feeder cattle coming from the North, South, and East

= 30% x 3,721,050 cattle

= 1,116,315 cattle (from each direction)

Number of feeder cattle coming from the West

= 10% x 3,721,050 cattle

= 372,105 cattle

These proportions have to be allocated to each county which must also match the number of feeder cattle per year for the individual counties, as shown in Table 5.3. To achieve this, an allocation procedure was developed and described as follows.

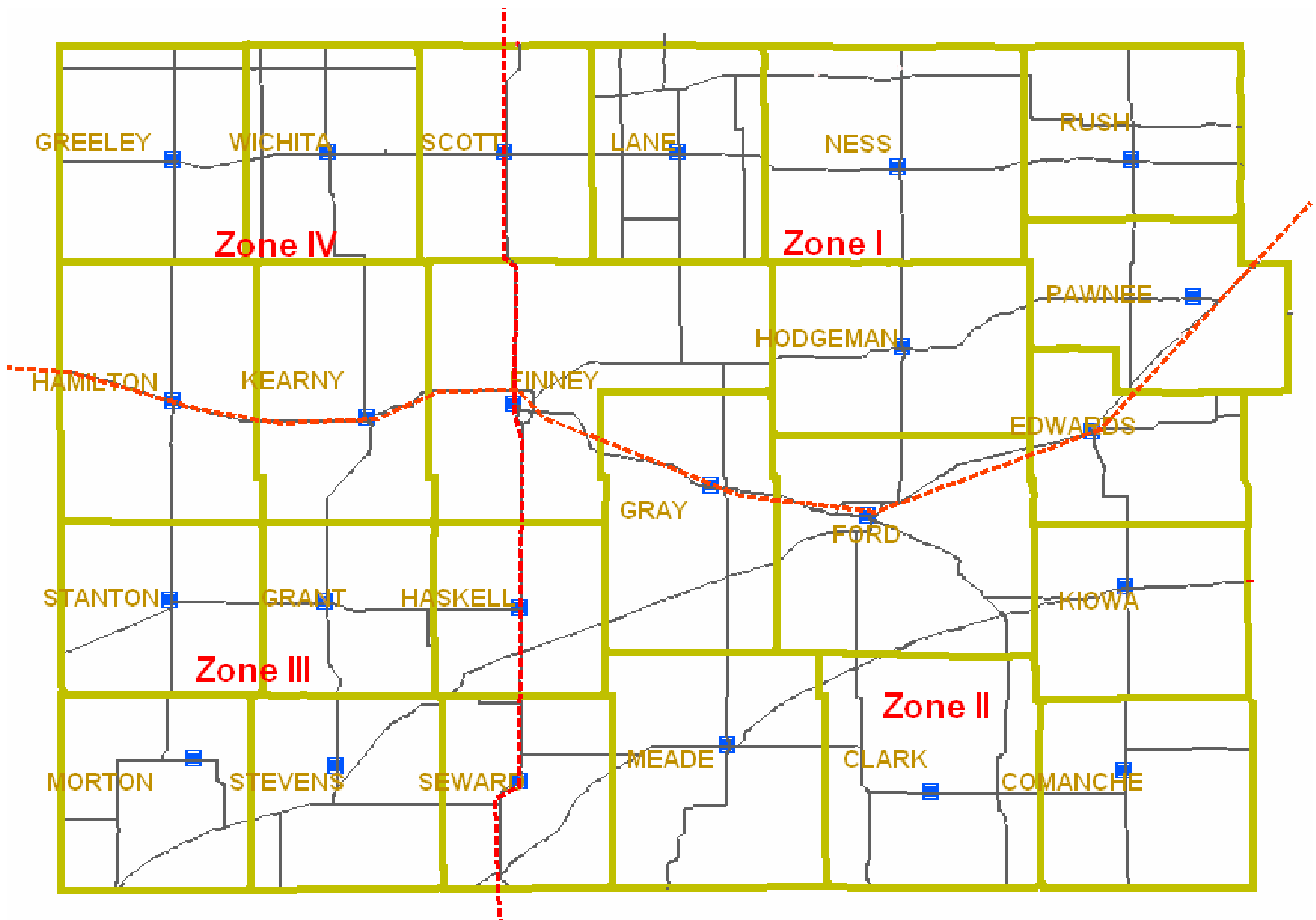


Figure 5.2: Zone Analysis of Allocating Cattle in Southwest Kansas

Initially, cattle from the east boundary are allocated to the counties in the east lying in Zones I & II. There are three entry points in the east boundary located on highways 54, 56, and 160. To begin with, Rush County, which lies at the northeast corner of the southwest Kansas region is filled with a total of 3,482 feeder cattle (per year), which is then followed by allocating cattle to Pawnee, Edwards, Kiowa, Comanche, Ness, Hodgeman, Ford, Clark, Lane and Finney. However, only a portion of Finney is filled since feeder cattle from the east are short by 91,885 head. The remaining counties are allocated by cattle coming from the north. Thus, Finney is allocated by cattle coming from two directions, 426,115 head of feeder cattle coming from the east and 91,885 head of feeder cattle coming from the north.

There are three entry points on the north boundary located on highways 83, 183, and 283. Cattle coming from the north are allocated in Finney County first, then, Scott, Wichita, Greeley, Hamilton, Kearny, and Gray counties (counties laying in Zone I & IV). However, only a portion of Gray is filled since cattle from the north are short by 204,222. The remaining is allocated by cattle coming from the south. Thus, Gray is allocated by cattle coming from two directions with 94,778 head of feeder cattle coming from the north and 204,222 head of feeder cattle coming from the south.

Next, the cycle of allocating cattle begins with cattle coming from the south boundary lying in Zones II & III. There are four entry points in the south boundary located on highways 54, 56, 183, and 283. Following Gray, allocation begins with Meade, Seward, Stevens, Haskell and Grant. However, only a portion of Grant is filled since cattle from the south are short by 283,517. Thus, Grant has to be allocated by cattle coming in from two directions with 54,747 head of feeder cattle coming from the south and 283,517 head coming from the west.

The remaining portions that are to be allocated are the counties lying in Zone III which are filled by cattle coming from the west. There are two entry points in the west boundary located on highways 50/400 and 160. Following Grant, allocation is continued to Morton and Stanton.

In this manner, counties lying in Zone I, Zone II, Zone III and Zone IV are allocated by cattle coming from all four different directions. However, it must be noted that there are three counties that receive feeder cattle in two directions and these are, Finney from east-north, Gray from north-south and Grant from south-west. To summarize, the feeder cattle allocation sequence is shown in Table 5.5.

Table 5.5: Sequence for Allocating Feeder Cattle in Each County

Total Feeder Cattle in Each Direction	County in Sequence	Number of Feeder Cattle Allocated to Each County
1,116,315 (East)	Rush	3,482
	Pawnee	165,800
	Edwards	62,506
	Kiowa	11,996
	Comanche	1,600
	Ness	0
	Hodgeman	65,800
	Ford	240,200
	Clark	67,800
	Lane	71,016
	Finney	426,115
1,116,315 (North)	**Finney**	91,885
	Scott	415,400
	Wichita	241,852
	Greeley	21,400
	Hamilton	131,400
	Kearny	119,600
	Gray	94,778
1,116,315 (South)	**Gray**	204,222
	Meade	37,000
	Seward	163,480
	Stevens	61,666
	Haskell	595,200
	Grant	54,747
372,105 (West)	**Grant**	283,517
	Stanton	85,264
	Morton	3,324
Total		3,721,050

Apart from allocating cattle to different counties, keeping in view the proportions and the directions of distributing cattle, it is also necessary to calculate the distances traveled by trucks from the entry points to county centriods. As mentioned, entry points are considered to lie on highways at the edge of the southwest Kansas boundaries. In the east, there are three entry points that lie on highways 54, 56, and 160. In the south, there are four entry points that lie on highways 54, 56, 183, and 283. In the west, there are two entry points that lie on highways 50/400 and 160. In the north, there are three entry points that lie on highways 83, 183, and 283. It is further assumed that the number of feeder cattle are distributed evenly across each entry point.

The travel distance from an entry point to a centroid of a county was calculated using TransCAD software and results are presented in Appendix VI. For instance, Clark County receives cattle from the east with entry points located on highways 54, 56 and 160 (using E54 to represent highway 54 in the east boundary of southwest Kansas, the same for E56 and E160). Each entry point contributes one third of the feeder cattle to Clark County. Based on the information shown in Appendix VI:

Total Distance from the entry points to the centroid of Clark County

= E54 + E56 + E160

= 51.13 + 70.15 + 111.35

= 232.63 miles

Average Distance Traveled

= Total Distance/ No. of Entry points

= 232.63/3

= 78 miles

VMT is a measure of the amount of travel that a vehicle makes on a daily or annual basis for a specified area (Texas Transportation Institute (TTI), 2006). For this analysis, mathematically, the annual truck VMT in a county due to transporting feeder cattle can be calculated using the following formula:

Annual Truck VMT = Annual Truckloads x Average Distance Traveled

For example, in Clark County, annual truck VMT can be calculated as follows:

$$\text{Annual Truck VMT} = 904 \times 78$$

$$= 70{,}512$$

$$\text{Daily Truck VMT} = \text{Annual Truck VMT}/365$$

$$= 70{,}512/365$$

$$= 193$$

Thus, on a daily basis the truck VMT for transporting feeder cattle in Clark County is 193 and 70,512 annually. Similarly, the truck VMT for the 24 counties can be calculated in the same fashion. Table 5.6 presents daily and annual truck VMT for transporting feeder cattle in the southwest Kansas region.

Table 5.6: Daily & Annual Truck VMT for Transporting Feeder Cattle from Outside Southwest Kansas to County Centroids

No.	County	Entry Point Highway	Total Distance (miles)	Average Distance Traveled (miles)	Feeder Cattle per year	Annual Truckloads	Annual VMT	Daily VMT
1	Clark	E160, E54, E56	232.63	78	67,800	904	70,512	193
2	Comanche	E160, E54, E56	146.28	49	1,600	21	1,029	3
3	Edwards	E160, E54, E56	143.85	48	62,506	833	39,984	110
4	Finney	E160, E54, E56, N183, N283, N83	645.04	108	518,000	6,907	745,956	2,044
5	Ford	E160, E54, E56	209.51	70	240,200	3,203	224,210	614
6	Grant	S183, S283, S54, S56, W160, W50/400	486.74	81	338,264	4,510	365,310	1,001
7	Gray	N183, N283, N83, S183, S283, S54, S56	661.83	95	299,000	3,987	378,765	1,038
8	Greeley	N183, N283, N83	335.94	112	21,400	285	31,920	87
9	Hamilton	N183, N283, N83	419.64	140	131,400	1,752	245,280	672
10	Haskell	S183, S283, S54, S56	313.45	78	595,200	7,936	619,008	1,696
11	Hodgeman	E160, E54, E56	248.69	83	65,800	877	72,791	199
12	Kearny	N183, N283, N83	341.96	114	119,600	1,595	181,830	498
13	Kiowa	E160, E54, E56	117.58	39	11,996	160	6,240	17
14	Lane	E160, E54, E56	391.46	130	71,016	947	123,110	337
15	Meade	S183, S283, S54, S56	236.43	59	37,000	493	29,087	80
16	Morton	W160, W50/400	114.23	57	3,324	44	2,508	7
17	Ness	E160, E54, E56	317.61	106	0	0	0	0
18	Pawnee	E160, E54, E56	178.55	60	165,800	2,211	132,660	363
19	Rush	E160, E54, E56	228.77	76	3,482	46	3,496	10
20	Scott	N183, N283, N83	187.22	62	415,400	5,539	343,418	941
21	Seward	S183, S283, S54, S56	243.79	61	163,480	2,180	132,980	364
22	Stanton	W160, W50/400	62.23	31	85,264	1,137	35,247	97
23	Stevens	S183, S283, S54, S56	315.41	79	61,666	822	64,938	178
24	Wichita	N183, N283, N83	260.89	87	241,852	3,225	280,575	769
Totals					3,721,050	49,614	4,130,854	11,317

5.5.2 TRUCK VMT FOR TRANSPORTING FEEDER CATTLE FROM COUNTY CENTROIDS TO FEED YARDS WITHIN SOUTHWEST KANSAS

Table 5.7 shows the daily and annual truck VMT for transporting feeder cattle within southwest Kansas counties. From Tables 5.3 and 5.4, the annual truckloads and average distances from centroids of counties to feed yards, respectively, were known and used for calculating truck VMT within a county. For example, the calculation procedure for Clark County is as follows.

Annual Truck VMT = Annual Truckloads x Average Distance

= 904 trucks x 14.82 miles

= 13,397

Daily Truck VMT = Annual Truck VMT/365

= 13,397/365

= 37

Similarly, the truck VMT can be calculated on daily and annual basis for the rest of counties in the southwest Kansas region.

Table 5.7: Daily & Annual VMT by Trucks for Transporting Feeder Cattle within Southwest Kansas Counties

No.	County	Annual Truckloads	Average Distance (miles)	Annual VMT	Daily VMT
1	Clark	904	14.82	13,397	37
2	Comanche	21	16.8	353	1
3	Edwards	833	14.54	12,112	33
4	Finney	6,907	15.82	109,269	299
5	Ford	3,203	11.94	38,244	105
6	Grant	4,510	12.78	57,638	158
7	Gray	3,987	10.38	41,385	113
8	Greeley	285	11.34	3,232	9
9	Hamilton	1,752	13.92	24,388	67
10	Haskell	7,936	11.32	89,836	246
11	Hodgeman	877	13.46	11,804	32
12	Kearny	1,595	9.29	14,818	41
13	Kiowa	160	18.34	2,934	8
14	Lane	947	11.23	10,635	29
15	Meade	493	14.37	7,084	19
16	Morton	44	10.76	473	1
17	Ness	0	17.23	0	0
18	Pawnee	2,211	13.04	28,831	79
19	Rush	46	12.78	588	2
20	Scott	5,539	11.24	62,258	171
21	Seward	2,180	14.45	31,501	86
22	Stanton	1,137	12.58	14,303	39
23	Stevens	822	11.52	9,469	26
24	Wichita	3,225	15.21	49,052	134
Totals		49,614	12.83	633,605	1,736

In summary, from these two steps, the daily and annual truck VMT for transporting feeder cattle from the boundaries of southwest Kansas to the 24 county centroids is 11,317 miles and 4,130,854 miles, respectively. The truck VMT for transporting feeder cattle from county centroids to feed yards in the respective counties is 1,736 miles daily and 633,590 miles annually. Thus, overall truck VMT for transporting feeder cattle from outside of southwest Kansas to the feed yards in the southwest Kansas region is:

Daily Truck VMT = 11,317 + 1,736
= 13,053

Annual Truck VMT = 4,130,854 + 633,590
= 4,764,444

However, it should be noted that the above analysis considers only the one-way truck VMT due to the transportation of feeder cattle from outside of southwest Kansas to the feed yards in the southwest Kansas region. After the feeder cattle are unloaded, trucks have to go back to their origins. Therefore, the total daily and annual truck VMT for transporting (loaded) feeder cattle from outside to the southwest Kansas region and back (unloaded or empty) to the origins are:

Daily Truck VMT	= 13,053 x 2
	= 26,106
Annual Truck VMT	= 4,764,444 x 2
	= 9,528,888

5.6 TRUCK VMT FOR TRANSPORTING FEED GRAINS TO FEED YARDS IN SOUTHWEST KANSAS

To estimate the truck VMT due to transporting feed grain to the southwest Kansas region, it is pertinent to estimate the amount of feed grain consumed by feeder cattle.

5.6.1 FEED GRAIN DEMAND IN SOUTHWEST KANSAS COUNTIES

To estimate the demand of feed grains for feed yards of southwest Kansas, it is relevant to have approximate estimations of the quantity of grains that are fed to cattle. This information was collected from the Kansas AgManager website at Kansas State University. The cattle feed requirements such as number of days on feed, the weight to be achieved, and total ration information (including the percentages of corn, grain sorghum, alfalfa-hay, and supplements) are collected for an above average and below average steer and heifer. This information is tabulated in Table 5.8 (Dhuyvetter, 2006). Thus, on average cattle consume a total ration of 4,242 lbs. for nearly 150 days.

Table 5.8: Average Feed (per cattle) Outline

		Days on Feed	Finished Weight (lbs.)	Total Ration (lbs.)	Corn (lbs.)	Grain Sorghum (lbs.)	Alfalfa (lbs.)	Supplement (lbs.)
Steer	Above Average	142	1225	3,753	1,914	1,276	450	113
	Below Average	156	1225	4,133	2,108	1,405	496	124
Heifer	Above Average	144	1175	4,331	2,209	1,473	520	130
	Below Average	161	1175	4,751	2,423	1,615	570	143
Average Per Cattle		150	1200	4,242	2,163	1,442	509	127
Percentage of Feed Grain				100%	51%	34%	12%	3%

Source: Dhuyvetter, 2006

Apart from acquiring an outline of an average cattle's feed grain consumption, the average daily and annual consumptions in pounds and truck capacity in pounds are shown in Table 5.9. Corn and grain sorghum are measured in bushels; alfalfa-hay is measured in bales, and the supplements (mainly protein) is measured in pounds. A typical semi-truck can carry 800-900 bushels of corn (Bertels, 2006). Thus, an average of 850 bushels of corn per truck is assumed for the calculations. A bushel of corn is approximately 56 lbs. which implies a truck can carry 47,600 lbs. of corn (Pleasant Hill Grain, 2006). A bushel of grain sorghum is approximately 55 lbs. which generates a truck capacity of 46,750 lbs. (Bean, 2006). Also, alfalfa-hay truck capacity of 650 bales is assumed with a unit conversion factor of 40 lbs. (The University of Maine Cooperative Extension, 2006).

Table 5.9: Average Daily & Annual Feed grain Consumptions and Truck Capacity

Ration	Percent of Share	Consumption		Truck Capacity (units)		Conversion Factor (bushels/bales to lbs.)	Truck Capacity (lbs.)
		Daily (lbs)	Annual (lbs)				
Corn	51.00%	14.4	4,320	850	Bushels	56	47,600
Grain Sorghum	34.00%	9.6	2,880	850	Bushels	55	46,750
Alfalfa-hay	12.00%	3.4	1,020	650	Bales	40	26,000
Supplement	3.00%	0.8	240				50,000
Total Ration (lbs.)		28.2	8,460				

It should also be noted that the feed grain consumptions are based on a total of 300 days per year (average number of days on feed is 150 with a turnover factor of 2).

Thus, the quantities of daily and annual feed grain consumptions can be calculated as follows.

Daily Consumption of Feed Grain = (Average total ration x Percent of total share) / Average number of days on feed

Using this formula, the daily consumption of corn can be calculated as:

Daily Consumption of Corn = (4,242 x 51 %)/150

= 14.4 pounds

Annual Consumption of Feed grain

= Daily consumption of feed grain x Average number of days on feed x Turnover factor

Based on this formula, the annual consumption of corn can be calculated as:

Annual Consumption of Corn = 14.4 x 150 x 2

= 4,320 pounds

Using the same formulas, researchers determined the daily and annual consumptions of grain sorghum, alfalfa-hay, and supplement.

With data on the number of cattle in each county in the southwest Kansas region and information on the daily consumptions of feed grains and feed grain demand, the truckloads for transporting the feed grains can be estimated for the various counties in southwest Kansas. For example, the quantities of feed grain and truckloads to transport it for Clark County are calculated as follows:

Annual demand of corn

= Feeder cattle per year x Days on feed x Daily consumption per cattle

= 67,800 x 150 x 14.4

= 146,448,000 pounds

Annual truckloads of corn

= Annual demand of corn / Truck capacity for corn

= 146,448,000 / 47,600

= 3,077 truckloads

Annual demand of grain sorghum

= Feeder cattle per year x Days on feed x Daily consumption per cattle

= 67,800 x 150 x 9.6

= 97,632,000 pounds

Annual truckloads of grain sorghum

= Annual demand of grain sorghum / Truck capacity for sorghum

= 97,632,000 / 46,750

= 2,088 truckloads

Annual demand of alfalfa-hay

= Feeder cattle per year x Days on feed x Daily consumption per cattle

= 67,800 x 150 x 3.4

= 34,578,000 pounds

Annual truckloads of alfalfa-hay

= Annual demand of alfalfa-hay / Truck capacity for alfalfa-hay

= 34,578,000 / 26,000

= 1,330 truckloads

Annual demand of supplements

= Feeder cattle per year x Days on feed x Daily consumption per cattle

= 67,800 x 150 x 0.8

= 8,136,000 pounds

Annual truckloads of supplements

= Annual demand of supplements / Truck capacity for supplements

= 8,136,000 / 50,000

= 163 truckloads

Likewise, the annual feed grain consumption for all the counties in the southwest Kansas region can be calculated. The results are shown in Table 5.10 Annual Feed Grain Demand for Feed Yards in Southwest Kansas Counties for 2005. In conclusion, there are approximately 3,721,050 feeder cattle in southwest Kansas in 2005. These cattle consume a total of more than fifteen and a half billion pounds of feed grain that generate annual truckloads of 365,392. Among these truckloads, about 168,855 truckloads are used for transporting corn, 114,616 truckloads for sorghum, 72,990 truckloads for alfalfa-hay, and 8,931 truckloads for supplements.

Table 5.10: Annual Feed grain Demand for Feed Yards in Southwest Kansas Counties in

No.	County	Feeder Cattle per year	Corn		Grain Sorghum		Alfalfa-hay		Supplements	
			Annually (pounds)	Annual Truckloads	Annually (pounds)	Annual Truckloads	Annually (pounds)	Annual Truckloads	Annually (pounds)	Annual Truckloads
1	Clark	67,800	146,448,000	3,077	97,632,000	2,088	34,578,000	1,330	8,136,000	163
2	Comanche	1,600	3,456,000	73	2,304,000	49	816,000	31	192,000	4
3	Edwards	62,506	135,012,960	2,836	90,008,640	1,925	31,878,060	1,226	7,500,720	150
4	Finney	518,000	1,118,880,000	23,506	745,920,000	15,956	264,180,000	10,161	62,160,000	1,243
5	Ford	240,200	518,832,000	10,900	345,888,000	7,399	122,502,000	4,712	28,824,000	576
6	Grant	338,264	730,650,240	15,350	487,100,160	10,419	172,514,640	6,635	40,591,680	812
7	Gray	299,000	645,840,000	13,568	430,560,000	9,210	152,490,000	5,865	35,880,000	718
8	Greeley	21,400	46,224,000	971	30,816,000	659	10,914,000	420	2,568,000	51
9	Hamilton	131,400	283,824,000	5,963	189,216,000	4,047	67,014,000	2,577	15,768,000	315
10	Haskell	595,200	1,285,632,000	27,009	857,088,000	18,333	303,552,000	11,675	71,424,000	1,428
11	Hodgeman	65,800	142,128,000	2,986	94,752,000	2,027	33,558,000	1,291	7,896,000	158
12	Kearny	119,600	258,336,000	5,427	172,224,000	3,684	60,996,000	2,346	14,352,000	287
13	Kiowa	11,996	25,911,360	544	17,274,240	370	6,117,960	235	1,439,520	29
14	Lane	71,016	153,394,560	3,223	102,263,040	2,187	36,218,160	1,393	8,521,920	170
15	Meade	37,000	79,920,000	1,679	53,280,000	1,140	18,870,000	726	4,440,000	89
16	Morton	3,324	7,179,840	151	4,786,560	102	1,695,240	65	398,880	8
17	Ness	0	0	0	0	0	0	0	0	0
18	Pawnee	165,800	358,128,000	7,524	238,752,000	5,107	84,558,000	3,252	19,896,000	398
19	Rush	3,482	7,521,120	158	5,014,080	107	1,775,820	68	417,840	8
20	Scott	415,400	897,264,000	18,850	598,176,000	12,795	211,854,000	8,148	49,848,000	997
21	Seward	163,480	353,116,800	7,418	235,411,200	5,036	83,374,800	3,207	19,617,600	392
22	Stanton	85,264	184,170,240	3,869	122,780,160	2,626	43,484,640	1,672	10,231,680	205
23	Stevens	61,666	133,198,560	2,798	88,799,040	1,899	31,449,660	1,210	7,399,920	148
24	Wichita	241,852	522,400,320	10,975	348,266,880	7,450	123,344,520	4,744	29,022,240	580
Totals		3,721,050	8,037,468,000	168,855	5,358,312,000	114,616	1,897,735,500	72,990	446,526,000	8,931

5.6.2 TRUCK VMT FOR TRANSPORTING FEED GRAIN FROM COUNTY CENTROIDS TO FEED YARDS WITHIN SOUTHWEST KANSAS

The daily and annual truck VMT for transporting feed grain are calculated similar to that of transporting feeder cattle. However, in addition to the centroid being considered as the center point of each county located on a highway, in this analysis the centroid is also considered to be a grain elevator station that distributes the feed grain to each feed yard in the respective county. Researchers assume that the quantities of feed grain in each county are sufficient to support the demand in that county. However, this may not be true for some of the counties in the southwest Kansas region, since some counties do receive feed grain from other states and/or other parts of Kansas. A major constraint is that the quantities of feed grain received from other states and/or other parts of Kansas and used for feeder cattle in southwest Kansas counties are unknown.

Information on distance and truckloads of feed grain in Table 5.4 (pp. 75) and Table 5.10 (pp. 88) was used to calculate the truck VMT due to transporting feed grain. The results of the calculations are presented in Table 5.11. The calculation procedure for transporting feed grain is described as follows.

Annual Truck VMT for Feed Grain = Annual truckloads x Average distance

For example, in Clark County, annual truck VMT for transporting corn can be calculated using the above formula:

Annual Truck VMT for Corn = 3,077 trucks x 14.82 miles

= 45,601

Daily Truck VMT for Corn = Annual Truck VMT for Corn / 365

= 45,601/365

= 125

Similarly, the truck VMT for transporting grain sorghum, alfalfa-hay, and supplements can be calculated for all of the 24 counties in the southwest Kansas region.

In summary, the daily and annual truck VMT for transporting feed grain are 12,782 miles and 4,666,151 miles, respectively, based on the data presented in Table 5.11. However, the data in this table only represents one-way trips. After the feed grain is unloaded, trucks have to go back to their origins. Therefore, the total daily and annual truck VMT for transporting feed grain (roundtrip) are 25,564 miles and 9,332,302 miles, respectively.

Table 5.11: Daily & Annual Truck VMT for Transporting Feed grain within southwest Kansas

No.	County	Average Distance (miles)	Feed grain							
			Corn		Grain Sorghum		Alfalfa-hay		Supplements	
			Annual truckloads	Annual VMT	Annual truckloads	Annual VMT	Annual truckloads	Annual VMT	Annual truckloads	Annual VMT
1	Clark	14.82	3,077	45,601	2,088	30,944	1,330	19,711	163	2,416
2	Comanche	16.8	73	1,227	49	823	31	521	4	67
3	Edwards	14.54	2,836	41,240	1,925	27,992	1,226	17,828	150	2,181
4	Finney	15.82	23,506	371,793	15,956	252,375	10,161	160,716	1,243	19,660
5	Ford	11.94	10,900	130,150	7,399	88,347	4,712	56,263	576	6,878
6	Grant	12.78	15,350	196,211	10,419	133,181	6,635	84,812	812	10,379
7	Gray	10.38	13,568	140,879	9,210	95,629	5,865	60,897	718	7,455
8	Greeley	11.34	971	11,010	659	7,473	420	4,763	51	578
9	Hamilton	13.92	5,963	83,023	4,047	56,347	2,577	35,880	315	4,386
10	Haskell	11.32	27,009	305,652	18,333	207,468	11,675	132,122	1,428	16,160
11	Hodgeman	13.46	2,986	40,186	2,027	27,280	1,291	17,374	158	2,126
12	Kearny	9.29	5,427	50,422	3,684	34,228	2,346	21,796	287	2,666
13	Kiowa	18.34	544	9,975	370	6,785	235	4,309	29	532
14	Lane	11.23	3,223	36,179	2,187	24,550	1,393	15,637	170	1,908
15	Meade	14.37	1,679	24,129	1,140	16,383	726	10,433	89	1,279
16	Morton	10.76	151	1,624	102	1,097	65	699	8	86
17	Ness	17.23	0	0	0	0	0	0	0	0
18	Pawnee	13.04	7,524	98,078	5,107	66,571	3,252	42,391	398	5,188
19	Rush	12.78	158	2,019	107	1,367	68	869	8	102
20	Scott	11.24	18,850	211,860	12,795	143,806	8,148	91,578	997	11,206
21	Seward	14.45	7,418	107,212	5,036	72,785	3,207	46,351	392	5,666
22	Stanton	12.58	3,869	48,686	2,626	33,044	1,672	21,040	205	2,580
23	Stevens	11.52	2,798	32,233	1,899	21,876	1,210	13,939	148	1,705
24	Wichita	15.21	10,975	166,956	7,450	113,332	4,744	72,168	580	8,823
Totals		12.83	168,855	2,156,345	114,615	1,463,683	72,990	932,096	8,931	114,027

5.7 TRUCK VMT FOR TRANSPORTING FINISHED CATTLE TO MEAT PROCESSING FACILITIES IN SOUTHWEST KANSAS

Based on USDA data, there were 7,321,400 cattle slaughtered in Kansas in 2005. Using the proportional method, the researchers estimated that there were 6,260,330 cattle slaughtered in the southwest Kansas region. Table 5.3 indicates that there were 3,721,050 cattle fed in southwest Kansas in 2005. It is assumed that all cattle fed in southwest Kansas are slaughtered in southwest Kansas. Thus, there were 2,539,280 (6,260,330 – 3,721,050) cattle that were brought into southwest Kansas from other states and/or other parts of Kansas. Therefore, it is necessary to take two steps to calculate the truck VMT for transporting cattle to meat processing facilities in southwest Kansas. The first step is to determine the truck VMT for transporting cattle from feed yards in southwest Kansas to the meat processing facilities; and the second step is to estimate the truck VMT for transporting cattle from other states and/or other parts of Kansas to meat processing facilities in southwest Kansas.

5.7.1 TRUCK VMT FOR TRANSPORTING FINISHED CATTLE FROM FEED YARDS IN SOUTHWEST KANSAS TO MEAT PROCESSING FACILITIES IN SOUTHWEST KANSAS

To calculate the truck VMT for transporting finished cattle from feed yards in southwest Kansas to meat processing facilities in the region, the researchers used a three-step approach. Required truckloads for transporting cattle were determined first. Second, the truck VMT from feed yards to the centroids of counties was calculated. Finally, the truck VMT from the centroids of each county to each of the four major meat processing facilities in southwest Kansas was determined. The sum of steps 2 and 3 is the total truck VMT for transporting cattle from feed yards in southwest Kansas to meat processing facilities in the region.

5.7.1.1 REQUIRED TRUCKLOADS FOR TRANSPORTING FINISHED CATTLE

With the truck capacities for transporting finished cattle from Table 5.2 (45 finished cattle per truck), the truckloads for transporting finished cattle can be determined. For instance, using the Clark County data, the following parameters can be calculated:

Annual Truckloads = Feeder cattle per year/ Number of cattle per truck

= 67,800/45

= 1,507 truckloads of finished cattle

Quantity transported = Finished cattle per year x Lbs. per cattle

= 67,800 x 1,200 lbs.

= 81,360,000 lbs.

Similarly, the number of truckloads along with the quantity transported (in pounds) can be calculated for the remaining counties in the southwest Kansas region. The results are shown in Table 5.12.

Table 5.12: Annual Truckloads for Transporting Finished Cattle in Southwest Kansas Counties in 2005

No.	County	Feed Yard Population	Turnover Factor	Finished Cattle per year	Annual Truckloads	Quantity transported (pounds)
1	Clark	33,900	2	67,800	1,507	81,360,000
2	Comanche	800	2	1,600	36	1,920,000
3	Edwards	31,253	2	62,506	1,389	75,007,200
4	Finney	259,000	2	518,000	11,511	621,600,000
5	Ford	120,100	2	240,200	5,338	288,240,000
6	Grant	169,132	2	338,264	7,517	405,916,800
7	Gray	149,500	2	299,000	6,644	358,800,000
8	Greeley	10,700	2	21,400	476	25,680,000
9	Hamilton	65,700	2	131,400	2,920	157,680,000
10	Haskell	297,600	2	595,200	13,227	714,240,000
11	Hodgeman	32,900	2	65,800	1,462	78,960,000
12	Kearny	59,800	2	119,600	2,658	143,520,000
13	Kiowa	5,998	2	11,996	267	14,395,200
14	Lane	35,508	2	71,016	1,578	85,219,200
15	Meade	18,500	2	37,000	822	44,400,000
16	Morton	1,662	2	3,324	74	3,988,800
17	Ness	0	2	0	0	0
18	Pawnee	82,900	2	165,800	3,684	198,960,000
19	Rush	1,741	2	3,482	77	4,178,400
20	Scott	207,700	2	415,400	9,231	498,480,000
21	Seward	81,740	2	163,480	3,633	196,176,000
22	Stanton	42,632	2	85,264	1,895	102,316,800
23	Stevens	30,833	2	61,666	1,370	73,999,200
24	Wichita	120,926	2	241,852	5,374	290,222,400
Totals		1,860,525		3,721,050	82,690	4,465,260,000

In summary, it is estimated that there are 82,690 truckloads that transport 3,721,050 finished cattle with a total of about four and a half billion pounds in weight from feed yards in southwest Kansas to meat processing facilities in the southwest Kansas region in 2005.

5.7.1.2 TRUCK VMT FOR TRANSPORTING FINISHED CATTLE FROM FEED YARDS TO COUNTY CENTROIDS

To calculate truck VMT for transporting finished cattle from feed yards to county centroids, information of the average distances from Tables 5.4 and annual truckloads of finished cattle from Table 4.3.1 were used. It should be noted that Table 5.4 gives data on an average distance between a county centroid to the feed yards in the respective county. The same data can be used for an average distance between feed yards to a respective county centroid. The results of the calculations are shown in Table 5.13. For example, the calculation procedure for Clark County is as follows:

Annual Truck VMT = Annual truckloads x Average distance

= 1,507 x 14.82

= 22,334

Daily Truck VMT = Annual Truck VMT / 365

= 22,334 / 365

= 61

Similarly, the VMT can be calculated on a daily and annual basis for the rest of the counties in the southwest Kansas region.

Table 5.13: Daily & Annual Truck VMT for Transporting Finished Cattle from Feed Yards to County Centroids within southwest Kansas

No.	County	Annual Truckloads	Average Distance (miles)	Annual VMT	Daily VMT
1	Clark	1,507	14.82	22,334	61
2	Comanche	36	16.8	605	2
3	Edwards	1,389	14.54	20,198	55
4	Finney	11,511	15.82	182,069	499
5	Ford	5,338	11.94	63,738	175
6	Grant	7,517	12.78	96,086	263
7	Gray	6,644	10.38	68,986	189
8	Greeley	476	11.34	5,398	15
9	Hamilton	2,920	13.92	40,655	111
10	Haskell	13,227	11.32	149,686	410
11	Hodgeman	1,462	13.46	19,676	54
12	Kearny	2,658	9.29	24,695	68
13	Kiowa	267	18.34	4,896	13
14	Lane	1,578	11.23	17,714	49
15	Meade	822	14.37	11,813	32
16	Morton	74	10.76	796	2
17	Ness	0	17.23	0	0
18	Pawnee	3,684	13.04	48,022	132
19	Rush	77	12.78	984	3
20	Scott	9,231	11.24	103,750	284
21	Seward	3,633	14.45	52,508	144
22	Stanton	1,895	12.58	23,846	65
23	Stevens	1,370	11.52	15,782	43
24	Wichita	5,374	15.21	81,751	224
Totals	82,690	12.83	1,055,988	2,893	

In summary, the annual and daily truck VMT are 1,055,988 and 2,893 respectively, for transporting finished cattle from feed yards to county centroids within the southwest Kansas region.

5.7.1.3 TRUCK VMT FOR TRANSPORTING FINISHED CATTLE FROM COUNTY CENTROIDS TO MEAT PROCESSING FACILITIES

The finished cattle are finally transported from county centroids to the four major meat processing facilities in the southwest Kansas region to be slaughtered. It is assumed that 25% of the annual truckloads from each county, shown in Table 5.12, are distributed to each of the four major meat processing facilities evenly. Thus, the annual truckloads from each of the county centroids to each of the four meat processing facilities in the southwest Kansas region can be calculated using the following formula.

Annual truckloads from a county centroid to a meat processing facility

= 25% x Annual truckloads of a county

For example, annual truckloads from Clark County to the Excel Corporation in Dodge City can be calculated as follow:

Annual truckloads from Clark County to Excel = 25% x 1,507 truckloads

= 377 truckloads

Similarly, the annual truckloads originating from other counties to the Excel Corporation can be calculated in the same fashion.

Apart from the data on annual truckloads from each county centriod to the four major meat processing facilities, there is a need to determine distances from each county centroid to each of the four major meat processing facilities in order to calculate the truck VMT for transporting finished cattle from county centroids to the four meat processing facilities. These distances were determined using TransCAD software and the results are presented in Appendix VII. Therefore, truck VMT for transporting finished cattle from a county centroid to a meat processing facility can be calculated using the following formula:

Annual truck VMT from a county centroid to a meat processing facility

= Annual truckloads (from centroid to meat processing facility) x Distance from centroid to meat processing facility

For example, annual truck VMT from the Clark County centroid to the Excel Corporation can be determined as follow:

Annual truck VMT from Clark to Excel	= 377 truckloads x 47.18 miles
	= 17,787
Daily truck VMT from Clark to Excel	= Annual truck VMT / 365
	= 17,787 / 365
	= 49

The distance of 47.18 miles from the Clark County centroid to the Excel Corporation is presented in Appendix VII. Using the same formula, the truck VMT for transporting finished cattle from the remaining county centroids to the Excel Corporation in Dodge City are calculated and the results are tabulated in Table 5.14.

Table 5.14: Daily & Annual Truck VMT for Transporting Finished Cattle from Southwest Kansas County Centroids to the Excel Corporation

No.	County	Annual Truckloads	Distance Traveled (miles)	Annual VMT	Daily VMT
1	Clark	377	47.18	17,787	49
2	Comanche	9	71.27	641	2
3	Edwards	347	39.38	13,665	37
4	Finney	2,878	60.45	173,975	477
5	Ford	1,334	4.86	6,483	18
6	Grant	1,879	112.16	210,749	577
7	Gray	1,661	27.55	45,761	125
8	Greeley	119	141.96	16,893	46
9	Hamilton	730	111.56	81,439	223
10	Haskell	3,307	85.42	282,484	774
11	Hodgeman	366	31.69	11,599	32
12	Kearny	664	84.24	55,935	153
13	Kiowa	67	45.56	3,053	8
14	Lane	394	78.59	30,964	85
15	Meade	205	41.88	8,585	24
16	Morton	18	132.34	2,382	7
17	Ness	0	56.93	0	0
18	Pawnee	921	68.69	63,263	173
19	Rush	19	78.9	1,499	4
20	Scott	2,308	95.76	220,990	605
21	Seward	908	75.34	68,409	187
22	Stanton	474	134.03	63,530	174
23	Stevens	343	108.82	37,325	102
24	Wichita	1,344	120.23	161,589	443
Totals	20,672		1,579,000	4,325	

The calculation procedure described above is used to determine truck VMT for transporting finished cattle from county centroids to the other three meat processing facilities including National Beef in Dodge City (Table 5.15), National Beef in Liberal (Table 5.16), and Tyson Fresh Meats in Holcomb (Table 5.17).

Table 5.15: Daily & Annual Truck VMT for Transporting Finished Cattle from Southwest Kansas County Centroids to National Beef in Dodge City

No.	County	Annual Truckloads	Total Distance Traveled (miles)	Annual VMT	Daily VMT
1	Clark	377	49.79	18,771	51
2	Comanche	9	66.71	600	2
3	Edwards	347	34.77	12,065	33
4	Finney	2,878	55.84	160,708	440
5	Ford	1,334	0.25	334	1
6	Grant	1,879	107.55	202,086	554
7	Gray	1,661	22.94	38,103	104
8	Greeley	119	137.35	16,345	45
9	Hamilton	730	106.95	78,074	214
10	Haskell	3,307	80.81	267,239	732
11	Hodgeman	366	27.08	9,911	27
12	Kearny	664	79.63	52,874	145
13	Kiowa	67	40.99	2,746	8
14	Lane	394	73.98	29,148	80
15	Meade	205	44.49	9,120	25
16	Morton	18	134.95	2,429	7
17	Ness	0	52.32	0	0
18	Pawnee	921	64.08	59,018	162
19	Rush	19	74.29	1,412	4
20	Scott	2,308	91.15	210,351	576
21	Seward	908	77.95	70,779	194
22	Stanton	474	129.42	61,345	168
23	Stevens	343	111.43	38,220	105
24	Wichita	1,344	115.62	155,393	426
Totals	20,672		1,497,071	4,103	

Table 5.16: Daily & Annual Truck VMT for Transporting Finished Cattle from Southwest Kansas County Centroids to National Beef in Liberal

No.	County	Annual Truckloads	Total Distance Traveled (miles)	Annual VMT	Daily VMT
1	Clark	377	72.08	27,174	74
2	Comanche	9	102.12	919	3
3	Edwards	347	117.13	40,644	111
4	Finney	2,878	69.3	199,445	546
5	Ford	1,334	82.61	110,202	302
6	Grant	1,879	63.11	118,584	325
7	Gray	1,661	75.72	125,771	345
8	Greeley	119	147.06	17,500	48
9	Hamilton	730	112.91	82,424	226
10	Haskell	3,307	39.64	131,089	359
11	Hodgeman	366	109.44	40,055	110
12	Kearny	664	91.04	60,451	166
13	Kiowa	67	99.84	6,689	18
14	Lane	394	120.79	47,591	130
15	Meade	205	37.87	7,763	21
16	Morton	18	62.94	1,133	3
17	Ness	0	134.69	0	0
18	Pawnee	921	146.44	134,871	370
19	Rush	19	156.65	2,976	8
20	Scott	2,308	104.72	241,668	662
21	Seward	908	15.57	14,138	39
22	Stanton	474	84.99	40,285	110
23	Stevens	343	39.99	13,717	38
24	Wichita	1,344	129.19	173,631	476
Totals		20,672		1,638,720	4,490

Table 5.17: Daily & Annual Truck VMT for Transporting Finished Cattle from Southwest Kansas County Centroids to Tyson Fresh Meats in Holcomb

No.	County	Annual Truckloads	Total Distance Traveled (miles)	Annual VMT	Daily VMT
1	Clark	377	112.39	42,371	116
2	Comanche	9	129.97	1,170	3
3	Edwards	347	96.95	33,642	92
4	Finney	2,878	7.53	21,671	59
5	Ford	1,334	63.02	84,069	230
6	Grant	1,879	44.28	83,202	228
7	Gray	1,661	40.33	66,988	184
8	Greeley	119	77.84	9,263	25
9	Hamilton	730	43.68	31,886	87
10	Haskell	3,307	37.19	122,987	337
11	Hodgeman	366	63.5	23,241	64
12	Kearny	664	16.36	10,863	30
13	Kiowa	67	104.26	6,985	19
14	Lane	394	60.75	23,936	66
15	Meade	205	78.18	16,027	44
16	Morton	18	93.16	1,677	5
17	Ness	0	88.66	0	0
18	Pawnee	921	106.25	97,856	268
19	Rush	19	116.45	2,213	6
20	Scott	2,308	38.96	89,910	246
21	Seward	908	61.26	55,624	152
22	Stanton	474	66.16	31,360	86
23	Stevens	343	67.98	23,317	64
24	Wichita	1,344	57.62	77,441	212
Totals		20,672		957,699	2,623

The truck VMT for transporting finished cattle from the county centroids to the four meat processing facilities is tabulated in Table 5.18.

Table 5.18: Daily & Annual Truck VMT for Transporting Finished Cattle from County Centroids to Meat Processing Facilities in Southwest Kansas

No.	Meat Packing Plant	City	Annual VMT	Daily VMT
1	Excel Corporation	Dodge City	1,579,000	4,325
2	National Beef	Dodge City	1,497,071	4,103
3	National Beef	Liberal	1,638,720	4,490
4	Tyson Fresh Meats	Holcomb	957,699	2,623
Totals			5,672,490	15,541

Based on the data presented in Tables 5.13 and 5.17, the daily and annual truck VMT for transporting finished cattle from feed yards to the four major meat processing facilities within the southwest Kansas region can be calculated as follows:

Daily Truck VMT = 2,893 + 15,541

= 18,434

Annual Truck VMT = 1,055,988 + 5,672,490

= 6,728,478

However, it should be noted that the above analysis is based on one-way truck VMT. After unloading the finished cattle, trucks have to go back to their origins. Therefore, the total daily and annual truck VMT for transporting (loaded) finished cattle from feed yards to the meat processing facilities within the southwest Kansas region and back (unloaded or empty) to the origins are:

Total Daily Truck VMT = 18,434 x 2

= 36,868

Total Annual Truck VMT = 6,728,478 x 2

= 13,456,956

5.7.2 TRUCK VMT FOR TRANSPORTING FINISHED CATTLE FROM OTHER STATES AND/OR OTHER PARTS OF KANSAS TO MEAT PROCESSING FACILITIES IN SOUTHWEST KANSAS

According to the data collected from the four largest meat processing facilities in the southwest Kansas region, the daily kill in the area is approximately 23,600 cattle. Apart from these four meat processing facilities, about 4,000 cattle are slaughtered in another large meat processing facility in Kansas, but it is not in the southwest Kansas region (AllExperts, 2006). Thus, in total there are approximately 27,600 cattle killed every day in Kansas. And based on USDA data, there were a total of 7,321,400 cattle slaughtered in Kansas in 2005 (USDA, 2006d). Thus, approximately the number of cattle slaughtered in the southwest Kansas region in 2005 can be proportionately estimated as,

= (7,321,400 / 27,600) x (23,600)

= 6,260,330 cattle

Table 5.3 estimates that there were 3,721,050 cattle that were fed in southwest Kansas in 2005. Thus, the number of finished cattle coming from other states and/or other parts of Kansas to the four major meat processing facilities in southwest Kansas in 2005 are:

= Cattle slaughtered in southwest Kansas – Cattle on feed in southwest Kansas

= 6,260,330 – 3,721,050

= 2,539,280 finished cattle

These cattle have to be allocated to each of the four major meat processing facilities in the southwest Kansas region. Based on the information collected from some of the feed yards and the site visits conducted in the southwest Kansas region, the following assumptions are made about the quantity of cattle coming from different directions – 70% of the cattle come from the south and 10% of the cattle come from each of the north, east, and west directions.

Thus, the number of finished cattle coming from the south

= 70% x 2,539,280 cattle

= 1,777,496 cattle

Number of finished cattle coming from the north, east, and west

= 10% x 2,539,280 cattle

= 253,928 cattle (from each direction)

It is further assumed that cattle from each direction, shown above, are distributed to each of the four meat processing facilities evenly. Thus, the annual number of cattle coming from each direction to each of the meat processing facilities in the southwest Kansas region can be calculated using the following formula.

Annual number of finished cattle from one direction to a meat processing facility

= 25% x Annual number of finished cattle from a certain direction

For example, the annual number of finished cattle from the south to the Excel Corporation in Dodge City can be calculated as follows:

Annual number of finished cattle from the south to Excel = 25% x 1,777,496 cattle

= 444,374 finished cattle

Annual number of finished cattle from each of the north, east, & west to Excel

= 25% x 253,928 cattle

= 63,482 finished cattle

Therefore, the annual number of finished cattle from outside southwest Kansas to Excel

= 444,374 + 63,482 x 3

= 634,820 finished cattle

Similarly, the annual number of finished cattle originating from different directions to the rest of the meat processing facilities can be calculated in the same fashion. In fact, the numbers of cattle coming from different directions to each of the meat processing facilities remains the same (634,820 cattle per meat processing facilities) since it was assumed that cattle are distributed equally among the four meat processing facilities.

Knowing the numbers of cattle from each direction to the meat processing facilities and the number of finished cattle per truck (45 finished cattle per truck, Table 5.2); the required truckloads for transporting cattle can be calculated as follows:

Annual truckloads from one direction to a meat processing facility

= Annual number of finished cattle to a meat processing facility (single direction)/No. of cattle per truck

For example, annual truckloads from the east, west, and north to any of the four meat processing facilities

= 63,482 / 45

= 1,410 truckloads

Similarly, annual truckloads from the south to any of the four meat processing facilities

= 444,374 / 45

= 9,874 truckloads

Apart from the data on the number of finished cattle from different directions to each of the four meat processing facilities, distances traveled by trucks from entry points located on the southwest Kansas boundaries to the four meat processing facilities can be determined using the assumptions made on the entry points in Section.5.1 and TransCAD software. The results of the distance calculations are presented in Appendix VIII. These distances are used for the calculation of truck VMT for transporting finished cattle from different directions to each of the meat processing facilities. For instance, the Excel Corporation in Dodge City receives cattle from the east with entry points located on highways 54, 56, and 160 (using E54 to represent highway 54 in the east boundary of southwest Kansas, the same for E160 and E56). Each entry point contributes one third of the finished cattle to the Excel Corporation. Based on the information shown in Appendix VIII;

Total distance from the entry points to the Excel Corporation in Dodge City

= E54 + E56 + E160

= 62.32 + 71.39 + 85.15

= 218.86 miles

Average Distance Traveled

= Total Distance/ No. of Entry points

= 218.86/3

= 72.95 miles

Similarly, the average distances traveled by trucks for transporting finished cattle from the south, west, and north are calculated in the same fashion and the results are shown in Table 5.19.

Knowing the average distance traveled and annual truckloads in each direction, truck VMT for transporting finished cattle from all directions (east, south, west, and north) to a meat processing facility can be calculated using the following formula:

Annual truck VMT from all directions to a meat processing facility = ∑ [(Annual truckloads from one direction to a meat processing facility) x (Average distance traveled from one direction to a meat processing facility)]

For example, annual truck VMT from all directions to the Excel Corporation can be determined as follows:

Annual truck VMT from all directions to Excel

= [(1,410 truckloads from east x 72.95 miles) + (9,874 truckloads from south x 84.79 miles) + (1,410 truckloads from west x 92.44 miles) + (1,410 truckloads from north x 138.95 miles)

= 1,266,336

Daily truck VMT from all directions to Excel

= Annual truck VMT from all directions to Excel / 365

= 1,266,336 / 365

= 3,469

The calculation procedure described above is used to determine truck VMT for transporting finished cattle from other states and/or other parts of Kansas to the other three meat processing facilities including National Beef in Dodge City, National Beef in Liberal, and Tyson Fresh Meats in Holcomb. The results are shown in Table 5.19. In summary, the daily and annual truck VMT for transporting finished cattle from other states and/or other parts of Kansas to the four meat processing facilities within the southwest Kansas region are 14,299 and 5,219,422, respectively.

Table 5.19: Daily & Annual Truck VMT for Transporting Finished Cattle from Other States and/or other parts of Kansas to the Four Meat processing facilities in Southwest Kansas

No.	Destination	Entry Point on Highway	Average Distance Traveled in Each Direction(miles)				Annual Truckloads in Each Direction				Annual VMT	Daily VMT
			East	South	West	North	East	South	West	North		
1	Excel Corporation, Dodge City	E54, E160, E56, N183, N283, N83, W160, W50, S54, S283, S56, S183	72.95	84.79	138.95	92.44	1,410	9,874	1,410	1,410	1,266,336	3,469
2	National Beef, Dodge City	E54, E160, E56, N183, N283, N83, W160, W50, S54, S283, S56, S183	69.02	87.09	136.38	89.87	1,410	9,874	1,410	1,410	1,276,257	3,497
3	National Beef, Liberal	E54, E160, E56, N183, N283, N83, W160, W50, S54, S283, S56, S183	130.32	61.39	116.1	148.26	1,410	9,874	1,410	1,410	1,162,664	3,185
4	Tyson Fresh Meats, Holcomb	E54, E160, E56, N183, N283, N83, W160, W50, S54, S283, S56, S183	128.03	107.8	72.08	118.86	1,410	9,874	1,410	1,410	1,514,165	4,148
Total							5,640	39,496	5,640	5,640	5,219,422	14,299

However, the above analysis considers only one-way truck VMT. Therefore, the total daily and annual truck VMT for transporting (loaded) finished cattle from other states and/or other parts of Kansas to the four meat processing facilities in the southwest Kansas region and back (unloaded or empty) to the origins are:

Total Daily Truck VMT = 14,299 x 2

= 28,598

Total Annual Truck VMT = 5,219,422 x 2

= 10,438,844

Combining the results presented in Section 5.3 and above, the overall daily and annual truck VMT for transporting finished cattle from feed yards, other states, and other parts of Kansas to the four meat processing facilities in southwest Kansas and returning to the origins are:

Daily Truck VMT = 36,868 + 28,598

= 65,466

Annual Truck VMT = 13,456,956 + 10,438,844

= 23,895,800

5.8 TRUCK VMT FOR TRANSPORTING MEAT TO U.S. CUSTOMERS

The processed meat (boxed beef) from each of the four major meat processing facilities is transported to various customers in the United States. For analysis purposes, researchers assumed that processed meat is first distributed to customers in large cities in the U.S. including Atlanta, Chicago, Dallas, Los Angeles, New York, and Phoenix. Then, the meat is distributed from these large cities to customers in other small cities and towns. There are two reasons that the researchers make these assumptions.

1. Based on interviews conducted during the site visits, researches come to a consensus that these six cities represent the biggest cities in the east, south, west, and north directions from where the processed meat is mostly distributed to other small cities and towns.
2. The same highways in the southwest Kansas region are used to transport the processed meat to customers in the U.S. even if the final destinations are not in these six cities.

With the above assumptions, the calculation of truck VMT for transporting meat to U.S. customers is transferred to the determination of truck VMT for transporting meat to the six US cities. To calculate the VMT for transporting meat to the six cities, the distances traveled from the respective meat processing facilities to the six cities were determined first using TransCAD software. The results are presented in Appendix IX. Mileages have been tabulated separately for the southwest Kansas area, other areas in Kansas, and outside of Kansas. Next, it is necessary to calculate the annual truckloads of boxed beef originating at each of the meat processing facilities. It should be noted that the meat processing facilities receive cattle from feed yards in southwest Kansas and from other states and/or other parts of Kansas. Therefore, it is necessary to calculate the total red meat (boxed beef) produced (in truckloads or pounds) from these two sources at each meat processing facilities.

Considering the calculations for the Excel Corporation in Dodge City, the annual number of truckloads from Table 5.14 (20,672 truckloads, pp. 95-96) and the number of finished cattle per truck from Table 5.2 (45 head of finished cattle per truck) are used to calculate the annual number of finished cattle coming to Excel from feed yards in southwest Kansas.

Annual number of finished cattle shipped to the Excel Corporation in Dodge City coming from feed yards within southwest Kansas

= Annual number of truckloads x Number of finished cattle per truck

= 20,672 x 45

= 930,240 finished cattle

Annual number of finished cattle shipped to the Excel Corporation in Dodge City coming from other states and/or other parts of Kansas (Table 5.19)

= Annual number of truckloads from all directions x Number of finished cattle per truck

= (1,410 + 1,410 + 1,410 + 9,874) x 45

= 634,680 finished cattle

Therefore, total annual number of finished cattle coming to Excel

= Annual number of cattle coming from feed yards

+ Annual number of cattle coming from other states and/or other parts of Kansas

= 930,240 + 634,680

= 1,564,920 finished cattle at Excel

Based on the data collected from site visits, the weight of cattle at the time of processing is 1,200 lbs. with about 720 lbs. (60%) of red meat and 480 lbs. (40%) of byproducts. Also, a truck can carry a total of 42,000 lbs. of boxed beef. Therefore, the annual quantity of red meat originating at the Excel Corporation in Dodge City is as follows:

Annual quantity of red meat from Excel

= Total annual number of finished cattle coming to Excel x 720 lbs.

= 1,564,920 finished cattle x 720 lbs.

= 1,126,742,400 lbs. of red meat

Therefore, annual number of truckloads of boxed beef produced at Excel

= Annual quantity of red meat from Excel / Truck Capacity

= 1,126,742,400 / 42,000

= 26,827 truckloads of boxed beef

Thus, it is estimated that the Excel Corporation in Dodge City produced 26,827 truckloads of boxed beef in 2005. Using the same procedure, researchers determined the truckloads of boxed beef shipped by the other three meat processing facilities.

It is further assumed that the quantity of boxed beef from each of the meat processing facilities (origins) is equally distributed among the six large cities (destinations). Accordingly, about 16.67% (1/6 =16.67%) of the annual number of truckloads of boxed beef originating at each meat processing facility is distributed to each of the six cities. Therefore, the annual number of truckloads shipped from each meat processing facility to each of the six cities is as follows:

Annual number of truckloads from one meat processing facility to each of the six cities

= 16.67% x Annual number of truckloads of boxed beef at one meat processing facility

For example, at the Excel Corporation in Dodge City, the annual number of truckloads shipped to each of the six cities is as follows:

Annual number of truckloads from Excel to each of the six cities

= 16.67% x 26,827

= 4,471 truckloads of boxed beef

The weight of these truckloads of boxed beef is equal to 187,782,000 lbs. (4,471 x 42,000 lbs.). The formula used to determine the annual truck VMT for transporting boxed beef from a meat processing facility to each of the six cities is:

Annual truck VMT from one meat processing facility to each of the six cities

= Annual truckloads from meat processing facility to six cities x Total distance traveled in southwest Kansas

For example, annual truck VMT for transporting boxed beef from the Excel Corporation in Dodge City to Atlanta can be calculated using the above formula:

Annual Truck VMT from Excel to Atlanta = 4,471 x 91.76

= 410,259

Daily Truck VMT from Excel to Atlanta = Annual Truck VMT / 365

= 410,259 / 365

= 1,124

Similarly, the truck VMT can be calculated on a daily and annual basis for the remaining five cities. The results are tabulated in Table 5.20.

Table 5.20: Daily & Annual Truck VMT within Southwest Kansas Region for Transporting Meat from Excel Corporation in Dodge City to Six US Cities

Destination	Distance Traveled in Southwest Kansas (miles)	Annual Truckloads (trucks)	Annual VMT	Daily VMT
Atlanta	91.76	4,471	410,259	1,124
Chicago	91.76	4,471	410,259	1,124
Dallas	132.31	4,471	591,558	1,621
Los Angeles	86.61	4,471	387,233	1,061
New York	91.76	4,471	410,259	1,124
Phoenix	20.21	4,471	90,359	248
Total		26,827	2,299,927	6,301

The calculation procedure described above is used to determine the daily and annual truck VMT for transporting meat to the six cities from the other three meat processing facilities including National Beef in Dodge City (Table 5.21), National Beef in Liberal (Table 5.22), and Tyson Fresh Meats in Holcomb (Table 5.23).

Table 5.21: Daily & Annual Truck VMT within Southwest Kansas Region for Transporting Meat from National Beef in Dodge City to Six US Cities

Destination	Distance Traveled in Southwest Kansas (miles)	Annual Truckloads (trucks)	Annual VMT	Daily VMT
Atlanta	86.88	4,471	388,440	1,064
Chicago	86.88	4,471	388,440	1,064
Dallas	66.85	4,471	298,886	819
Los Angeles	70.53	4,471	315,340	864
New York	42.65	4,471	190,688	522
Phoenix	20.21	4,471	90,359	248
Total		26,827	1,672,153	4,581

Table 5.22: Daily & Annual Truck VMT within Southwest Kansas Region for Transporting Meat from National Beef in Liberal to Six US Cities

Destination	Distance Traveled in Southwest Kansas (miles)	Annual Truckloads (trucks)	Annual VMT	Daily VMT
Atlanta	3	4,471	13,413	37
Chicago	116	4,471	518,636	1,421
Dallas	3	4,471	13,413	37
Los Angeles	3	4,471	13,413	37
New York	116	4,471	518,636	1,421
Phoenix	3	4,471	13,413	37
Total		26,827	1,090,924	2,989

Table 5.23: Daily & Annual Truck VMT within Southwest Kansas Region for Transporting Meat from Tyson Fresh Meats in Holcomb to Six US Cities

Destination	Distance Traveled in Southwest Kansas (miles)	Annual Truckloads (trucks)	Annual VMT	Daily VMT
Atlanta	72.6	4,471	324,595	889
Chicago	72.6	4,471	324,595	889
Dallas	138.25	4,471	618,116	1,693
Los Angeles	43.97	4,471	196,590	539
New York	72.6	4,471	324,595	889
Phoenix	43.97	4,471	196,590	539
Total		26,827	1,985,081	5,439

However, it should be noted that the above analysis only considers one-way trips. After unloading the boxed beef at the destinations, trucks have to go back to their origins (roundtrip). Table 5.24 shows the total daily and annual truck VMT of roundtrip shipments in the southwest Kansas region for transporting boxed beef to the six U.S. cities.

Table 5.24: Total Daily & Annual Truck VMT within Southwest Kansas for Transporting Boxed Beef from Four Meat processing facilities to Six US Cities

No.	Meat processing facility	Annual VMT	Daily VMT
1	Excel Corporation, Dodge City	4,599,854	12,602
2	National Beef, Dodge City	3,344,306	9,162
3	National Beef, Liberal	2,181,848	5,978
4	Tyson Fresh Meats, Holcomb	3,970,162	10,878
Total		14,096,170	38,620

5.9 TRUCK VMT FOR TRANSPORTING MEAT BYPRODUCTS

The meat byproducts produced at each of the four meat processing facilities constitutes to about 40% of the total live weight of the cattle. It is also known from the site visits to the southwest Kansas region that about 50% of the byproducts produced at the four major meat processing facilities are transported by rail and another 50% by truck. Some of the byproducts are exported to Mexico via Dallas and East Asia via Phoenix and Los Angeles. Small amounts of the byproducts such as technical (inedible) tallow and meat and bone meal are sent by trucks to local feed yards for feeding swine, chickens, and turkeys. Because the quantity of byproducts sent to the feed yards are very small, researchers ignore the truck VMT for transporting this portion of the byproducts.

It is assumed that the amount of byproducts exported from each of the meat processing facilities is equally distributed to the three paths via Dallas, Los Angeles and Phoenix. These three cities are considered as the destinations for calculation purposes. The distances traveled from the respective meat processing facility to the three destinations were previously determined using TransCAD software, as shown in Table 5.25. The annual number of cattle slaughtered at each of the meat processing facilities was calculated in Section 5.7. That is, the annual number of finished cattle sent to each of the meat processing facilities is the total of the finished cattle coming from feed yards within southwest Kansas, other states, and/or other parts of Kansas. For example, the annual number of finished cattle shipped to the Excel Corporation in Dodge City is 1,564,920.

Each finished cattle account for about 480 lbs. (40%) of byproducts. Therefore, the annual quantity of byproducts originating at each of the meat processing facilities is:

Annual quantity of byproducts produced at each meat processing facility

= Annual number of finished cattle coming to each meat processing facility x 480 lbs.

For example, the annual quantity of byproducts produced at Excel

= 1,564,920 finished cattle x 480 lbs.

= 751,161,600 lbs.

Since 50% of byproducts are distributed by truck and the capacity of a truck is 42,000 lbs. for transporting byproducts, the annual number of truckloads for transporting byproducts from Excel can be calculated as follows:

Annual truckloads for transporting byproducts from Excel

= (50% x Annual quantity of byproducts at Excel) / Truck capacity

= (50% x 751,161,600) / 42,000 lbs.

= 375,580,800 / 42,000 lbs.

= 8,942 truckloads

Thus, it is estimated that the Excel Corporation in Dodge City produces 751,161,600 lbs. of byproducts of which about 375,580,800 lbs. are transported by truck which leads to 8,942 truckloads. Using the same procedure, the truckloads of byproducts can be determined at each of the remaining three meat processing facilities.

It is further assumed that 65% of the byproducts transported by trucks are distributed south to Mexico via Dallas and the rest of the 35% are distributed to East Asia via Los Angeles and Phoenix with a half-and-half split (the route to Phoenix is assumed as an alternative route to Los Angeles since the mileage is about the same as the direct route to Los Angeles). Therefore, about 17.5% (35%/2 = 17.5%) of the annual number of truckloads originating at each meat processing facility are distributed equally to the Los Angeles and Phoenix paths. Based on these assumptions, the annual number of truckloads from each meat processing facility to Mexico via Dallas is:

Annual number of truckloads from one meat processing facility to Dallas

= 65% x Annual truckloads for transporting byproducts from one meat processing facility

For example, annual number of truckloads from Excel to Dallas

= 65% x 8,942

= 5,812 truckloads

The weight of these truckloads of byproducts is equal to 244,104,000 lbs. (5,812 x 42,000 lbs.). Using the same method, researchers determined the truckloads for transporting byproducts via the Los Angeles and Phoenix paths, which are 1,565 (17.5% x 8,942) for both of them.

The formula used to determine the annual truck VMT in the southwest Kansas region for transporting byproducts from a meat processing facility to each of the three destinations (Dallas, Los Angeles and Phoenix) are:

Annual truck VMT from one meat processing facility to each of the three destinations

= Annual truckloads from meat processing facility to destinations x distance traveled in southwest Kansas

For example, annual truck VMT in the southwest Kansas region for transporting byproducts from the Excel Corporation in Dodge City to Mexico via the Dallas path can be calculated using the above formula:

Annual truck VMT from Excel to Dallas = 5,812 x 132.31

= 768,986

Daily truck VMT from Excel to Dallas = Annual Truck VMT / 365

= 768,986 / 365

= 2,107

Similarly, the annual and daily truck VMT in southwest Kansas for transporting byproducts from the Excel Corporation in Dodge City to export customers via the Los Angeles and Phoenix paths can be calculated using the same formula shown above:

Annual truck VMT from Excel to Los Angeles = 1,565 x 86.61

= 135,545

Daily truck VMT from Excel to Los Angeles = Annual Truck VMT / 365

= 135,545 / 365

= 371

Annual truck VMT from Excel to Phoenix = 1,565 x 20.21

=31,629

Daily truck VMT from Excel to Phoenix = 31,629 / 365

= 87

The same calculation procedure can be adopted for calculating the daily and annual truck VMT for transporting byproducts from the rest of the meat processing facilities (National Beef in Dodge City, National Beef in Liberal and Tyson Fresh Meats in Holcomb) to export customers via the Dallas, Los Angeles, and Phoenix paths. The results are tabulated in Table 5.25.

Table 5.25: Daily & Annual Truck VMT for Transporting Meat Byproducts from Meat processing facilities to Export Destinations

No.	Meat Processing Plant	Destination	Total Distance (miles)	Annual Truckloads	Annual VMT	Daily VMT
1	Excel Corporation, Dodge City	Dallas	132.31	5,812	768,986	2,107
		Los Angeles	86.61	1,564	135,458	371
		Phoenix	20.21	1,564	31,629	87
2	National Beef, Dodge City	Dallas	66.85	5,812	388,532	1,064
		Los Angeles	70.53	1,564	110,309	302
		Phoenix	20.21	1,564	31,608	87
3	National Beef, Liberal	Dallas	3	5,812	17,436	48
		Los Angeles	3	1,564	4,692	13
		Phoenix	3	1,564	4,692	13
4	Tyson Meats, Holcomb	Dallas	138.25	5,812	803,509	2,201
		Los Angeles	43.97	1,564	68,769	188
		Phoenix	43.97	1,564	68,769	188
Totals				35,760	2,434,368	6,669

It should be noted that the above daily and annual truck VMT represent one-way trips. After unloading the byproducts, trucks have to go back to their origins. Thus, the total daily and annual truck VMT (roundtrip) for transporting byproducts to export customers is 13,338 and 4,868,736, respectively.

5.10 TRUCK VMT FOR TRANSPORTING MEAT TO EXPORT CUSTOMERS

Currently, the market is closed for transporting meat to export customers in East Asia. However, if the market re-opens, then approximately 10% of the total boxed beef produced at each of the four major meat processing facilities will be distributed to export customers in East Asia. To anticipate the future market development, truck VMT for transporting boxed beef from the four meat processing facilities to export customers in East Asia have been estimated and tabulated in Table 5.26.

During the calculation process, it is assumed that all boxed beef sent to export customers is transported via the Los Angeles path. The travel distances from the four meat processing facilities to Los Angeles have been calculated using TransCAD software and the results are shown in Table 4.5.1 (pp. 112). Because the focus of the analysis is the truck VMT within the southwest Kansas region, only mileages within the southwest Kansas region are considered. Since 10% of the total production of boxed beef (meat) at each meat processing facility is distributed to export customers in East Asia, the number of truckloads from each meat processing facility to export customers in East Asia can be calculated using the following formula:

Annual truckloads of boxed beef from each meat processing facility to East Asia

= 10% x Annual truckloads of boxed beef at each meat processing facility (Section 4.4, pp. 108-109)

= 10% x 26,827

= 2,682 truckloads

The number of truckloads of boxed beef (meat) from each meat processing facility remains the same since it is assumed that the production rate is the same at each meat processing facility. Therefore, annual truck VMT for transporting boxed beef (meat) from each meat processing facility to export customers in East Asia via Los Angeles can be calculated using the following formula:

Annual truck VMT from meat processing facility to export customers in East Asia

= Annual truckloads of boxed beef from one meat processing facility to Los Angeles x Distance traveled in southwest Kansas

For example, annual truck VMT for transporting boxed beef from the Excel Corporation in Dodge City to export customers in East Asia via the Los Angeles path can be calculated using the above formula:

Annual truck VMT from Excel to export customers in East Asia

= 2,682 x 86.61

= 232,288

Daily truck VMT from Excel to export customers in East Asia

= Annual truck VMT / 365

= 232,288 / 365

= 636

Similarly, the daily and annual truck VMT can be calculated for transporting boxed beef (meat) from the remaining three meat processing facilities (National Beef in Dodge City, National Beef in Liberal and Tyson Fresh Meats in Holcomb) to export customers in East Asia. The results are shown in Table 5.26

Table 5.26: Daily & Annual Truck VMT for Transporting Meat from Meat processing facilities to Export Customers in East Asia (via Los Angeles)

No.	Meat Processing Plant (Origin)	Distance Traveled in southwest Kansas (miles)	Annual Truckloads	Annual Truck VMT	Daily Truck VMT
1	Excel Corporation, Dodge City	86.61	2,682	232,288	636
2	National Beef, Dodge City	70.53	2,682	189,161	518
3	National Beef, Liberal	3	2,682	8,046	22
4	Tyson Fresh Meats, Holcomb	43.97	2,682	117,928	323
Total			10,728	547,423	1,499

It should be noted that the above daily and annual truck VMT represent one-way trips. After unloading the boxed beef, trucks have to go back to their origins. Thus, the total daily and annual truck VMT (roundtrip) for transporting boxed beef to export customers in East Asia are 2,998 and 1,094,846, respectively.

In addition, if the East Asian market re-opens in the future, 10% of boxed beef from each of the four meat processing facilities will be transported to export customers in East Asia via Los Angeles. Thus, there will be a 10% reduction in quantity in the U.S. market. Accordingly, truck VMT for transporting meat to U.S. customers will be reduced by 10%. Table 5.27 presents the daily and annual VMT for transporting boxed beef from the four meat processing facilities to U.S. customers assuming the East Asian market reopens. This Table is generated based on the Table 5.24 with a 10% reduction.

Table 5.27: Daily & Annual Truck VMT within Southwest Kansas for Transporting Boxed Beef from Four Meat processing facilities to East Asian Market

No.	Meat processing facility	Annual VMT	Daily VMT
1	Excel Corporation, Dodge City	4,139,869	11,342
2	National Beef, Dodge City	3,009,875	8,246
3	National Beef, Liberal	1,963,663	5,380
4	Tyson Meats, Holcomb	3,573,146	9,790
Total		12,686,553	34,758

5.11 SUMMARY

This chapter focuses on determining the truck VMT generated by the processed meat and related industries in the southwest Kansas region. Based on the sequence of the Kansas Meat Industry shown in Figure 3.1, the process of estimating truck VMT is broken down into six components including:

1. Truck VMT for transporting feeder cattle to feed yards in southwest Kansas
2. Truck VMT for transporting feed grain to feed yards in southwest Kansas
3. Truck VMT for transporting finished cattle to meat processing facilities in southwest Kansas
4. Truck VMT for transporting boxed beef to U.S. customers
5. Truck VMT for transporting meat byproducts

6. Truck VMT for transporting boxed beef to export customers in East Asia

Table 5.28 presents the total daily and annual truck VMT generated due to business activities associated with the processed meat and related industries in southwest Kansas, assuming the East Asian market is closed (current situation).

Table 5.28: Total Daily & Annual Truck VMT for Processed Meat and Related Industries in Southwest Kansas without East Asian Market

No.	Sequence Components	Annual VMT	Annual VMT Percentage	Daily VMT	Daily VMT Percentage
1	Feed Cattle to Feed Yards	9,528,888	15.40%	26,106	15.40%
2	Feed Grain to Feed Yards	9,332,302	15.10%	25,564	15.10%
3	Finished Cattle to Meat processing facilities	23,895,800	38.70%	65,466	38.70%
4	Boxed Beef to U.S. Customers	14,096,170	22.80%	38,620	22.80%
5	Byproducts to Export Destinations	4,868,736	8.00%	13,338	8.00%
Total		61,721,896	100%	169,094	100%

Table 5.29 shows the total daily and annual truck VMT due to business activities associated with the processed meat and related industries in southwest Kansas, assuming the East Asian market is opened. Truck VMT presented in both tables clearly indicates that there is a need to reduce truck traffic in the southwest Kansas region. Reduction of truck traffic is achievable if the infrastructure of railroad and intermodal is sufficient in the region. Currently, railroad is used only for transporting a portion of the byproducts and feed grains. Thus, there is great potential to increase the utilization of railroad service for the processed meat and related industries.

Table 5.29: Total Daily & Annual Truck VMT for Processed Meat and Related Industries in Southwest Kansas with East Asian Market

No.	Sequence Components	Annual VMT	Annual VMT Percentage	Daily VMT	Daily VMT Percentage
1	Feed Cattle to Feed Yards	9,528,888	15.5%	26,106	15.5%
2	Feed Grain to Feed Yards	9,332,302	15.2%	25,564	15.2%
3	Finished Cattle to Meat processing facilities	23,895,800	38.9%	65,466	38.9%
4	Boxed Beef to U.S. Customers	12,686,553	20.7%	34,758	20.7%
5	Byproducts to East Asian Destinations	4,868,736	7.9%	13,338	7.9%
6	Boxed Beef to East Asian Customers	1,094,846	1.8%	2,998	1.8%
Total		61,407,125	100%	168,230	100%

Chapter Six - FUTURE GROWTH AND TRANSPORTATION CONSEQUENCES

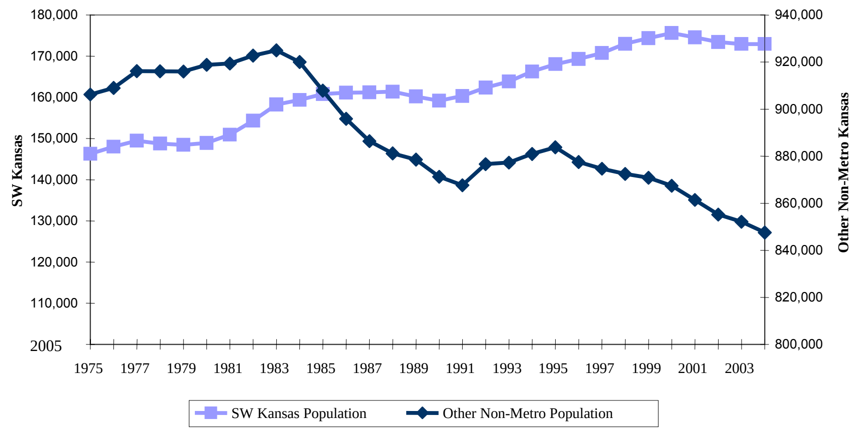
The meat processing industry in southwest Kansas has driven tremendous economic and demographic change over the last 30 years. The meat industry links with many if not most industries in the area. Input industries such as grain production, livestock feeding, and trucking, connect directly to the meat plants. More generally, retail trade, real estate, and service industries depend on the income of the meat processing industry's employees. As analyzed in Chapter 3, the meat plants and their complex of related industries place many demands on the transportation industry.

While the story of the last 30 years has been one of growth, there are signs that the meat processing and related industries are maturing. Growth in future years will be limited by the availability of human and natural resources, and by the ability of meat producers to cultivate new markets. Furthermore, new industries such as ethanol may develop in the region, and may compete with the meat industry for water and grain. The remainder of this chapter looks at the history and future of meat-related industries in more detail. The chapter then spells out the consequences of projected changes for transportation systems.

6.1 MEAT PROCESSING FACILITIES

Meat processing sustains the population level in southwest Kansas. While most of rural Kansas has been shrinking in population, the southwest region has added almost 30,000 people in the last 30 years. Meat plants in Liberal, Dodge City, and Garden City have attracted new employees to the region, with Garden City growing by

80% and Dodge and Liberal by 40% since 1975. The characteristics of the population also are changing as meat plants attract Hispanic and Asian migrants to the area.



Source: Bureau of Economic Analysis, REIS.

Figure 6.1: Population in Southwest Kansas and Other Kansas Non-Metropolitan Areas

The four meat plants in southwest Kansas currently slaughter over 6 million head of cattle per year. Statewide, the number of cattle slaughtered has risen from 2.8 million in 1975 to 7.3 million in 2005. The industry reached its peak slaughter level in 2000 at 8.2 million head per year (see Figure 5.2) (USDA, 2006h).

The future growth of the meat processing industry will be determined by the demand for red meat. National and international demand for beef and beef byproducts ultimately limit the size of the Kansas industry. Local factors such as labor, input supply, taxes, and transportation help to determine whether meat processing will remain in Kansas or move elsewhere.

6.1.1 National projections

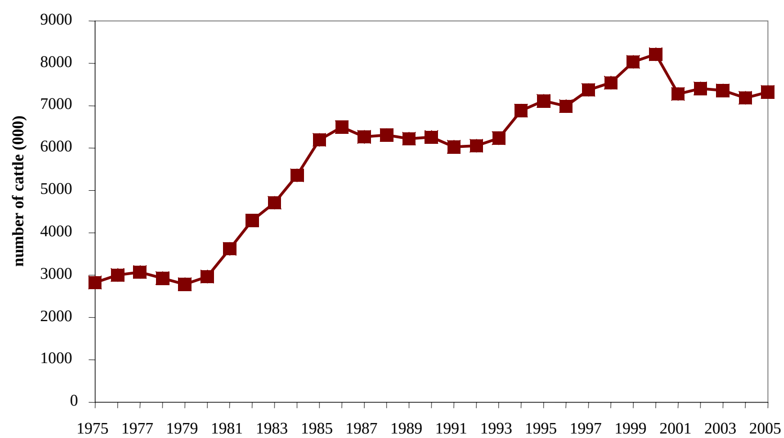
USDA recently produced projections of national and international demand for and production of beef through 2015 (USDA, 2006d). Overall, demand growth will be modest. USDA projects slow but positive growth in domestic beef consumption. Per capita beef consumption is projected to fall, in part due to the changing racial/ethnic profile of the U.S. and the aging of the population. (USDA, 2006d; Davis and Bing-Hwan, 2005). On the export side, shipments to Asian markets are expected to restore most of the market share lost due to the discovery of mad cow disease in late 2003. As seen in Table 6.1, overall production of U.S. beef is expected to grow by about 13% by 2015. Beef prices (wholesale and retail) will remain below historic highs, and will pose a challenge to profitability for both feeders and packers.

6.1.2 Kansas Projections

According to the interviews with beef industry executives and managers, the meat processing industry in Kansas will follow national trends. Most meat packers in Kansas are already operating at their capacities, at least during the times of year when demand warrants it. As for expansion, none of the packers see this in their immediate future (Site visits with Schnitker, 2005; Hoskinson, 2006; Westerman, 2006; King, 2006; McKee, 2006; See Appendix I and II). All of the packers plan to serve Asian markets, but they anticipate that the meat for Asian export largely will be shifted from domestic supplies. Exports are seen as a way of increasing revenue rather than production (Site visit with Hoskinson, 2006; See Appendix II).

Table 6.1: USDA Baseline Projections for the Beef Industry, 2006-2015

Year	Total Beef Production Mil. Lbs	Exports Mil. Lbs	Price: Choice Steers Nebraska $/ctwt
actual			
2002	27,090	2,447	67.04
2003	26,238	2,518	85.47
2004	24,548	460	84.75
2005	24,685	629	85.96
projected			
2006	25,762	640	81.25
2007	26,083	800	78.50
2008	26,608	880	77.06
2009	27,386	968	76.91
2010	27,577	1,113	78.32
2011	27,776	1,280	79.10
2012	28,069	1,472	79.70
2013	28,379	1,693	79.92
2014	28,746	1,947	80.27
2015	29,099	2,239	80.51
Change: 2006-2015	13.0%	249.8%	-0.9%



Source: USDA NASS 2006.

Figure 6.2: Cattle Slaughtered in Kansas 1975-2005

Overall, many of those interviewed feel that the industry had matured within the southwest Kansans region. They expect growth in production volume to be modest at best. A further fact supporting the “limited growth” scenario is that production has stayed below its historic highs for the last five years (see Figure 6.2.).

Several interviewees mentioned the possibility of a new meat processing facility to be placed about 20 miles south of the Kansas border near Hooker, Oklahoma. Researchers have not been able to confirm if ground has broken on the plant. Should the plant be built as anticipated, many of its new employees probably would live in Kansas, and some of the cattle would be pulled from Kansas feed yards. (Site visit with Mull, 2006; See Appendix II). The feed yard industry may be able to grow even if the meat processing industry has reached its capacity within the borders of Kansas.

6.1.3 Current and Future Transportation Modes for Fresh and Frozen Beef

Southwest Kansas meat processing facilities currently ship fresh boxed beef almost exclusively by truck. A small amount of beef (some interviewees said none, some said 1%) is frozen at the plant and sent east to Kansas City. Current rail use is seen as too slow for fresh meat products. Furthermore, delivery of beef by rail would require off-loading and then re-loading onto trucks for delivery to the final consumers.

Three additional factors currently limit the use of rail for fresh or frozen boxed beef. First, there are no intermodal facilities in or near southwest Kansas-the nearest such facilities are located in Denver, Kansas City, and Amarillo. Hence a rail shipment almost always will require loading and offloading onto truck trailers. A second factor is the physical layout of the meat plants. The plants have rail sidings where byproducts can be loaded, but they do not have refrigerators and freezers next to the rail, nor do they have the freezer capacity to store meat until a railcar load bound for a single destination can be filled. Finally, shipping for export customers is arranged by the customer, not by the packer. Export customers want meat sealed in intermodal containers that can be used by trucks and for water transport (Site visit with King, 2006; See Appendix II).

Overall, researchers expect the number of truck shipments of boxed beef to grow modestly if at all. An exception may be in the Liberal area, if indeed the meat processing industry expands across the Oklahoma border. In that case, beef shipments from Oklahoma will use US highway 54 to serve customers in the eastern and central part of the country. Researchers anticipate that traffic patterns will change, with more boxed beef moving towards the west than in past years to serve Asian and West Coast markets. However this is unlikely to change the total VMT on Kansas highways (see discussion in Chapter 5).

It is unlikely that shipments of boxed beef will shift to rail without access to an intermodal facility and without on-site plant facilities to accommodate the use of rail for frozen products. One factor that might make an intermodal facility feasible in the future is growth in exports to Asian countries. If export shipments increase dramatically, then loading shipping containers onto rail bound for the Port of Los Angeles might become cost- and time-effective.

6.1.4 Current and FUTURE Transportation Modes for Byproducts

Packers currently split their shipments of byproducts about 50-50 between rail and truck. Overall growth in the volume of byproducts will depend on the growth of the meat processing industry, which is projected to be fairly flat. There do not seem to be strong structural impediments to the use of rail, probably because byproducts are not very time-sensitive. One interviewee expressed the option that the share transported by rail will grow if and only if rail develops a strong price advantage.

6.2 FEED GRAIN PRODUCTION AND TRANSPORT

The meat processing industry has stimulated demand for the products of related industries that provide inputs: in particular corn and sorghum. The region grows substantial amounts of corn and sorghum and also relies on supplies from Central and Eastern Kansas and from cornbelt states.

6.2.1 Current and Projected Future Corn Production

Irrigated corn acreage and production per acre in southwest Kansas have increased in step with the meat processing industry. Together, these factors have allowed production to nearly double since 1975. Southwest Kansas now produces about 40% of the corn within the state. And Kansas as a whole is now the seventh largest corn-producing state in the nation, following the states within the traditional cornbelt.

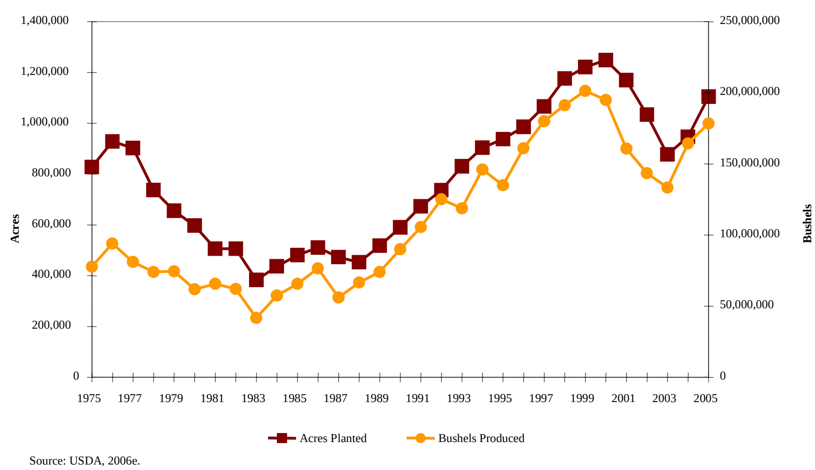


Figure 6.3: Corn Acres Planted and Bushels Produced in Southwest Kansas, 1975-2005

On the supply side, the region has harvested an average of about 162 million bushels of corn per year over the past six years. Of course, the production pattern exhibits highs and lows depending on weather, projected prices, and other factors.

On the demand side, beef cattle absorb most of the corn in southwest Kansas. Hogs and dairy cattle compete with beef cattle for corn supply, as will, in the future, the emerging ethanol industry.

Current levels of beef production use an annual average of 146 million bushels of corn (see estimates in Table 5.10, converted to bushels). The hog industry demands another 5 million bushels (estimated using methods of Chapter 5). The amount of corn used by the nascent dairy industry has not been estimated, but is small compared to beef cattle and hogs. In an average year, the area is slightly more than self-sufficient in corn production.

As for the future of corn production in the region, corn is a thirsty crop; it would not be viable in southwest Kansas without extensive irrigation. Most of the region's acreage and an even greater percentage of its production are from irrigated land. Although the USDA predicts that overall U.S. corn production will increase by about 8% between now and 2015 (USDA, 2006i), it is unlikely that the southwest Kansas region will share in this production. As pointed out by Petz and Heiman (Site interview 2005; See Appendix I) and by several other interviewees, the underground water supply in the region is shrinking. Compounding this, higher energy costs increase the cost of pumping water. These factors probably will lead some farmers to shift production from corn to sorghum, which is primarily a dryland crop.

6.2.2 Corn Shipments into and within the southwest Region

In Chapter 5, researchers made the assumption that corn production is proportional to demand throughout the southwest area. This assumption works for the region as a whole, since corn demand and supply are about equal in amount. However, the actual distributions of corn demand and supply differ significantly by county (see Figure 6.4, calculations by authors). The northern half of southwest Kansas appears to have a corn deficit while the southern part appears to have a corn surplus. Complicating matters, it is unlikely that much corn will flow from south to north within the region because prices tend to be higher in the south. Therefore, the northern part of the region will need to import corn from Central and Eastern Kansas and from cornbelt states, while the southern counties may actually ship corn to feed yards in the Oklahoma panhandle. As a consequence of corn surpluses and deficits, Chapter 5 may underestimate the VMT by trucks hauling feed grains. Grain shipments with different counties of origin and destination generally will travel longer distances than those with their origin and termination within the same county. In other words, the VMT calculations in Chapter 5 should be considered lower bound estimates.

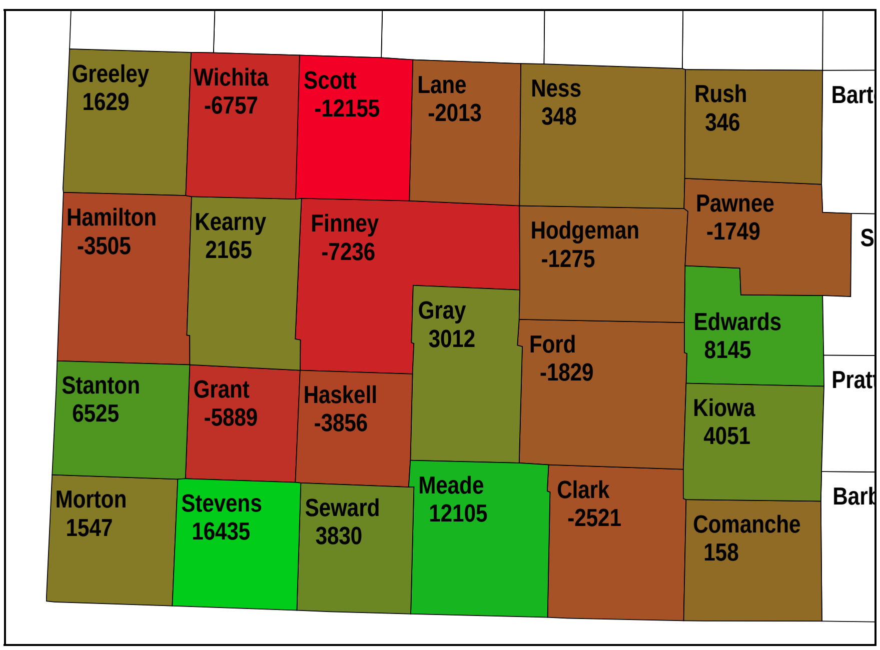


Figure 6.4: Estimates of Corn Surplus or Deficit, 2000-2005

6.2.3 Sorghum Production and future projections within the southwest Region

Southwest Kansas sorghum producers in the region supply grain to the 300+ feed yards that now dot the southwest Kansas landscape. The area currently produces about 25% of the sorghum in the state. Unlike the case of corn, sorghum production in southwest Kansas has shown no clear upward trend. Production varies greatly from year to year because the bulk of the crop is not irrigated. Average production in the region (about 50 million bushels per year over the last five years) is not sufficient to meet the current demands of the cattle feeding industry (about 97 million bushels per year). However sorghum is plentiful in Kansas counties further to the east. In fact, Kansas is the number one producer of grain sorghum in the nation, harvesting about half of the national supply.

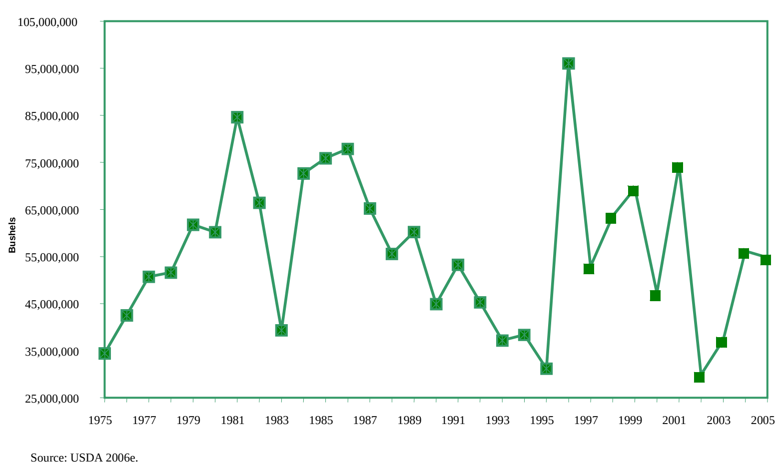


Figure 6.5: Sorghum Production in Southwest Kansas, 1975-2005

Future production of sorghum is likely to rise in the southwest region due to a number of factors. First, sorghum is less water intensive than corn, so some producers may shift crops as irrigation costs rise. Second, a ready market for sorghum exists in the numerous southwest Kansas feed yards. Finally, the developing ethanol industry may use sorghum as a basis of ethanol production.

6.2.4 Sorghum Shipments into and within the southwest Region

As is the case with corn, the southwest region relies on in-shipments of sorghum as well as local production. Ford, Scott, Gray, and Finney counties in the southwest are large producers, but the majority of sorghum production in Kansas occurs in the central portion of the state. Given the high levels of sorghum production within Kansas, it is unlikely that large quantities are imported from other states.

6.2.5 Current and Future Transportation Modes for Feed Grains

The key problem with modeling feed grain shipments in southwest Kansas is that researchers have very little supporting data. Data on grain shipments by truck are unavailable because no agency counts grain trucks as they cross the borders of southwest Kansas counties. Shipments by rail are available for a sample of shipments, but only for large rail companies and only for geographic areas much larger than the county level (STB, 2004).

Here is what researchers can piece together about shipments of feed grain in the area:

- Trucks currently are the preferred mode of transportation for feed grain shipments in the area. Data analyzed by Babcock, Bunch, Sanderson, and Witt (2003) for a study period in the late 1990s show that about 98% of corn and 80% of sorghum shipped out of central and western Kansas elevators leave by truck. The major destinations for truck shipments of corn and sorghum are feed yards in Kansas, Oklahoma and Texas. This confirms what researchers learned from the interviews in southwest Kansas - that trucks dominate shipments of Kansas produced grain to the feed yard industry.

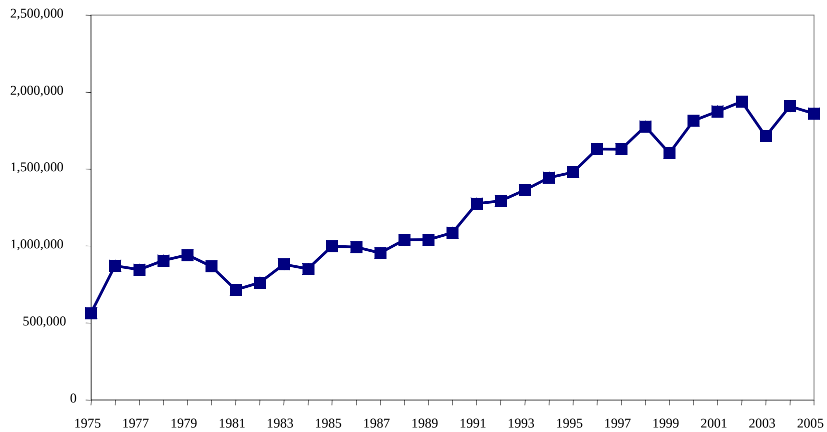
- Class I railroads have played a substantial role in bringing corn into the region from other states, at least in low production years. Data from the Surface Transportation Board (STB, 2005) indicate that Class I railroads shipped approximately 17 million bushels of corn into an area that includes southwest and south-central Kansas in 2004. The source of the corn was primarily Nebraska and Iowa, and most of it came in on unit trains. The average car weight was about 205,000 pounds, so it does not appear that the grain was shipped in on jumbo hoppers. No imports of sorghum on Class I railroads were recorded during the time period covered by the data.
- At least one of the short line railroads in the region hauls corn into its service area about seven months out of the year. The estimated amount is about 12 million bushels per year. (Site visit with Hale, 2005).

In the future, researchers expect about the same amount of feed grain to be produced in the region as today, although the mixture between sorghum and corn probably will change (Site interviews with Petz and Heiman , 2005; Kinsley, 2005). Trucks probably will continue to have an advantage for short hauls of feed grain of less than 200 miles (Site interview with Hail, 2005).

It is likely that corn imports from other states will rise. Some of the corn will arrive by truck from Nebraska and some on unit trains from states further to the east. Once corn arrives at terminal elevators, the mode used for distribution to the final customers could include short line rail, depending on the location of the customers and on cost.

6.3 THE FEED YARD INDUSTRY

The concentrated feed yard industry has grown from its infancy by a factor of almost four. Currently southwest Kansas feed yards hold about 1.8 million head of cattle, and fatten over 3.5 million per year. The industry pulls in feeder cattle from eastern Kansas, Nebraska, Missouri, and other areas and delivers finished cattle to nearby meat plants.



Sources: USDA 2006f and KDHE 2006. Calculations by authors.

Figure 6.6: Number of Cattle on Feed in Southwest Kansas, 1975-2005

6.3.1 Projected Growth of the Feed yard Industry

As discussed earlier in this Chapter, the overall growth of the meat industry in the U.S. is limited by domestic and export market demand. Meat demand is expected to grow at only a modest pace in the next decade. However, the feed yard industry in the southwest Kansas region can continue to grow if the industry shifts from less competitive locations. Interviewees were of mixed opinion about whether an expansion of the feed yard industry in Kansas will take place. One interviewee expressed concern that water availability soon would start to limit feed yard growth. Another interviewee maintained that the feed yard industry might already have an over-capacity ((Site interviews with Petz and Heiman, 2005; Kinsley, 2005). Data shown in Figure 6.6 show that growth has tapered off over the last few years supporting in part the views of the interviewees above. Other interviewees were more optimistic, believing that the industry will expand in Kansas to be closer to major meat processing facilities and feed supplies, and to avoid high land costs in states such as California, Arizona, and Washington. (Site interviews with Kindsvater, 2005; McKee, 2006). One interviewee went so far as to suggest that the industry might triple in size. Interviewees also pointed out that the industry is consolidating and will continue to consolidate, with feed yards getting larger and larger.

6.3.2 Transportation Consequences

A larger feed yard industry will mean more truck traffic for southwest Kansas. Trucks will continue to be used to ship cattle in and out of feed yard facilities, with the number of trucks proportional to the number of cattle on feed. Corn from outside the state will probably arrive by unit trains at shuttle facilities. Where facilities exist, short line rail could haul feed grain to elevators close to the feed yards, or even into the feed yards directly. Currently price is a barrier—according to Gene Pflughoft (Site interview, 2006) in Ulysses Kansas, it is less expensive to haul grain from shuttle facilities in Garden City by truck than to bring grain in by short line rail. Energy price increases could make rail prices comparatively cheaper and tip the balance towards rail. As for the feed yard industry, there exist possibilities for using rail to bring in feed grains to large facilities.

6.4 DAIRY

Two new industries are emerging in southwest Kansas: dairy and ethanol. The dairy industry in southwest Kansas is centered in Grant County, where the industry is expected to double to 160,000 cattle within the decade (site interview with Pflughoft, 2006). About four tanker trucks per day ship milk to the south and southeast in the summer and to the north and northeast in the winter. A proposed milk processing plant may add cheese and other products to the shipments list.

Trucks will continue to be the primary transport mode for the dairy industry. It is likely that the final products of the industry, fresh milk and possibly cheese, with continue to be shipped by truck because of concerns for freshness. As the industry expands, more trucks will be needed to haul in feed.

6.5 ETHANOL

Ethanol production will potentially change the economic landscape of southwest Kansas. Construction is already underway on a 110 million gallon plant in Seward County near Liberal. In Garden City, ground has been broken on a 55 million gallon plant. Ford Haskell, Kearney, and Grant counties are among those that have plans in the works. If all the proposed plants were completed, the ethanol production capacity in southwest Kansas would be well over 800 million gallons per year (Kansas Energy Information Network, 2006; Kansas Corn Commission et. al., 2006).

6.5.1 ETHANOL PROJECTIONS

Ethanol can be produced from almost any plant material, but facilities typically are constructed to use corn or sorghum as raw materials. These grains are converted to ethanol at a rate of about 2.7 gallons per bushel. The process also yields distillers grains, which can be used as livestock feed. Each bushel of corn yields about 15 to 17 pounds of distillers grains on a dry weight equivalent basis. As mentioned earlier, capacity of over 800 million gallons per year is in some stage of planning. However, it is unlikely that all of the planned facilities actually will be constructed. Therefore, researchers look at more realistic production levels of 200, 400, and 600 million gallons.

Table 6.2: Ethanol Inputs Use and Byproducts for Alternative Production Levels

Plant Capacity (gal. per year)	200,000,000	400,000,000	600,000,000
Inputs			
Corn or sorghum (bushels@2.5 gal./bu.)	80,000,000	160,000,000	240,000,000
Corn or sorghum (lbs @ 55 lb./bu.)	4,400,000,000	8,800,000,000	13,200,000,000
Southwest Kansas corn crop 2005 (bu.)	178,371,000	178,371,000	178,371,000
Southwest Kansas sorghum crop 2005 (bu.)	54,762,000	54,762,000	54,762,000
Combined corn plus sorghum	233,133,000	233,133,000	233,133,000
% of crop	34.3%	68.6%	102.9%
Byproducts			
Dry distillers grain (lbs)	1,200,000,000	2,400,000,000	3,600,000,000
% of original grain weight	27.3%	27.3%	27.3%

Source: Calculations by the authors.

As shown in Table 6.2, production even at the 200 million gallon per year level makes a big dent in the southwest Kansas grain supply. However, some of the grain used for ethanol can be recovered in the form of distillers grains. Distillers grains can be fed to cattle on a pound per pound substitution basis, although modifications to feed yard equipment and procedures will be necessary (Site interview with McKee, 2006). Additionally, the emergence of ethanol as a major product may stimulate more production of sorghum, and new ethanol plants may be equipped to use inputs such as switchgrass rather than grain.

6.5.2 Transportation consequences of the ethanol industry

Development of ethanol production facilities in southwest Kansas will affect transportation in several ways. First, more grain will need to be imported into the region, both from Central and Eastern Kansas and from other states. Grain from Nebraska, Iowa, and beyond probably will arrive by shuttle train. Distribution of grain from shuttle facilities to ethanol plants may be by truck or rail. Secondly, the proposed volumes of ethanol will require a large number of tank cars or trucks for transport. According to Pflughoft (site interview 2006), a 100 million gallon per year plant will produce 180 rail tank cars of output per week. If the product were shipped by truck, this would be about 180 * 2.5 = 450 trucks per week from a single plant. Third, ethanol is flammable so that safety considerations will be foremost, whether the product is shipped by truck or rail. Fourth, ethanol plants will introduce a new product, distillers grains, into the feed lot supply chain, to the extent that distillers grains substitute for corn or sorghum, the number of miles traveled by grain trucks serving feed yards may remain unchanged. However, traffic is likely to be very heavy on routes from ethanol plants to nearby feed yards. Some facilities, such as the proposed Ulysses Agraplex (Site interview with Pflughoft, 2006) may be placed so that wet distillers grains possibly could be distributed to nearby feed yards by pipeline, reducing truck traffic for this stage of the process.

Ethanol plants currently planned or in progress are all located in communities on rail lines. The advantages of rail over truck fit well with the ethanol production process: a large volume of inputs is delivered to a single location, and a large volume of output is delivered to a few locations such as refiners and gasoline distributors on the west coast.

However several factors could limit actual rail use. It may cost less to haul corn by truck than by rail in some areas of southwest Kansas (site interview with Pflughoft, 2006). For those communities on short line railroads, the rail may not have the physical capacity to haul tanks of finished ethanol. Finally, even in communities with access to Class I railroads, lack of coordination between ethanol plant developers and railroads may place the facilities at sites where rail access is difficult (site interview with Union Pacific, 2006).

6.6 SUMMARY

Table 6.3 summarizes the future transportation impacts of the processed meat industry, supporting industries such as feed yards, and developing industries in the southwest Kansas region. For each industry segment, researchers look at a high rail use and a low rail use scenario.

Table 6.3: Future Transportation Impacts

Industry	Low Rail Use Scenario	High Rail Use Scenario	Low Truck Volume Scenario	High Truck Volume Scenario
Meat processing.: boxed beef	No rail use.	Some use of intermodal containers to West Coast; but would require intermodal facility.	No growth in industry, hence no growth in truck shipments of beef.	Growth of industry at national rate (13% by 2015). Truck volumes proportional to increased production,
Meat processing: Byproducts	No change.	Shift of more byproducts to rail – half of those currently trucked.	Shift to rail of half of byproducts currently trucked, reducing trucks accordingly.	No shift to rail, so truck volume proportional to overall industry growth, possibly 13%.

Table 6.3: (Continued) Future Transportation Impacts

Industry	Low Rail Use Scenario	High Rail Use Scenario	Low Truck Volume Scenario	High Truck Volume Scenario
Feed grains	Feed yard industry does not grow, so corn volume stays the same. Some use of rail to bring corn in from other states and some use of short line to distribute.	Feed yard industry grows, so more corn brought in from other states by unit trains. Short lines distribute to feed yards or nearby elevators. New feed yard developments designed to make use of rail.	Feed yard industry does not grow, so grain volume unchanged. Some grain diverted to short lines.	Feed yard Industry grows, so grain volume expands. At the same time, water challenges reduce local crop, so that grain is hauled longer distances.
Feed yards: feeder cattle	No rail use.	No rail use.	No growth, so no increase in truck volume.	Proportional to industry growth. Some project that the number of cattle could at triple.
Dairy	Industry remains at under 100,000 cattle. Minimal rail use for transport of feed grains. No use of rail for final product.	Industry doubles and grows and new facilities are designed to bring in some grain by rail. No use of rail for final product.	Industry remains at under 100,000 cattle. Truck volumes unchanged.	Industry doubles, and associated truck volumes expand accordingly. If the industry expands to 200,000 cattle, its input demand and associated truck volumes would be about 10% of those associated with the feed yard industry.
Ethanol	Industry expands to the 200 mil. gal/yr. level. Some grain brought in to shuttle facilities by train, but most grain distributed by truck. Trucks distribute finished product.	Industry expands to 600 mil. gal. level. New facilities designed to bring in grain by rail and ship out ethanol by rail.	Industry expands to the 200 mil. gal/yr. level. Most grain brought in by rail, and final output distributed by rail Trucks used for local grain shipments.	Industry expands to the 600 mil. gal/yr. level. Some grain brought in to shuttle facilities by train, but most grain distributed by truck. Trucks distribute finished product. 600 million gal. per year translates to about 60,000 truck loads.

Chapter Seven - CONCLUSIONS & RECOMMENDATIONS

The purpose of this chapter is to state the conclusions and recommendations that the researchers have determined based on the literature review (Chapter 3), data collection (Chapter 4), data analysis (Chapter 5), and the future demand on the transportation infrastructure (Chapter 6). Based on this information the following conclusions are made:

7.1 CONCLUSIONS

1. The total daily and annual truck VMT is high in the study area, indicating that there is a need to look for other modes, in addition to trucking, to transport items for the meat processing and related industries.
2. If truck VMT continues to increase, there could be an increase in the amount of damage to highways and bridges, possibly causing a need for maintenance work earlier than projected.
3. The main obstacle for meat processing facilities to ship boxed beef by rail is that there is no infrastructure near the meat plants. Also, these facilities do not have enough freezer capacity to hold enough boxed beef in storage to transport by rail.
4. Other problems with using the railroad to transport time-sensitive goods is that rail takes longer than trucks do and customers of the meat processing facilities are usually not located on rail lines.
5. There is a large amount of truck VMT on highways 50/400 and 54 and could cause rapid deterioration of these highways and potentially higher accident rates

if truck VMT continues to increse. Also, if the meat processing facility in Hooker, OK is built, it will increase the truck VMT on these roads.

6. Even if the East Asian market was reopen, it would have little impact on the amount of truck VMT for the shipment of boxed beef in the southwest Kansas.
7. Upgrades need to be made on short line railroad lines, since they are limited in their load capacity and speed, in order to increase the use of short line railroads and in turn decrease the cost to use the short lines.
8. There are new business developments in the study area including dairy farms, milk processing plants, and ethanol plants that will require more trucks on the roads unless an alternative transportation mode exists.
9. If purposed ethanol plants are built, then it will cause an increase in the amount of grain shipped into the region.
10. The transport of ethanol may cause traffic safety concerns.
11. Fuel costs does not change the transportation mode used to ship items in the meat processing and related industries.
12. The truck driver shortage will continue because of the hard lifestyle associated with the trucking business and it is assumed to continue even with an increase in wages for drivers.

The results of this research also lead the researchers to certain recommendations in order to improve the transportation infrastructure that supports the processed meat and related industries. Based on the researchers' results, the following recommendations are made:

7.2 RECOMMENDATIONS

1. When new facilities are being planned (meat processing plant, ethanol plant, milk processing plant, etc.) rail should be considered as part of the facility from the earliest planning stage.
2. There needs to be an increase in investments for short line railroads' infrastructure in order for businesses in the area to have the option to use the short line railroads instead of, or in conjunction with, trucks for freight movements.
3. Rail lines need to be upgraded so that they will be used more and not abandoned since short line railroads have a broad economic impact on a community.
4. With the possibility of more grain being imported into the area, short line railroads should concentrate on bringing in grain, in addition to taking out grain (mostly wheat).
5. There is a need to study the entire state of Kansas rail service for the flow of freight in order to identify future congestion problems which may restrict the flow of freight in Kansas.
6. Every organization in a community needs to come together to develop a regional economic plan to utilize transportation modes most effectively.
7. As the Asian markets reopen, decisions to use the railroads to transport frozen boxed beef should be reconsidered.
8. If there is an increase in exports, either in the meat processing or other industries, there will be a need to study the feasibility of building an intermodal facility in the region.

9. There is a need to study damage and safety issues of highways and bridges due to truck traffic not only in the region, but also statewide.
10. There is a need to study the effects of new business (e.g., dairy and ethanol) on highway and rail infrastructure for all of Kansas.
11. There should be location studies as to the best places to establish these new businesses in order to best utilize all transportation modes available in a given area.

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APPENDICES – ELECTRONIC FORMAT ONLY*

*The full report with appendix available electronically at www.ksdot.org, click the *Publications and Reports* link on the left-hand side, then click the *KDOT Research Reports Catalog* link in the top box, center of the page. Enter *KU-02-1* in the search box and click on search. For a copy of the report with Appendix on CD, please email library@ksdot.org.

APPENDIX I - FIRST SITE VISIT MINUTES

Date: August 1, 2005

Time: 2:00 p.m.

Location: Tyson Prepared Foods, Inc. – Hutchinson, KS

Description: Dr. Yong Bai, Pat Oslund, and Christine Atkins met with Ron Blank, Plant Manager

GENERAL

Ron explained that Tyson has a two-part production at the Hutchinson site. First they prepare ready to eat tacos. Corn, beef, and seasoning make up the tacos, which are shipped primarily westward to CA, AZ, WA, and IL. Secondly, bacon pizza topping is processed at this location. Raw bacon is shipped in and the meat is shipped primarily to the Olathe cold storage location, and is distributed from there.

IN & OUT

- 2.5 loads of corn at 120,000 lbs per load are shipped in each week.

The corn is shipped from Nebraska.

- 5 loads of meat (beef) at 160,000 lbs per load are shipped in each week.

About 50% of the meat is imported via Texas and the rest comes from Tyson's Emporia, Garden City, and Nebraska meat processing locations.

- 4 loads of bacon at 160,000 lbs per load are shipped in each week.

The bacon is shipped in from Texas and the coast.
They ship about 500,000 lbs per week, which translates into about 14 outgoing trucks per week.

*** Doing some math: 2.5* 120 + 5*160 + 4*160 = 1740 or 1.74 million lbs in per week. He said that only 0.5 million are going out. These numbers aren't working out, so we need to check them if we are going to use them for anything.

All shipment to and from this location is by truck. Ron said transportation by rail is not an option. He assumes that shipment by rail from Hutch is limited. However, he has noticed that some businesses in the area that use train as their shipment method are the salt producers; Morton, Cargill, and NA Salt.

PROJECTION OF GROWTH

Ron projects that the growth of the company will only go up.

ADEQUACY OF CURRENT TRANSPORTION MODE

The condition and adequacy of the highways are adequate. And there is no concern of difficulty transporting products by truck on the highways. Ron mentioned that hwy 96 is four lane to Wichita and I-70 is close to Hutchinson also.

Their inter-company transport, consisting of a fleet of trucks, is utilized for 25% of the shipments. The other 75% are shipped through contracts with local carriers. 12-13 trucks go west every week. Six to California and 2 to Pheonix … Most product is transported to Tyson's cold storage warehouse in Olathe, KS. Their meat is used internationally. They supply most of the beef topping being used at all pizza restaurants in the United States.

INCREASING FUEL COSTS

Fuel costs are tied into their pricing, so customers pay for the increase. Fuel surcharges are definitely tied in, but not a barrier nor an issue.

Q. If fuel prices continue to rise, do you think Tyson will change their shipment method for this location?
A. No, Ron thinks truck will probably be used even with continued increase in fuel costs.

OTHER ISSUES

Q. Do you have a problem with product damage during shipment?
A. No, everything is packaged well. Claims are low … It's not a problem.

COMPANY INFO

Tyson is a public company. They supply 75% of pizza toppings used in the U.S. They supply a lot products for companies, such as Taco Bell and Applebees. 1/3 of U.S. residents consume a Tyson product each day. More statistics can be found at their website.

1930-Wynchester Foods sold to IBP then, Tyson

They have been making pizza topping since 1993 and have been at their current state for the last 12-14 years.

150 persons are employed at this location. Tyson headquarters is in Springdale, AR.

Q. What are your busy times of the year?
A. Summer and Thanksgiving through Christmas.

The plant is in operation 52 weeks out of the year.

SECURITY

They place tamper evident seals on their trucks.

*** Ron said he would help us locate the Tyson employee who oversees transportation of products throughout all of Kansas for all of their locations, if or when we need to.

*** Ron would like a copy of the report when we're finished.

Date: August 2, 2005

Time: 12:30 p.m.

Location: Cimarron Valley Railroad – Satanta, KS

Description: Dr. Yong Bai, Pat Oslund, and Christine Atkins met with Henry Hale, General Manager

COMPANY INFO

CVR is a short line railroad that connects to BNSF at Dodge City, KS.

They average 21 employees per year. All work at the Satanta location. CVR's parent company is Western Group, out of Ogden, UT; which owns 70 rail companies and a construction company.

CVR has track running from Dodge City, KS to Boise City, OK and branches to Springfield, CO.
*** Email Elizabeth Clough –CVR Administrative Assistant to get a copy of their rail map.

IN & OUT

Q. What do you ship?
A. Grain and feed; particularly for Seaboard Farms in Hugoton where they mix feed meal. Corn is shipped to Ensign and Hugoton primarily. Corn and soy bean meal (SBM) are used to feed cattle and pigs. SBM is shipped from Emporia, KS and Nebraska, and corn is moved within Kansas and at times shipped in from NE. Texas Farms in Pennington, TX is another big customer.
*** Do we need to contact these companies?

SBM: 15 tons/week are shipped, and most of it is unloaded in Hugoton
CORN: varies, depending on local economy. Local crop may last 2.5- 4.0 months out of the year. 11,000 tons/ week (for about 7 months out of the year on average) are shipped in when local crop has run out.

Rail cars hold 100 tons ≈ 3300 bushel

Backloads: When corn goes out, wheat can be shipped back on the same cars, but SBM cars go back empty.

Q. Is it possible to ship cattle by rail?

A. The humane society won't allow for it; the standards are too high to transport live animals by train effectively. In the "old days" cattle would be shipped from Elkhart, KS to Dodge City, KS, which would take 12-16 hours; now they are hauled by truck and it takes two hours.

PROJECTION OF GROWTH

Henry Hale doesn't foresee shipping boxed beef on flat cars. BNSF ships some refrigerated goods in KC, Denver, and Amarillo. In order to make it work they would have to ship 5,000 trains per day to cover the costs of the new building (they would need new loading technology). Shipping on flat cars, in that way, is very technical. Also, a meat plant would have to move there.

In the future there could be an expansion of the amount of grain shipped from Kansas to CA or TX, etc. Right now there is a lot of short haul grain shipments transported by truck and some longer hauls over the border. By short distance, he means to Emporia, Wichita, Hutchinson, places within about a 200 mi. radius. Henry discussed how elevators in the area handle varying amounts of grain. Some only load 4 cars at a time, others 25 or 26, and a few handle 110 cars making a whole train at once. The trend is towards larger loading facilities. He foresees the continuation of short haul movement of grain by truck to large loading facilities where 110 car trains will be loaded and sent out. And the long haul to be accomplished by train.

INCREASING FUEL COSTS

Q. Has the increase in fuel costs affected your business?
A. Yes. CVR has more business now with an increase in fuel costs, because they are more economical: more tons can be shipped with the same price. This is because of how the train runs. It has a throttle from 1-8, and runs most efficiently at 8. So, the more it's pulling, the better fuel efficient it is by ton. At the same time there is an adverse affect, as for trucks, because of increased cost.

TECHNOLOGY

There is a new 286k (lbs) heavy axle car which holds 4 semi truck loads (vs. the common 264k which holds 3.5 semi t. l.), and a 316k soon to come. Larger trains, cars, power … larger everything.

SECURITY

They use sealed cover hoppers. 3/8" cables are sealed with mashed lead, so that if the car is tampered with it's evident.

Date: August 2, 2005

Time: 3:00 p.m.

Location: Cattle Empire LLC, Division 2 Feed Yard and Office – Satanta, KS

Description: Dr. Yong Bai, Pat Oslund, and Christine Atkins met with Cory Kinsley, Risk Management Director.

COMPANY INFO

They employ 120 persons between their various locations.
***Refer to our notebook for more information on the company.

IN & OUT

Feed grain is shipped in: 40% by rail (off loaded) and 30% from local elevators. There are two shuttle terminal locations 45 miles away. Most of the local elevators are within a 50 mi. radius and the short haul is done by 1. local contracts 2. their own trucks (they own a few farm trucks) or 3. the grain elevator can deliver and pick up. Longer hauls are sometimes necessary; these are by truck from northwest KS and NE (100 mi. or so away) and they take back haul freight.

Grain comes in from NE, IA, and sometimes MN when it is shipped in by rail (mostly from along the Missouri River). The shuttle terminals mentioned above are 110 car unit trains. This concept is still immature in Kansas.

Q. What do you think about the possibility of an ethanol plant in the area, and the possibility of being able to use by-products for feed?
A. 75% of feed is grain (corn and milo) and 5-10% is a protein source. There are dried distillers in SD, IA, MN, and NE from which they receive dried distillers grain off of ethanol plants, gaining ration levels. They ship salt and wheat and receive the grain on back haul (trade secret … shhh).

Q. Is the demand for corn by ethanol plants a threat to your business because of the competition for local grain?
A. It's a concern, but efficiency will take over. Corn turns into beef … may use other products for beef. Corn may be more efficient for the production of ethanol.

Quantities of loads on the roads:
- 25 lb/day of feed is shipped in for each animal
- 155k head at 1.8 turns/facility is the industry average (C-E has 2.1 turns/facility)

Cattle are brought in from central TX, OK, and NM. Fattened cattle are sent to slaughter plants at Liberal, KS; Holcomb, KS; Dodge City, KS; and Dumas, TX. The price determines location. There are cattle shipped in and out almost every day. Cory mentioned that a feeder wants cattle to get off the truck and perform right away and that there are pre-determined “shrink levels” (determined by hours on the road, probably), which estimates weight loss from travel. Sometimes cattle are transported long haul: 12-15 hours.
*** I’m curious, what are the distance regulations for the transportation of cattle?

ADEQUACY OF CURRENT TRANSPORTION MODE

Q. Is the highway infrastructure good enough for future growth?
A. Good. No problems.

PROJECTION OF GROWTH

They have expanded in the last few years, going from 145 to 170k head in the last two years. It’s a profitable business.

Access to water is the most significant barrier. Alternative feeds may come into play because irrigation is becoming less of an option for Kansas farmers. As the water level falls, less corn will be produced in Kansas. Currently it is shipped somewhat short distances by truck, but as it is brought in from other states we may see a shift to rail. Texas has had to adapt because of the same reasons (their low water table). There are less feed yards there than in the past, because of the cost of feed. Shuttle transportation has decreased transportation costs, though. (***Kansas needs to learn from Texas’ innovation and mistakes). There is the largest non-roughage feeding trial going on in the county. There is a need to procure the roughage source (ration) from 70% to 2% inclusion of roughage.

INCREASING FUEL COSTS

It has affected procurement of all products. The increased cost of fuel increases the cost of cattle, etc. So far it hasn’t affected them too much. The driver is whether there is a good local crop size. This year 70% of the grain was local supply. Over the last 5 years it has been less, 30-50%.

SECURITY

There hasn’t been a problem. Everyone keeps a good eye out. If somebody isn’t supposed to be there, they’ll be noticed.

Date: August 3, 2005

Time: 9:00 a.m.

Location: Kansas Department of Transportation, District Six – Garden City, KS

Description: Dr. Yong Bai, Pat Oslund, and Christine Atkins met with Larry Thompson, Ron Hall, Dale Luedke - Area Three, Kirk Hutchinson, Chuck Oldaker – Area Two, and Ron Berglund.

ADEQUACY OF CURRENT TRANSPORTION SYSTEM

Some believe there is a safety issue because there is a solid line of trucks headed North on 83 in the early morning. Four lanes may be safer … there is no "gridlock."

Kansas roads are great right now due to two complete highway programs, one after the other. Fifteen years ago it was a different story; our roads were comparable to that of Oklahoma.

Q. How has the increase in transportation of products by truck affected the roadway systems?
A. Ron H. said that the problem has been dealt with. There were issues in 1988, before the CHP, with dual wheel ruts everywhere.   The state was limited in its ability to respond. The CHP rebuilt highway traffic routes through 2010. CHP met 16-20% of the need. Now CTP is meeting 16-20% of the current need, but some of the reconstruction is on the same roads. It's not a contest between Eastern and Western Kansas. Comparatively, Southwest Kansas covers a lot of miles with less population, and partly so because we have fewer bridges. Don addressed some priority routes. Larry mentioned that we need a statewide transportation system. The money is spent in the Eastern part of the state because that's where the people are. But everything going out of SW KS came on truck, then left. The system is a necessity.

WARRANTEE WORK

Q. Dr. Bai discussed maintenance work and performance based contracting with warrantees. Opinion?
A. Larry's opinion is negative. We're headed that way on some QATC testing procedures, but not complete performance specs. This may never happen because the construction industry isn't enthused about it. The current pay system (by square meter) helps make the contractor more responsive and responsible. The answer may be to continue putting incentives in place and limit the contractor's exposure to risks (unknowns), because this seems to result in a better product when the project is complete.

Side note: KDOT designs all maintenance work, and 25% of major renovations are designed by major firms.

Ron H. mentioned that the large grain trucks are not causing most of the road damage. It is the smaller farm trucks that have improper axle loading (they load too much weight). The highway patrol doesn't stop to scale because of political issues. A person doesn't want to stop a farmer in the middle of harvest. You just don't do it.

Q. What's the answer to overloaded harvest trucks?
A. Ideally, we could regulate it, Ron said, but that's not good for the local economy. We could encourage the purchase of larger trucks with enough axles to handle the load. We're seeing more of that, but they're still overloaded. This short haul movement is what is causing the ruts. These trucks are overloaded beyond specification. The long haulers meet specs, because they've been through an extensive application process to travel through the state.

NEW INDUSTRY

Larry said the ethanol plant that might be built in Ulysses would use 37 million bushels of grain. It would produce 287k tons/ year of distilled grain by-products, which can be used for feed. An agri-plex may be created: feed yard, ethanol plant, dairy production, etc. This has to be shipped by unit cars (110 cars) in and out. Two trains every 2.7 days. 90 cars of ethanol will go out every 7-10 days on BNSF to L.A, and 10 million gallons of gas will come in to dilute the grain. Ron H. said this may possibly help move the transportation of other products to train. Much of the grain in the area is shipped to the gulf.

Dairies have moved into the state of Kansas. Hamilton County is the largest milk producer in the state of Kansas. Because of the nature of the industry (dairy products expire quickly and are sensitive to heat), the products are transported short haul in the summer, and longer haul in the winter. Part of the reason for the move of dairies from CA to KS is because of water rights.

THE WATER ISSUE

While dairies are moving here because of the water, Kansas farmers are producing more wheat and rye as opposed to corn because of the cost of irrigation. Cotton production could be on the rise and can be transported by train to Dodge City by CVR.

SHUTTLE TRANSPORTATION & NEW TECHNOLOGY

WindRiver Grain resulted out of consolidation. It is more economical to truck into WindRiver rather than load onto CVR. WR exports wheat and imports corn. Unless you can find some way to pump the grain to the yards, it will be trucked.

New technology has improved tire design, Ron H. says.
Q. Super singles vs. tandles
A. Ron H. doesn't see a trend towards super singles because the #/si is higher. More tire means reduction in impact, and when we're talking about 250k loads it's important.

The grain and liquid hauling containers that work for truck and rail may ease the transition to rail.

TRUCK TO TRAIN

There is no way to eliminate local transportation by truck (by local: 200 mi radius). The only active short line is CVR and it is usually cheaper to transport by truck. They don't see it changing.

Ron H. mentioned that he has seen rock move from train to truck over the last 10-12 years. But the decision, rail or truck?, is not our say. If the legislation lowers funding for roads, there may be a transfer of movement by rail because the road conditions may be poor. There has been a recent trend of rail to highway because of economics (cheap and quick). Also, it's all about access.

Rail has to build their highway. They system is provided for trucking companies.

INCREASING FUEL COSTS

This has affected both the trucking and rail industry (higher cost for both).

SECURITY

Even before 9/11 this has been a big question. Where do we divert traffic in an emergency? There are active emergency programs in the area which address these issues. There have been exercises to plan for mad cow disease, etc. Everyday security hasn't changed much.

CONTACTS

When we need traffic engineering data, Allan Spicer in planning at the Topeka office will be a good resource (785.296.3841).

Contact Katherine Patrick for cost estimates and quarterly bid estimates.

Date: August 3, 2005

Time: 2:00 p.m.

Location: Garden City Western Railway Inc. – Garden City, KS

Description: Dr. Yong Bai, Pat Oslund, and Christine Atkins met with Kelly Chopp, General Manager.

COMPANY INFO

Short-line rail company built in 1915 or 1916. The first dead end rail line runs west 14.5 mi. to Quinby. The north line was purchased in 1989 from Santa Fe, and it runs 30 miles to a dead end, just past Shallow Water (just short of Scott City). Garden City Coop used to own GCW, but Pioneer Rail Corporation now owns it. Burlington Northern Santa Fe is GCW only connection to ship outside of this area, and the interchange point is in Garden City.

GCW owns three engines, but normally just run one. They perform their own maintenance on site and have only four employees.

IN & OUT

GCW transports agricultural products, scrap iron, utility telephone poles.
Q. What type of cattle feed do you transport?
A. grain and mostly molasses

IN:
- Feed: corn from the north in tank cars; beat molasses, which comes in tank cars from North Dakota and Minnesota; and other grain
- Fertilizer (for farming): dry, called "potash," by hopper car; liquid, 32% solution, by tank car; phosphoric acid

OUT:
- Grain: Milo, corn, and mostly wheat

To ship out wheat, GCW gathers empty cars from BNSF, takes them to the elevators to be loaded, and then ships them back to BNSF.

Q. We've heard that corn is shipped from out of state for feed part of the year. Do you handle any of it?
A. Sweet corn is shipped out of Iowa to Dalhart, TX, going through Kansas on the BNSF line.

Q. How many truck loads would usually equal a rail car load?
A. 3 or 4 truck loads per rail car

The majority of shipments are coming in, and the outbound cars tend to be empty. GCW does “originate” some cars during wheat harvest, and this brings in more money, because the load originates on their line. The majority of their customers are on the west line. Most of the feed products are delivered to Quinby where they are trucked to the feed yards to be mixed. There are elevator locations on each of GCW’s two dead end lines.

Q. How long does it take to deliver a load?
A. Once a car is released (from BNSF) and ready to pick up, it can leave that day or the next. If we’re delivering to Shallow Water, which is 30 mi. north, it is a one day trip out because we’re a 10 mph railroad. So, delivery can take one or days.

CHALLENGES FACING THE INDUSTRY

GCW gathers 10 cars, then 10, then 10 (originating along the way) so, it takes time. Costs are high to ship on GCW because the profit is shared with BNSF. Sometimes it is cheaper for the customer to truck their product to BNSF. Also, unit trains (shuttle locations) are a competitor, because product is usually trucked to WindRiver, from which it is shipped on BNSF rail.

FUEL PRICES

Q. How have the fuel prices impacted your business?
A. Red diesel is our fuel source. We take bids from fuel suppliers. Once a bid is accepted, the fuel company sends a truck out, which then fuels the engine. I don’t know how the prices affect the bottom line. We keep our tanks full for uncertain times.

PROJECTED GROWTH

The marketing department in Illinois is looking at the possibility of putting in a new switch at Brookover. So, there is a possibility of expanding. Also, there is a possible merging with WATCO out of Coffeeville (Kansas City and Oklahoma City rail) which would give GCW direct access to switch at Hutchinson. The future interchange at Scott City would give GCW access to Port Cadussa in Tulsa, OK. WATCO would be able to run down the GCW line to BNSF, which is a much shorter route from Scott City to Garden, than they currently utilize. This merge would also give GCW the ability to negotiate with both Union Pacific and BNSF to get better rates, as opposed to their current situation of depending solely on BNSF.

GCW is focused on customer service. They can give them what they want, when they want it. For example, one customer works with GCW because he can set up a time each week to switch. The crew is always the same and this customer can get more cars switched on when he wants to.

Kelly mentioned that GCW may need to look at upgrading their rail in order to higher operation speeds from 10 mph.

SECURITY
To avoid bioterrorism, the filled and empty cars are sealed with a thin metal. The customer seals it themselves. They have never had to reject a load, because of the lack of a seal.
Date: August 3, 2005

Time: 4:30 p.m.

Location: WindRiver Grain LLC – Garden City, KS

Description: Dr. Yong Bai, Pat Oslund, and Christine Atkins met with Charlie Sauerwein, Grain Merchant, and Kammi Schwarting, Financial Manager.

COMPANY INFO

Bob Temple is the CEO, in charge of merchandising.

WindRiver (WR) was established in 1997, as a part of the "Gulf export of wheat program," from Southwest Kansas to Houston, TX. The first joint venture was 50% Garden City Co Op and 50% Irsik and Doll and another company. This "exploder train concept" came out of the Destination Efficiency Train Program (DET), and has proved to get rid of excess wheat. The "freight efficiencies" proved valuable; loading 110 cars in 15 hours or less and getting the train back in 6 days.

IN & OUT

WR is a corn unloading facility and they reload with wheat, which is sent to the Gulf. This provides huge efficiencies for WindRiver and the rail companies.

In: corn from Iowa and Minnesota
Out: Kansas wheat and milo; shipping primarily to the Gulf
They don't ship beans.

Everything depends on the "futures market," which is a risk management market, changing everyday. The grain and cattle industries would not run without the Free Market. It's the job of the country elevator to keep full. The "Carry charge market" – futures market structure – tells you whether to move or sell. Everything runs by supply and demand. WR only buys from commercial elevators (well, for "landlord splits" ***??), making 400k bushel train transactions. WR uses SFA record keeping. WR used to rent grain storage space, but now they use if for their own. They turned the 1.2 million (bushels) space 26x last year. WR is a "basis trader."

WR budgets for 1 train of 110 cars per week on average for the year. During harvest, they send out two trains per week. So, they run 52-53 trains per year.

WR trucks in from a 30 mile radius, using independent freight companies, and they try to keep 16 trucks busy. The surrounding Co-Op locations sell FOB then contract trucks. Sometimes WR will haul sand and rock out of local queries to Wakeeney. Safety is very important, so they do background checks on their truck drivers, and check load weights. WR abides by the regulations, and has held educational sessions with KDOT for the drivers, in order to educate them on why the rules are there. WR pays drivers the best rates, and only runs short hauls, so that the drivers are home with their families at night.

CHALLENGES FACING THE INDUSTRY

Water Issue: Mississippi needs to upgrade from their lock and dam system.

Competition: Brazil has been a big competitor for export of beans to South America, because they have been producing more beans than the U. S. for the first time in history. The French wheat sale to Russia affects us. We drop our prices. When ocean freight was higher in the Gulf, China was buying beans out of Portland, OR, so we were sending beans on truck and rail to the NW. There were 46 shuttles (110+ cars per shuttle) backed up in transit or waiting to be unloaded in Portland. Prices are down right now, so we're sending beans to the Gulf. Charlie said something about the Houston Panda Group and a Co Op cooperative effort to manage freight and logistics.

Business Logistics: Cargill currently administers grain trade at the Gulf for WR. WR could sell to a smaller company, but Cargill has stability. Zeno Grain is the largest Co Op in Japan … Firemiller is in New Mexico. WR has 1.8 million dollars on a train load of wheat. When China walked away from a soybean contract, Cargill had to foot the bill, and the have the money and stability to survive it. The U.S. Government wants to change how money changes hands for trade between U.S. and Cuba, so that's Cargill's headache.

INCREASING FUEL COSTS

Railroad companies charge a 10.5% fuel surcharge. The cost of trucking has also gone up. The increase of fuel costs falls on both the seller and the buyer.

OTHER ISSUES

Kansas State Board of Agriculture in Topeka should be a good source for the number of cattle on feed in Kansas. USDA Cattle on Feed Report is a good source – talk to Jim Mintert.
*** We need to keep these two sources in mind.

Date: August 4, 2005

Time: 9:00 a.m.

Location: Irsik & Doll – Corporate Office - Cimarron

Description: Dr. Yong Bai, Pat Oslund, and Christine Atkins met with John Petz, President and CEO, and Jon Heiman, Cattle Risk Manager.

COMPANY INFO

Liquid supplement plant: Performix – High Plains. The supplement is used in feed as a protein source. It's a high volume state of the art facility built three years ago.

Grain elevators: grain is hauled by truck from the fields during harvest and from bins in the off season. They also ship out by truck.

Feed yards and grow yards: they are share holders in dairy, packing, farming, and ranching.

HISTORY

John P. shared with us that the traffic flow on the highway was light growing up, and has evolved since the 70's. There are now train loading stations at Wright Co-Op in Dodge City, Ensign, Plains, Garden City, Coolidge, Colby, Wakeeney, Ogalla, and Hutchinson. These are 110 car shuttle train loading facilities, running extremely efficiently. The train is back in three or four days. "Car utilization" used to be from two to six turns in a month. The old system was a "transit environment," where a single car fare from Cimarron to Hutchinson cost 30¢, while the transit rate from Cimarron to the Gulf was only 70¢. So, from Hutchinson to the Gulf a customer would only be paying 20¢ per bushel. The terminal elevators with transit rates were not running efficiently, there was not a profit. Now grain is shipped by truck to a shuttle location in Wichita or Hutchinson, and then goes out on one big train. So, there is an increase of grain being trucked in the area because of the new system.

The cattle industry moved to southwest Kansas because of the weather, water, land, etc. The static water level is at 100-120 feet. So, there are more trucks on the road.

The dairy industry has moved from California to southwest Kansas. There are currently 65k head in southwest KS with a projected growth of 100k. There is also the possibility of a milk and/or cheese processing plant, which means more trucks.

Ethanol plants might also move into the area. Dried distillers grain, a by-product, can be used for cattle feed. More truck traffic.
The Kansas Board of Agriculture would be a good contact.

Feeder cattle are in Texas and Missouri, from where they move to Kansas to finish. Most cattle flow from east to west. The largest influence is MO, OK, and TX. They also come from KY, TN, CA, and OR. Fewer pounds are brought in from farther out. I & D has a combined capacity of 170k head of cattle.

Each week packers come around and bid on what cattle their interested in.

The commercial feeding business: customers bring cattle in and feed them to be sold. The industry standard is 150 days on feed. Weights vary from 200-250 pounds. There is about a 50-52k pound add-on rule to a truck. An 18 wheeler semi can weigh 85,500k at an absolute maximum if it has an extra axle and special distribution, etc. It's 40k for hay trucks. They try to stay at maximum weight for efficiencies.

Grain: There is more of a feed demand in Kansas than can be met by Kansas farmers. Corn is and will continue to be shipped in for part of the year. The ethanol plants in IA, MN, NE, and SD are stopping some of the corn which "raises the basis level" (the difference between $3.00 cash and the underlying futures price of $3.40, leaving a basis of $.40 under K. C. futures basis). So, the corn is trucked in from central KS or NE. Milo is a feed alternative. Cattle eat about 25 pounds of feed per head per day.

Hog industry: Seaboard in Hugoton has a feed mill and hogs. Pigs require higher protein have more sensitive feeding rations than cattle.

IN & OUT

IN: The owner arranges for transportation of cattle to the feed yard. I & D has their own grain elevators and feed mill, so the grain comes from local sources mostly. When grain is shipped in it is trucked or sent by rail. Cane molasses, by-product off of ADM corn syrup production comes in by rail in tanker cars.

OUT: The cattle are sold on a live contract base and the packer arranges the freight, because they need to be in control of the efficiencies of their plant. Sometimes they pick up half a load at one yard and go to the next yard to pick up another half. The liquid feed (from Performix) is transported to the feed yards and dairies by truck. Wheat, and occasionally milo, is transported by rail. John P. doesn't see anything converting to rail.

Backhauling is important because of efficiency. They ship wheat out, and bring back feed from distillers in NE.

ADEQUACY OF CURRENT TRANSPORTION MODE

Trucking: From an employee standpoint, the job is low paying and difficult. It's hard to retain drivers because they move around from job to job. Contract haulers own their own truck and are forced to take a low wage, but there is romanticism about being your own boss. It's not a lucrative business. I & D works with contract hauling for the most part. They have grain hoppers.

The transition to farmers with semis has impacted business, because they can work for less. State law says that they can't haul commercially with a farm tag.

Barriers of current transportation: Yes, available funding has gone to the populated areas and not to industry. John P. said he's not saying that from a biased standpoint. He has lived in KC, Chicago, and NY. The transportation bill hasn't looked at industry. Two-lane highways bring prosperity. There are 6,000 vehicles on highway 50 per day. (***Maybe we should recommend two-lanes from D. C. to G. C.). And highway 83 is considered the connection between Canada and Mexico. There needs to be reallocation of funding to support this industry. We need the infrastructure.

The answer is not going to be the railroad. There has been an effort to protect the short-lines. They are not the future because they are not efficient. Truck and pavement is more efficient. However, the main line railroads are efficient and a necessity. Look at the cost of putting a short-line rail connection into the feed-yard to substitute the use of truck. One company won't be able to hold 110 car capacity of grain and then use for feed. Feed yards just won't have the efficiency needed to support the line on their own. Ethanol plants may haul enough grain and by-products to build rail and use train in the future. The market has determined the most efficient way, with train loading stations as opposed to short-line rail systems.

PROJECTION OF GROWTH & FUTURE TRENDS

Facilities not so much, because of space. They added a lot of grain storage in the mid 90's, so storage building has declined. John P. doesn't' see more bin structures going up. They have expanded their feed yard capacity, and have been continually growing. They currently have over-capacity. The industry as a whole in the area was expanding in the 90's and now they are at over-capacity.

The grain business has consolidated, but the cattle industry hasn't yet. The cattle industry will begin to expand at a much higher rate. There will be more integration in the future, but the cattle business is very independent, so there is slow movement towards consolidation.

The cost of land is much higher in AZ and CA than in KS, the weather is better here, and we don't have population risks. Efficiency drives. Industry will relocate out here.

INCREASING FUEL COSTS

The increasing costs have impacted them tremendously. They utilize natural gas boilers for steam flake grain production. They use gas powered mechanics to run the legs at grain elevators and power the mill. Rates have been raised by one third. Truck and rail fuel charges or rates have impacted them. Freight from Cimarron to Wichita is up to 30¢ from 20¢ and from $1.90 to $2.50 per mile for cattle freight. They tend to have to absorb the cost, because it is hard to transfer it.

ENVIRONMENTAL ISSUES

There is a uniqueness of the area. The quality of the underground water creates good wheat, hay, corn, and milo. The water table is low, however, and over time it will have an impact like the energy prices. The reason for the migration of dairies to southwest Kansas is because of the environment and water. Livestock consume about 15 gallons per head per day on average of water (industry average- they have found it to be more like 10-13). There have been efforts to retire water rights and protect the aquifer from moving down much farther. When purchasing land, a person buys the surface rights, or the mineral rights and/or water rights. If more farmers switch to milo as opposed to corn, there will be more of a feed grain deficit in the area, but we will preserve the water. It's better to convert farmland to dry-land in this area than to lose the cattle industry and the packing plants. Cotton is an alternate crop and displaces the need for storage.

A geological survey group projected that natural gas could run out in 20-25 years. Off shore drilling has curbed that. There have been predictions that we will lose the water aquifer in 50 years. Oil is scarce also.

There are EPA regulations on seepage rates from the feed yard lagoons. The drainage can be put on farm ground for fertilizer – it can even be pumped right out. Retention structures collect the solids.

Date: August 4, 2005

Time: 1:30 p.m.

Location: Excel Corporation – Dodge City, KS

Description: Dr. Yong Bai, Pat Oslund, and Christine Atkins met with Dan Schnitker, Vice President and General Manager

IN & OUT

IN: live cattle, boxes and supplies (CO2)
OUT: boxed beef, by-products, and hides

Transportation mode: truck. 80% by leased drivers who own their own truck and trailer. Excel uses mostly national truck lines to transport refrigerated products.

The cattle come from within a 150 mile radius. Excel has a 6,000 head per day kill capacity. 40-45 head fit in a truck trailer.

75 loads per week of boxed supplies arrive from Texas on back-haul.

75% of the boxed beef shipments go south, and then destination sites just swing up the east coast. The northeast plant heads north and northeast to the Great Lakes. There is a 28 day shelf life on the beef, which is packed in oxygen barrier packaging. It takes 3 days to truck to the west coast and 10-15 days to arrive in Korea or Japan. Turn around rate: Denver to coast takes 48 hours on truck and 7+ days on train. Shipping by rail would tie up equipment and Excel would lose money each day the meat sits. Shipment by rail is not really an option. Thirty-eight years ago, they used to send iced "swinging meat" (full carcasses) by rail. During the long shore man strike (?) they shipped by air, and of course the cost was high. The hides couldn't be shipped during the strike, so they were stacked.

95% of the hides source load in ocean 20' – 40' containers, because they are the same containers used to ship overseas.

Talo or lard fat and meat and bone-meal are shipped 50% by rail and 50% by truck. The shorter hauls to KS, NE, OK, and TX feed-mills are completed by truck. The majority of it is used for cattle feed. Blood is high in lysine, which is good for dairy feed. Some is sold to the fertilizer industry, because it is high in nitrogen. Excel's onsite Millard freezer holds 8 million pounds of frozen product.

PROJECTION OF GROWTH

Dan would like to see the Asian market open up again. They make-up 5% of business, purchasing cuts that aren't preferred in the states and by-products at a higher price that the U.S. is willing to pay, because of varying cooking styles.
The Dodge City Excel location won't be able to raise the kill capacity because there is a volume cap per day regulation.

Workman's compensation regulations have caused a decrease in the per box poundage. For example, customers won't accept anything over 80 lbs. This means more trucks than before go out for the same load.

Just-in-time delivery has become the status quo. There is a shortage of drivers for teams of trucks. The 10 hour per day rule went into effect last year, and it includes waiting time. So, when scheduling they "drop dead time." Example: If Excel has a delivery to Florida, they will calculate the scheduled delivery time by number of miles and legal driving time. The responsibility is then placed on the trucking company. If the driver shows up late, the scheduled deliver time is not changed, but if the trailer is loaded late, Excel will take responsibility and call the customer. There is a shortage of drivers because it's all about rates, and it's a demanding business. Dan has seen more team drivers and female drivers. Excel promotes the driving industry and hosts a driver appreciation week with free food and gifts.

ADEQUACY OF CURRENT TRANSPORTION MODE

Dan suggested that a by-pass be built around the north side of Dodge City that connects to south hwy 83 for cattle trucks. He believes the community is in support of it. Possibly a toll could be put in place, which he thinks would be accepted by the community. The small cost would be worth the time saved for the trucks and it would divert traffic from going through town, increasing safety.

Q. What would have to happen in order to use the railway system?
A. If the rail system could move product from location A to B as efficiently as the truckers … so that by the time Dan figures the rate and days to move the product, it's competitive with the trucking industry …. Dan gave us an example about how they had ordered a crane and it took an extremely long time to arrive, and even with a lot of calls and push, it arrived right before the deadline. He is waiting for the options to materialize. They can't rely on the rail system for dry goods, let alone refrigerated.

INCREASING FUEL COSTS

The fuel price increase has raised raw material costs. There hasn't been a problem getting trucks.

Date: August 4, 2005

Time: 3:30 p.m.

Location: Burlington Northern Santa Fe Railway Company – Dodge City

Description: Dr. Yong Bai, Pat Oslund, and Christine Atkins met with Stephen Muncy, Trainmaster, and Dennis Mustoe, Superintendent of Operations.

GENERAL

BNSF brings in corn from IA and NE, and ships wheat out to TX. The Garden City location takes 15 hours or less for the release of cars. The business is all about velocity and volume. In order to generate inbound loads, they need business to take the load. 100-105 tons of grain can fill a car. The c3 hopper is half the size of a grain hopper, but will weigh the same. About 8 semi trucks equal one hopper car of grain.

FUTURE TRENDS

We need water for corn in this area; however IL, IA, MN, & NE have an abundance of corn, some of which is being shipped to this area. The farming is starting to use less water to grow other things. Corn IN is a new concept.

GROWTH

20 years ago one car round trip per week annual average was good. Now BNSF turns three trips on a car in a month (***that doesn't make any sense … someone correct me). They ship in 110 car blocks and keep the unit origin to destination. The key is to keep moving the locomotive, cars, and employees.

SHORT-LINE RAILROADS

A small elevator might order 26 cars. Cimarron Valley Railroad (CVR) has four elevators on their line, which load 26 cars apiece, and then CVR sends the whole block to BNSF. CVR has 90 cars and 200 waiting. They ship 500 per week after harvest. Garden City Western (GCW) will send in 25 at a time. Boothill and Western is pulling up their line.

The short-lines are important because they serve the customer. They are a valuable partner and Dennis sees short-line rail expanding. It's up to them to decide whether their line is profitable when weighed against costs. A driving factor is the union vs. non-union environment.

SHUTTLE FACILITIES

Shuttle facilities in the area: Coolidge, Ensign, WindRiver, Dodge City, and Wright Co-Op. Dennis mentioned that the old rule used to be a 60 mi. radius between shuttle locations, and that it may be farther now. Ensign is on CVR, Wright is southeast of Dodge City.

MEAT RELATED PRODUCTS

Meat processing by-products are moved by train. Talo is moved in tanker cars, and tankage is moved in covered hopper cars. Large reefer cars are loaded at Tyson in Garden City.

Q. What would a business have to do in order to implement this?
A. In order to load the large reefers (refrigerated cars), a loading facility is needed and track. It is loaded on flat cars. This inter-modal is very specialized. BNSF would have to change some things also.

Q. How long would it take BNSF to ship refrigerated products to L.A.?
A. Excel ships from Dodge City to Los Angeles everyday of the week. BNSF could pull the car from industry today and place in the train headed to Newton tomorrow, and then it would go to K. C., or if there were enough to send to CA, they would go from there. The train may go to Chicago to another line, then over. 56 hours is the premium inter-modal time frame. BNSF scheduling office is in Ft. Worth, TX and they can answer scheduling related questions. Refrigerated products won't receive high priority; UPS would (for the 56 hour premium). So, realistically, Dennis would guess 10 days, give or take to ship refrigerated boxed beef from D. C. to L. A.

INCREASING FUEL COSTS

Q. How has the increase in fuel prices affected business?
A. Dennis has seen an increase in the amount of product shipped by rail. BNSF strives to stay at a capacity where their lanes are filled with profitable shipments. Rail and truck are partnered stronger than they have ever been. As far as pricing changes go, that's a "highly guarded secret." Stephen and Dennis both admittedly didn't know any examples for pricing. They don't even see it. We may be able to get information from Steve Dot, economic development, in KC or off of the internet through the pricing system. The major companies (customers) work with the economic development team first on pricing.

APPENDIX II - SECOND SITE VISIT MINUTES

Date: May 22, 2006

Time: 10:00 a.m.

Location: National Beef – Dodge City, KS

Description: Dr. Yong Bai, Pat Oslund, Shaymala Tamara, and Michael Barnaby met with Carey Hoskinson, Vice President and General Manager

In & Out
Q: What are the products and by-products that National Beef produces?
A: We produce various red meat cuts (strip, chuck, round, etc.), and by-products (hides, tallow, bone meal).

Q: How many products and by-products are produced and how are they shipped by National Beef?
A: We slaughter 35,000 head per week, 5,800 head per day. They come in by truck and on an average truck there are 42-45 head of cattle. We receive on average 131 loads of live cattle that come in from a 250 mile radius, mostly from Kansas, Iowa, Nebraska, and occasionally South Dakota. The bulk usually comes in from an 80-120 mile radius. We usually have 1,000 standing cattle on the grounds to begin the day. We produce approximately 2,600,000 pounds of boxed beef per day (60% of the live cattle weight is used to produce red meat, with the avg. dressed weight being 750 pounds, of which 450 pounds is red meat), usually 62 loads of boxed red meat per day, all of which is sent out by truck. We ship about 10 to 12 tanker cars per day of tallow, some by truck also, probably a 50-50 split between truck and rail. We ship about 40 containers of hides per week, which comes to about 30,000-35,000 of hides shipped by truck per week. Then we probably do about 6 loads per day of bone meal, which are ground meat scraps, mostly by truck because of proximity.

Q: Where are the products and by-products shipped?
A: We ship refrigerated beef to hotels, restaurants, and grocery stores nation wide. And some is exported outside of the U.S. to Taiwan, Hong Kong, Japan, and Egypt. We ship hides across the U.S. and export them mostly to China and Korea. We also ship leftovers (tongue, heart, etc.) to the export arena. We ship bone meal and tallow to the domestic market.

Q: How are the products and by-products shipped?
A: The exports are source loaded, in sealed refrigerated containers, hides are shipped in non refrigerated containers, and sent to either Seattle, LA, or (?) and are mostly sent by truck.

Q: What is the time that it takes from production to deliver to the customer?
A: I would say that about 98% of our products are manufactured and delivered to the customer within 3-4 days. That's because we have very little aged products, but restaurants will age their own products. The main reason that we want to get the product out so fast is because of the shelf life of our products, ground beef has a shelf life of 20 days, while for fresh-red meat on average I would say that it takes at most a week to 10 days from first cut to the time the customer receives it. For our exports it takes about 3 days to get the products to the west coast.
Q: Is the packaging that is seen at the grocery store the way National Beef packs their beef?
A: No, it is shrink-wrapped here and put into a box and shipped out, once it is received by the grocery store it is cut and repackaged. Now there are some that sell our cuts in their original packaging like Wal-Mart, which is shipped to their distribution centers in Georgia and Pennsylvania. I could see case-ready meat grow possibly by 15% a year.

Q: What are the inputs to the products and how many trucks come in per week?
A: We bring in bags, boxes, glue, pallets, chemicals, oils, lube, safety gear, welding supplies, tape, etc. We have about 500 supply trucks per week. Usually 10-12 loads of boxes per truck, coming from everywhere in the nation and locally.

Exports
Q: When do you think that Japan and other Asian markets will re-open? And will it have an effect on your plant as far as an increase in production?
A: I believe the Japan market will reopen around mid to late August and maybe possibly Korea sometime this year. Right now we are shipping to Taiwan and hopefully someday to China, which I think might happen within the next couple of years. As far as increasing plant production, it probably will not happen, even with these markets making up about 10% of our output because we are already at kill capacity at 5,800 head per day and 35,000 per week.

Transportation Options
Q: Why can you not use rail to transport chilled boxed beef and could you expand to be able to ship boxed beef by rail?
A: First off we don't have a rail spur that goes by our freezer in order to load the beef. And if we did, I wouldn't have enough freezer space to be able to store all of the beef. So basically we cannot ship exclusively by rail because our facility is not equipped to deal with the railroad. We do ship most of our frozen by-products by rail, about 10-12 loads per day. We will ship all of our tallow by rail and some frozen items because there is no time concern. I cannot see fresh-red meat being transported by rail because it has a limited shelf life. Also we deal with just-in-time delivery, therefore we try not to have any stored meat and the same goes for stores, they like to have no storage and prefer to have delivers as they are beginning to run low on products. This allows them to have the freshest product possible and also helps them to lower their overhead costs.

Q: Is there any possibility of moving any of your products or by-products by rail instead of trucks?

A: The only thing that I can see moving all to rail are hides, bone meal and tallow, and the frozen loads. Of which we send out about 10-12 loads per day. We sometimes send some to a 3rd Party freezer down the street for storage.

Q: Do you see any possibility of any products being moved more by train?
A: Maybe for specific markets like overseas, with more frozen rather than fresh. The biggest problem is that we delivery to a lot of distribution centers that are not near railroad tracks.

Q: What is National Beef's responsibility for the transportation of the product?
A: Once the product is placed on the truck we are no longer responsible, while the product is on the truck. Once it is receive by the customer, if there are quality problems we will send out an investigation team to determine what happened to the product, whether it was a shelf life issue, truck/trucker damage issue, or a warehouse issue. I would say that 32% (?) or less of the problems that arise happen within 10-20 days of the product being produced. About 28% of the problems I would say arise from freezer problems, either with the truck's or the warehouse's freezer.

Q: How are the services of the trucking company obtained?
A: We usually contract out 25-30 different carriers. We negotiate bids with the companies once a year and commit to a per mile charge and the number of trucks that we need.

Q: Are trucking companies providing adequate service?
A: Their service is adequate and I understand the problems they have with driver turnaround. The one problem is there are not enough refrigerated trailers to supply the need for them, I think because of insurance cost. I believe the insurance cost has caused several small carries to go out of business.

Q: Is it difficult to find enough trucks?
A: Yes, very difficult to find enough refrigerated trucks, then when you do, sometimes you cannot find enough drivers, especially during the holidays. The biggest problems I have with truck companies is the driver turnaround, weather conditions, and the sever lack of refrigerated equipment.

Q: Do you use your own trucks?
A: No, we use independent carriers, but some stores, like Dillon's, will send their own trucks to pick up boxed beef.

Transportation Infrastructure
Q: Is the highway infrastructure adequate in the southwest region of Kansas?
A: I believe that there are enough roads, but the repair and maintenance of them is inadequate, not only in Kansas, but nationwide.

Fuel Price

Q: Has the increase in the price of diesel fuel affected your business?
A: It's tremendously affected our business. It has increased our total cost per load out and our cost for freight in, which is transferred to the kill cost, and is then transferred to the customer. It also does not help that the time of year diesel prices are the highest, June, July, August, are our busiest months of the year. The price of cattle also has the same affect.

Projection of Growth

Q: Do you think that National Beef or the southwest Kansas area will increase the production of beef?
A: I do not think so because not too long ago, 1998, we started an expansion project which has double our production size and has stopped at about a 5,800 kill capacity per day. At least in the Dodge City area, I believe that it has fully matured to its maximum capacity. The industry as a whole I do not believe will grow because there are already big plants in Finny and Amarillo, TX, and 7 of the biggest meat plants in the nation our in southwest Kansas, and the panhandles of Oklahoma and Texas. That area kills about 750,000-850,000 head per week, which is about 80% of the entire industry's production.

Q: Do you believe there will be revenue growth in the area, especially if the export arena were to open back up.
A: Yes, especially if the exports returned. I think it's something like for every dollar spent here it increases the value of the surrounding area by a multiple of 12. At the moment we employ about 2,300 people with a $50 million dollar payroll.

Date: May 22, 2006

Time: 2:00 p.m.

Location: Kindsvater Trucking, Inc. – Dodge City, KS

Description: Dr. Yong Bai, Pat Oslund, Shaymala Tamara, and Michael Barnaby met with Dennis Kindsvater, owner of Kindsvater Trucking, Inc.

In & Out
Q: What products do you transport?
A: We primary ship box beef on our front end hauls. We will take just about anything on our back hauls: tires, bagged fertilizer, groceries, bagged animal feed, but usually not grain, mostly consumer goods on the back haul.

Q: Where is the boxed beef sent?
A: It is typically shipped out to about a 1,000 mile radius, to the south and southeast.

Q: Do you ship live cattle?
A: No, we only do consumer products, mostly boxed-beef. National Beef has some of their own trucks and trailers; same with Excel they too have most of their own trailers. We ship a lot of our boxed-beef south to the port in Houston or Mexican boarder towns, but some of that has slowed since the last BSE scare.

Q: Is there any possibility of using short line railroads to move live cattle?
A: No, those short-line rails only ship grain. Railroads stopped shipping live cattle around 1955, they are now all moved by truck because of time reasons and because trucks provided more consistent and prompt service. There are about 150 rail cars of grain a day that comes into Dodge City. With the increase in energy costs, it cost more to pump water and therefore there is less corn production in this area, which causes more alfalfa to be grown in the area. I believe that with the increase in the cost of energy used to pump water in this area, it will some day make the feedlots start to move east toward the supply of grain.

Trucking Costs
Q: What is the cost of trucking?
A: We pay drivers a per diem that comes to about $7^{1}/_{2}$ cents per mile. We pay about 22% of the gross freight charge. Our revenue is about $1.65-$170 without the $0.36 fuel surcharge. With the surcharge the cost to move a truck is about $.50-$.55 per mile. I came up with an excel spreadsheet that helped me to understand what all truckers try to do, and that is to price time. The conclusion that I came to was that with the high fuel prices it is a better idea to wait for a back haul and pay a driver a layover charge, rather than come back empty and lose money on the back haul, even though that means not being able to do as many runs. It costs about $900 to fuel a truck which has forced us to do longer hauls at higher prices and to refuse short hauls. The problem with most independent truckers is they spend too much money on used trucks and then they do not charge a high enough price because they do not know how to price time and therefore they go out of business.
Q: Who pays for the loading and unloading of the trucks?
A: Usually the packers do it and do not charge the trucker. If they do it's about $45.

Q: What percentage of your revenue goes to the trucker?
A: About 20% of our revenue goes to truckers.

Driver Info
Q: How many hours per day can a driver drive?
A: Its government regulated at 70 hours every 8 days. They don't receive overtime, but they get a percentage of the gross of the haul and if there is a layover we will pay them for their time, but layovers only happen 1 out of every 20-25 hauls. We employ only 3 of our own drivers and we contract out the rest to independent drivers.

Q: Is it hard to find drivers?
A: Always, because the trucking industry has changed. We now have to find more proficient truckers who can do the job and do it well. Truckers now need to have more knowledge of the job than they use to, they can no longer afford to get lost or delayed because the industry demands fast, timely delivery or you will lose all of your customers and go bankrupt. Also, with technological improvements, a trucker has to be more educated. I would say that in about one or two years there will be GPS tracking systems on the trucks, which truckers are going to need to know how to work. But, I do not think it will come around until the rates demand it.

Q: Who owns the trucks/trailers?
A: We own our own trucks and refer trailers. Some packers will own there own livestock trailers. The most difficult part is finding a trucker.

Truck Maintenance

Q: How long do you own your trucks and about how many miles until they need a major overhaul?

A: Around 700,000-900,000 is when they need major repairs. If properly maintained I will keep them for about 4-5 years and then sell them for about $25,000 after buying them around $100,000; $80,000 for a trailer. The reason I sell them a little earlier than most tucking companies is because if a truck breaks down it cost me downtime and if you have too many trucks breaking down you will lose customers. I usually only keep a truck for a couple of years because the older the truck the more repairs it usually needs and newer trucks do not need as many repairs. That is what these small independent truckers do not understand and they get in trouble by buying these used trucks and do not set aside money for repairs on it in the future. We have our own repair shop to fix our own trucks and we also repair other truckers' trucks for a fee. If it was not for the shop we would probably be out of business.

Q: Is it important that you constantly have new equipment?

A: Yes, because nowadays there is no downtime allowed. We try to use only refer trailers because we can use them for backhauls, which come out to about 3,000-4,000 loads per year of backhauls.

Transportation Infrastructure

Q: Is the highway infrastructure adequate in the southwest Kansas region?

A: Definitely not, especially between Dodge City and Kinsley on U.S. highway 50/56, even though it is a super-two highway it only has one passing lane between Dodge City and Kinsley, which is not enough with all the truck traffic that goes through there. The biggest problem is that anybody, regular driver or truck driver, coming from the southwestern U.S. to Kansas City, uses U.S. 50/56. Therefore, there is not only a lot of local traffic but also a lot of through traffic from the southwest U.S. There is also quite a bit of traffic west between Garden City and Dodge City on U.S. 400/56 and there is also quite a bit of traffic coming into Dodge City from Nebraska on U.S. 283 bringing in grain from the north. But I feel the biggest problem is U.S. 50/56, I believe that there needs to be a four lane highway in between Dodge City and Kinsley because there is just too much traffic and it is not safe because of all of the truck traffic on it. The second worse problem would be U.S. 400/56 between Dodge City and Garden City, with all of the truck traffic that goes back and forth between there it also needs to be four lanes or have more passing lanes. The third biggest problem I would say would be U.S. 54 west from Kingman on because the amount traffic that uses that route to head out to California. I think it is four lanes once you get into Oklahoma and Texas, but I believe that Kansas should do the same all the way to the state line because of traffic and safety concerns. As far as grain trucking goes, it takes 7 times the weight of the cattle of grain to feed cattle. Most of that is local traffic, but if Nebraska has a really good year they will truck some of that south on U.S. 283 down to the southwest Kansas area. Overall, I would say that the state of Texas has better highways than Kansas, but Kansas is comparable to Iowa, Nebraska, and Colorado highways, and Kansas definitely has better highways than Oklahoma.

Security
Q: Did 9/11 cause your any security issues or an increase in insurance cost?
A: It has changed the way loads are sealed and has made us more aware of security issues, but it did not make a huge change in the cost of insurance.

Ethanol
Q: What are your opinions about the Ethanol Plants being built in this area?
A: I think it is a good idea if they can make the plants self sufficient. The one thing that people do not understand is that it takes about 170 lbs of nitrogen to fertilize 170 acres of corn. People forget that it takes energy from coal plants and other oil products to produce nitrogen, sometimes more than what ethanol can produce.

Date: May 23, 2006

Time: 10:00 a.m.

Location: Excel Corporation – Dodge City, KS

Description: Dr. Young Bai, Pat Oslund, Shaymala Tamara, and Michael Barnaby met with Jane Westerman, Fleet Manager.

In & Out

Q: What are the names of products and by-products produced by Excel Corporation?
A: The main product that we produce is chilled boxed-beef and rendered by-products: meat and bone meal, blood, hides, and tallow.

Q: What are the quantities of products and by-products produced by Excel Corporation on daily, weekly, monthly, and annual basis?
A: We slaughter 6,000 head of cattle per day, 35,000 head per week and 1.6 million head per year. That comes out on average to about 90 trucks of boxed-beef per day and about 15 cars of by-products per day by railroad. We have about 140-160 trucks of cattle in per day as well, 75% of them coming from about a 100 mile radius: Texas, Oklahoma, Colorado, Nebraska; depending on the prices in those areas. We usually start with the cattle from the south and move north as the year progresses.

Q: Does excel own their own trucks?
A: There are 35 trucks leased to Cargill (Excel) that we use from a central location in Wichita. The transportation fleet goes to the origin point and picks up the cattle and then goes straight to the drop off point. Otherwise, we use outside carriers with their own trucks and trailers. About 40% of the trailers used by outside carriers are owned by Excel, there is a different rate paid to the diver if they use Excel's trailers. The outside carriers carry most of our live cattle in.

Q: What are the major shipping destinations outside of Kansas?
A: Boxed-beef is usually shipped to the east and southeast parts of the U.S.

Q: What are the major shipping destinations inside of Kansas?
A: East and Northeast Kansas

Q: Are there any exports going out?
A: Not at the moment with Japan and most of the Asian markets being closed, but we would if they were open.

Q: What is the required time (days) to deliver the products to the customers?
A: It takes boxed-beef 2-3 days by truck. It takes by-products usually 5-8 weeks by railroad, tallow usually 6-$6^1/_2$ days by tanker cars.

Q: How many railroad cars would be needed if all of the by-products would be moved by rail?
A: If it was all by rail, it would be 180,000 lbs. of the product per railcar and would come to a total of 41 railcars per week.

Transportation Options
Q: What are the reasons for using trucks for shipping instead of the railroad?
A: The main reason is because trucks are quicker and that is important when dealing with a perishable product like boxed-beef. Railroads can usually respond the same day to our request but it still takes longer for them to reach their destination.

Q: If the diesel price continues increasing, will you ship more products and/or by-products via railroad?
A: Yes

Q: What do railroad companies need to do in order to have more business from you?
A: Railroad companies need to have more cars available, especially more refrigerated cars. The problem with railroads verses trucks is that we need a constant supply to transport our supplies and products, so at some point trucks would need to be used even if we tried to move our products mostly by railcars. All of our by-products are shipped using the railroad.

Q: What are the major obstacles that prevent you from using railroad service?
A: The lack of refrigerated cars and certain times of the year require us to have a constant inflow and outflow of products, which the railroad could not do in a timely manner.

Q: What are the areas in which trucking companies need to improve their service?
A: Overall, the companies that we deal with are adequate because if they were not we would use another company. So they treat us well and we treat them well, for example, we usually pay truckers the same week as when they make a shipment for us, where as others it may take a couple of weeks. The area in which trucking companies need to improve their service is to pool their trailers in order to move more items at a faster speed than using only their trailers. Also, companies need to invest in temperature controlled trailers in order to keep the product at a constant temperature.

Q: Is keeping the correct temperature a problem?
A: It can be, especially for truckers who are not use to dealing with refrigerated trailers. The temperature of every truck is checked every 2 hours. Some trucks have digital thermometers, but we prefer the older thermometers because the sun can play havoc with the digital thermometers

Q: What do railroad companies need to do in order to have more business from you?
A: The biggest problem with the railroad companies is that it takes too much time to make a track switch and when they do get around to making the switch, there are not enough workers with enough time to make the switch. Also, they need more cars especially refrigerated cars. Also there are not any tracks where some of the facilities are built.

Transportation Costs
Q: How has the increase in the price of diesel fuel affected Excel and the industry as a whole?
A: It has caused a lot of independent trucking companies to go out of business because of the increase in the price of petroleum based products, also the increase in insurance costs and replacement parts. What it comes down to is the bottom dollar because what is happening is that the meat packing industry is forcing the trucking industry to absorb the increase in cost. Many small independent carriers cannot compete with the rising cost because if they increase their price they would lose too much business and if they keep their price at the same level they will not make enough money to stay in business. Now drivers do get a fuel surcharge but it is usually behind the actual price because the price of diesel has to increase by $0.05 in order to have the fuel surcharge to increase. Also, the price of fuel is different in other areas, sometimes making the fuel surcharge even more worthless. Also, the fuel surcharge is a week behind what the actual price is, so that makes it even less helpful.

Q: Does the diesel price have an effect on the price of the final product?
A: The price increase of diesel has a bigger effect on the price of the live animal because the fuel surcharge is usually placed back on to the cost of the live animal or the slaughter cost and is not transferred to the final product.

Q: If the Asian markets reopened would that have an affect on costs?
A: The cost would be reallocated and would probably improve costs at the feeder lots and the slaughter house.

Q: As more independent trucking companies go out of business, will there be enough drivers?
A: The amount of drivers is always a concern because everyone in any industry is looking for drivers and drivers with their own trucks. It also takes a special breed of truck driver to haul live cattle.

Q: If shipping by truck, does the company pay the trucking company a lump sum, an hourly rate, per truck, or per package?
A: We pay the driver by mileage for boxed-beef and by weight and mileage for live cattle. The weight is based on the department of transportation's regulations; most of our trailers weigh between 48,000-50,000 pounds. Boxed-beef loads are easier to estimate the weight of the loads because the boxes are always around a certain average weight, whereas live cattle create a problem with the weight of our trucks because the weight of the cattle is estimated at the feed yard. On average we spend between $125,000-$150,000 using our own trucking fleet and about $25,000 using outside carriers. A normal rate paid to a trucker with a back-haul to say Illinois is $2.15 per mile; an atypical rate without a backhaul say to Houston is around $1.62 per mile, with weight figured into those rates.

Q: How much does a head of cattle cost?
A: About $1000 per head.
Q: Who pays for the loading and unloading of the trucks?
A: As far as Excel goes, we pay for the loading and unloading of the trucks and that is usually the same for most companies.

Transportation Infrastructure

Q: Is the current highway system adequate?
A: For the most part it is sufficient. The one problem area is U.S.400/50 between Garden City and Dodge City; there is so much regular traffic as well as truck traffic, along with it being such a curving road with very few passing lanes, and which I feel there needs to be either a 4-lane highway or a super-two highway built there. U.S. 50 also should be like that all the way to the state line into Colorado. Also, U.S. 56 is a rough road west of Dodge City, which is harder on the trucks and the animals.

Q: Is the maintenance of the highway system adequate?
A: Yes, I would say they do a fairly good job.

Projection of Growth

Q: Is Excel at kill capacity at the moment?
A: Yes, we run 2 kill shifts and 1 cleanup shift. We cannot run more or longer shifts because of employee health issues, but we must keep everyone working because it cost Excel about $1,200 per minute of downtime.

Q: Do you think there will be any new plants built in this area in the future?
A: Probably not because between us and National Beef, this area kills about 25,000 head of cattle per day. There recently was a packing plant in Holcombe that burned down and as of yet no one has rebuilt it, leading me to believe that this area is already at maximum capacity.

Q: Do you think that there will be any growth in other areas of the country?
A: I believe that between Excel and other companies that all of the meat packing plants have been strategically placed and that if there is any expansion it would be the purchasing of other plants, so more consolidation than expansion.

Date: May 23, 2006

Time: 3:00 p.m.

Location: National Carriers – Liberal, KS

Description: Dr. Yong Bai, Pat Oslund, Shaymala Tamara, and Michael Barnaby met with Fred Mull, Livestock Division Manager.

Q: What are the major affects of the U.S. economy on your business?
A: It causes us to have a labor shortage for truckers and the cost of fuel hurts just-in-time deliveries

In & Out
Q: Do you haul exclusively for National Beef?
A: Even though we are a separate entity from National Beef, I would say that 99% of our business is with National Beef. We do some hauls with other companies but not much. We are owned though by National Beef but we operate as a separate entity. Our busiest time of year, especially hauls for National Beef, is during the spring and fall.

Q: What is the process that cattle go through before they are shipped to the packing plants?
A: Typical beef cattle will be born on a private ranch and moved to grazing pasture. After they are somewhat grown they are sent to a starter feed yard and then to a finishing feed yard until they reach the ideal weight and finally sent to the packing plants

Q: How many cattle fit onto a truck?
A: Between 40-45 head of cattle, weighing between 1075-1375 lbs per head of cattle.

Q: How many loads of cattle per day do you haul?
A: On average we haul 150 truck loads of cattle to National Beef in Dodge City and about 160 truck loads of cattle to National Beef in Liberal, in all 310 truck loads per day.

Q: About what percentage of the livestock comes from within a 100 mile radius?
A: I would say about 90%-92% of the livestock comes from a 100 mile radius, the shortest distance being about 5 miles away. We try to have all of the drivers drive equal distances everyday and we start with the shortest and work our way out.

Q: Where do you haul the chilled boxed-beef to?
A: That is part of our refer division, which ships in general to the southeast, southwest, and Midwest regions of the U.S., we do not ship very much east and there is none going out west because the Asian markets are currently closed. All of the boxed-beef is shipped by truck on refrigerated trailers.

Q: Was your capacity maintained even with the close of the Asian markets?
A: Yes, and if it were to reopen we would just shift some of the domestic production over to exports and stay at our capacity level.

Q: How do you know if there will be a backhaul?
A: We will call independent carries and ask if they have any feeder cattle that need to go out to our pickup area. We have started to try to take anything that we can on backhauls in order to increase profits and cut costs of deadhead hauls.

Q: What is the typical schedule for a haul of livestock?
A: We will make calls in the morning to see who has cattle for sell and at what price. There are usually some already bought the day before and that are usually ready for pick up. Once it is determined where the pick-ups are we schedule and dispatch the trucks to go and pick up. We schedule for drive time there and back, loading and unloading time, and try to have all the trucks drive the same distances everyday so we pay everyone the same. We will start with the closest cattle yards and work our way out as the day goes on. Our first loads go out and pick up cattle between 4-7 a.m. so that they can be back with a load of cattle between 6-8 a.m. On average each truck makes 3 hauls of cattle per day.

Transportation Costs
Q: What is the rate to pickup livestock?
A: If it is less than 200 miles it is about $4 per mile, while if it is greater than 200 miles it is about $3.10 per mile plus fuel surcharge.

Q: What is the cost of shipping a product?
A: It cost about $3.50-$4.50 per mile to ship something. On a refer trailer with a backhaul it costs us about $1.50 per mile.

Q: What do you pay a normal driver and what do you pay an experienced driver?
A: A normal driver gets paid around $0.38-$0.40 per mile, while an experienced driver receives about $0.40-$0.42 per mile for the transportation of boxed-beef. For livestock, they get paid a percentage of the load, usually around 27% of the load revenue. We have about 3 of our own drivers who also get benefits from us.

Q: What percentage of total cost does shipping, diesel fuel, driver and insurance account for?
A: The biggest would be the cost of hiring a driver which accounts for about 35%-40% of total cost, next would be the cost of diesel fuel which accounts for about 10%-12%, then insurance cost which accounts for about 3% of total cost, and finally shipping cost which accounts for about 2%-3% of total cost. There are other costs which are hard to account for; an example being the price of aluminum has risen causing an increase in the price of the trailers that we buy.

Q: What percentage of overhead is associated with shipping cost?
A: About 20%, because of safety, training, logbooks, dispatch, etc.

Q: Do you or do the customers that you deliver to pay the loading and unloading cost?
A: Usually it is the customer that we deliver to that pays the loading and unloading cost. But if loading and unloading takes longer than $1^1/_2$ hours, then I have to pay the driver by the hour while he waits. We have started to bill the customer if we have to pay the driver to wait for a long period of time and usually the next time we go to the customer we do not have wait as long to have the trailer loaded. We also pay extra for drivers who do multiple drops and next day drops, but they increase our profit by making us more efficient.

Q: Since you are an independent entity from National Beef but still apart of it do you still negotiate your rates with National Beef?
A: Yes, because since we are separate entities we each have separate bottom lines so we have to negotiate with them, which we do once a year.

Fuel Costs
Q: Do you try to pass the fuel cost onto the production process?
A: Some, but not enough to cover the cost. The problem is that most of our livestock trailers are more than 50% deadheads on backhauls. Also, the lengths of most of the livestock hauls that we do are less than 100 miles which means we have to pay by weight. The price of weight helps the packers cost but hurts us. Another problem is that the fuel price on average is higher in southwest Kansas than the national average, which also hurts the driver because the fuel surcharge is based on the national average.

Q: What is the fuel mileage for the trucks?
A: Our trucks average $4^1/_2$-$5^1/_2$ miles per gallon. Fuel costs are our biggest concern, while insurance is not much of a cost factor.

Q: At what price does the cost of diesel fuel cause problems for your business?
A: When it starts to get around $3 a gallon it makes things tough. At $5 a gallon it becomes a huge problem because 75% of our shipping cost is due to a fuel surcharge, which is eventually passed on to the consumer, some of which is already happening, and it is made worse with the Asian markets being closed.

Q: Do you think that there will be an increase in use of alternative energy sources?
A: Yes, in fact there are already some in use, for example there are some trucks that use a mix of propane and diesel to increase gas mileage. But, overall we are behind the rest of the world and we need to rework our alternative fuels so that they will be efficient. The biggest problem that I see is the fact that there will certainly be government regulations that go along with these alternative energy sources which will cause our costs to increase. I understand why these restrictions are in place, but I feel that sometimes they go too far though and end up hurting more than helping.

Driver Info

Q: Do you employee your own drivers?
A: No, most of the drivers are owner-operators, who get paid a % of the rate. About 75% of the drivers use National Carriers' trailers.

Q: Is it difficult to find drivers?
A: Yes and it is getting more difficult all of the time because of the work ethic it takes to haul not only live cattle but to be a driver in general is not an easy job because of the lifestyle of being on the road all the time and not being home very often.

Q: How many hours can a driver drive per day?
A: The national government regulates the hours that a driver can drive per day, which is 10 hours per day with a constant 8 hour break in-between. There are some differences though between national trucking regulations and Kansas trucking regulations, for example, since most of our hauls are less than 100 miles the national government does not require us to have a logbook for our truckers, but the state of Kansas does, so we have to pay attention to the state regulations because for some reason they overrule the national regulations, which does not make any sense to me.

Maintenance

Q: Does National Carriers have their own maintenance shop on-site?
A: Yes, we do major repairs only for our trucks. We will do repairs for trucks that we lease out, but for a cost because like us, the maintenance shop is a separate entity, with a separate bottom line.

Q: On average how many years do you use your trucks before buying new ones?
A: We will use our trucks a little longer than most carriers because we usually only deal with short-haul runs and also because we have our own maintenance shop which keeps them in good shape. On average we will use our trucks for about 4-8 years. We will reuse our trailers for as long as possible.

Transportation Infrastructure

Q: Is the highway infrastructure in southwest Kansas adequate for your business' needs?
A: No, I believe that Oklahoma and Texas are way ahead of Kansas, by probably about 5 years. The worst problem is probably U.S. 54, which is heavily congested all the way from El Paso to Kansas City because of the increase in traffic because of NAFTA and from regular traffic because of the population explosion in the southwest, especially in Arizona. Oklahoma finally has expanded 54 into 4-lanes in some areas. I feel that it should be 4-lanes at least all the way from Minneola, Ks to Texhoma, OK, but really it should all be 4-lanes all the way to U.S./Mexico boarder. There have been improvements on U.S. 54, like making it a super-two and inserting passing lanes, which help but it is still not enough and if the Asian markets open back up, which I think they will soon, it will create even more traffic west on 54. The biggest problem is that the state of Colorado will not expand their highways so therefore there is more traffic from the west that uses U.S. 54. Also there is supposed to be a new plant being built in

Oklahoma along U.S. 54, which will increase the amount of traffic along that road. Overall, I think improvements to U.S. 54 will not only help us, but the community as a whole by increasing the standard of living and population of the area.

Q: Are the pavement conditions adequate?
A: No, because when these highways were built there was not as much traffic and there was not the same technology that is used today in the building of roads, so they do not deal well with the heavy traffic in the region.

Projection of Growth
Q: Do you think that the beef industry will grow in the future?
A: Yes, because there is already a new plant being built in Oklahoma and I believe with the increase in population in the southwest U.S. it will mean more plants being built. The only problem is the work force, especially if the southern boarder is closed off. Also, with more plants there will be more traffic on the roads causing safety concerns.

Date: May 24, 2006

Time: 10:00 a.m.

Location: National Beef – Liberal, KS

Description: Dr. Yong Bai, Pat Oslund, Shaymala Tamara, and Michael Barnaby met with Mike King, head of transportation.

Company Info
Q: Where is National Beef's headquarters located?
A: They are based out of Kansas City, Missouri. I believe they have just purchased a case ready plant in Georgia and already have one in Pennsylvania, which packages meat to be case ready for grocery stores.

In & Out
Q: What are the products and by-products that National Beef produces and where are they shipped?
A: Our main product is boxed-beef which we ship to the lower 48 states, Canada, Mexico, and some to China, but none to Japan at the moment. We ship out about 1,050 loads of boxed-beef per week between the Dodge City and Liberal plants, with an average load weighing about 42,000 lbs. per truck load. We also produce trim secondary meat products for companies like Oscar Myer's for use in their meat products. Most of the boxed-beef goes on a truck, very little goes by railroad, but most of the by-products are shipped by railroads.

Q: How many boxes of beef do you send out per day?
A: We ship about 46,800 boxes per day, with a weight ranging from 50-100 lbs per box, with an average weight of about 68 lbs per box, depending on the product.

Q: Where is most of the boxed-beef shipped?
A: We ship to all of the lower 48-states. Our weakest concentration would be the northwestern U.S. because of the packing plants in California and Nebraska. We have a heavy concentration in the southwest, Midwest, southeast, and northeast U.S., we ship to the distribution of population.

Q: What percentage of boxed-beef is transported by railroad?
A: About 1%, maybe less and that is because it has such a low shelf life. Also, most of our customers want the product to go from the plant to its final destination as soon as possible. Usually it takes 48-72 hours for a head of cattle to be received and shipped out. Then about 99% of the boxed-beef is at its final destination within 7-10 days after it has been boxed.

Q: What is its final destination of the boxed-beef that is shipped by railroads?
A: The fresh cuts are usually frozen and sent east to Kansas City. But we mostly use the railroad for the shipping of tallow and some dried blood. Shipping of most of our products is customer oriented and we organize only about 10% of the shipping for our customers.

Q: How much of your by-products are shipped by railroad?
A: We ship some of the trimmings, liver, brains, and hearts by rail, but probably less than 1%. But, all of the tallow that we produce is shipped in tankers cars by the railroads. On average we ship about 6 cars per week of by-products by railroad. Most of the edible tallow is sent to manufacture companies who make lard for cooking.

Q: Is the domestically shipped beef containerized?
A: It is put onto a truck and the truck is sealed. If a truck has multiple stops, after the drop off is made we ask that the customer reseal and initial the seal on the truck, because if it gets to the next customer and the truck is not sealed or not sealed properly then they will refuse the shipment. The purpose of the seal is to prevent contamination of the product.

Q: How many trucks of cattle come into National Beef per day?
A: On average we have about 110 trucks per day, with about 45-50 head of cattle per trailer in order to do our average slaughter of 6,000 head of cattle per day and at our Dodge City facility they kill about 5,400 head of cattle per day.

Q: What other products come into the plant in order for National Beef to produce its finished products?
A: We have trucks that come in with boxes, mostly from Garden City, we have safety equipment, containers, pallets, etc. On average I would say we have about 35-40 trucks per week come in with supplies for our plant.

Exports
Q: What is the percentage of boxed-beef that is shipped to Canada and Mexico?
A: Mexico receives quite a bit of our by-products, but as far as fresh meat is concerned they receive about 2% of our total boxed-beef, Canada about 2%, and China less than 2%.

Q: Is there any possibility of increasing exports to any of these countries?
A: Probably not, as far as Canada and Mexico are concerned. Canada has their own meat packing plants and Mexico usually receives quite a bit of by-products. I think that someday China will open up more and we can start to export more to China.

Q: If the Japan market was open, what percentage of boxed-beef would be exported?
A: About 20%, it definitely left a big gap in the market which hurt the entire industry. Our sales team has done a good job of filling that gap within the domestic market.

Q: If the Japan market were to reopen, would you increase your production?
A: No, we are at maximum capacity at the moment. We would just move some from the domestic market to the export market.

Q: Is the beef that is exported shipped by truck to California for export?
A: Yes, the country in which we are exporting to works with a shipping company who sends trucks and containers to National Beef to be filled and shipped out by their own trucks and containers. A majority is shipped by truck all the way to Oakland, CA, and a little grab rail in Denver and then out to California.

Transportation Options
Q: What are the major obstacles that prevent you from using railroad service?
A: The major problem is that railroads do not go to the places that we go to, many of the urban cities that we go to do not have railroads to the distribution plants that we have to deliver to.

Q: Is there any possibility of hauling some of the product by railroad all the way from here to California?
A: We do not make that decision; it is all up to the country that we export to and the shipping company that they deal with. Usually the shipping company owns the containers that are sent and they are the ones who decide how the container is going to be shipped.

Q: Does National Beef own its own refrigerated trailers?
A: We do not own any of our own refrigerated trailers.

Q: Do you have to have a refrigerated back haul if you use a refrigerated trailer?
A: No, you can put just about anything, as long as they are not chemicals, on a refrigerated trailer and just shutoff the refrigerator if it is not needed for the product shipped on the backhaul.

Q: Why do you think that there are fewer small carries than before?
A: Like I said before, truckers have to be managers in order to succeed. We prefer the smaller carriers because we seem to have better luck with them than we do with lager carriers because the smaller ones are on time more often and are easier to get a hold of if problems arise.

Q: Is it difficult to find enough trucks?
A: Yes, especially during the summer months (June, July, and August) because everybody is looking for as many trucks as they can find, especially reliable carriers. The real problem is not finding the trucks but drivers to drive the trucks.

Q: Do you think that an increase in the pay rate will attract more people into trucking?
A: Yes, it is possible, but truckers make good money if they want to work. In my personal opinion, I think it is more than a money situation because trucking is a tough job. And I think that most people cannot handle the lifestyle because it is a very lonely life, and I know this because I drove a truck for about 10 years myself. Most truckers are only home about once a week and have no time for a social life and very little time for family life. Most people, I feel, do not like to be away from home for long periods of time.

Q: What are the areas in which trucking companies need to improve their service?
A: Most of the 35 regional carriers (of these, only 6 transport nationwide) that we use do a fairly good. We try to use mostly regional carriers and we try to keep them in their comfort area because they do a better job if they know the roads and if they know where the loading areas are for the places that we deliver to.

Q: What do you consider a short haul or a long haul?
A: A short haul is less than 600 miles and a long haul is anything greater than 600 miles (one-way). When we ship to a large metropolitan area we will pay the trucker an additional $125 city fee, we count the 12 largest cities as ones where we charge the additional city fee.

Transportation Costs
Q: How do you pay the trucking companies?
A: They are paid per mile and each company negotiates their rates with us once a year. A normal rate would be probably around $1.63-$1.70 per mile. That is based on a direct route, if a trucker takes an indirect route he is wasting fuel and money, unless he does multiple stops for us then the trucker will be compensated for every extra stop he makes after the first stop. I would say that about 99% of our trucks weigh about 42,000 lbs. per truck, which is the net weight.

Q: How are the rates you pay the carriers determined?
A: Everyone has about the same rates because everyone uses the same Rand-McNally travel software that determines the most direct route to a location and based on that distance the rate is determined, using a ratio that is similar to everyone else's ratio. Usually, the shorter the travel distances the higher the rate.

Q: Who pays for the loading and unloading cost?
A: Usually we will pay an unloading fee of up to $110, but we do not pay a loading fee. Usually it is negotiated on a carrier by carrier basis.

Q: Do you pay insurance on products shipped?
A: We require that the carries have at least $1 million in cargo insurance. That cost is billed through the price that we negotiate with the carriers.

Fuel Price

Q: How has the diesel price affected your business?

A: It has affected us in two ways, 1.) It has forced us to pay a fuel surcharge to our drivers, which is set by the federal government. If the diesel price goes above $2.15 per gallon, then we have to pay a fuel surcharge of $0.01 per mile for every $0.05 increase in the price of diesel fuel. 2.) It has caused rate hikes from carriers. Trucking has changed from a fun job to an actual job. Truckers now have to be managers, otherwise they will not survive, because at one time it use to cost noting to deadhead, but now it is not economically rational to deadhead with the price of diesel as high as it is. Carriers are now customer oriented and therefore are taking on fewer customers at higher prices. This slows trucking companies down because they are tied to another customer and therefore slows everyone else down because it adds about one day of wait time to every delivery. Now carriers are becoming more coordinated in order to reduce wait time and the amount of deadhead trips they make. Of course, fuel prices will have an impact on any business, but more so on trucking companies because if they do not get rid of their deadhead trips, then they will not survive.

Transportation Infrastructure

Q: Is the current highway infrastructure adequate in the southwest Kansas area?

A: We definitely need more. It would probably help if we were not in the middle of nowhere. U.S. 50 and 54 to the east is a trouble area with all of the traffic that goes east. Also, U.S. 54 to the west is a trouble area also because of the heavy traffic and even though it is 4-lanes for about 25 miles in Oklahoma it is still not enough to relieve the traffic flow. The same goes for U.S. 83 south towards Amarillo, it is only two-lanes into Amarillo and the same goes for Oklahoma City.

Q: How much time would you save if it was all four-lanes?

A: Say for a four hour drive to Wichita, if it was four-lanes all the way to Wichita, it would take less than $3^1/_2$, therefore on average you are looking at cutting off about a half-hour to forty-five minutes of travel time.

Projection of Growth

Q: Do you think the beef industry in this area will expand?

A: It is expanding as of right now. I have heard that Smithville Foods is getting ready to build a new plant in Hooker, OK. But otherwise as of this moment I believe this area is at capacity, but you never know and I guess only time will tell.

Security

With 9/11, truckers have been an extra set of eyes out on the roads. It has also made truckers more aware of their surroundings, like making sure their trailer is locked, it is parked in well lit areas, etc. It has also forced us to start to inspect the trailers every time they enter and leave our facility. And has forced us and our customers to pay more attention to the seals on the trucks because if it goes to the next customer and it does not meet the correct specifications the entire shipment will be sent back

Product Inspection

Q: Do you do your own inspection of your product?
A: Yes, we have an on-site lab which we test each lot of cattle and once the tests are completed and the lot is approved we will then send out the truck with the final product. There are also two USDA inspectors on-site, along with our own quality assurance team, which is backed up by another quality assurance team to check their work. We can even track each piece of beef down to which head of cattle it originally came from. We also have an automated packaging system and the only time that the boxes of beef are touched is when they are loaded onto the truck.

Q: Is your product branded with a National Beef brand name?
A: Only if it is from our case-ready plant, for the most part it is repacked in another package without the National Beef name on it.

Q: Is there a quality difference between the type of meat that you ship to grocery stores and restraints?
A: There are different grades but the quality is all the same.

Date: May 24, 2006

Time: 1:30 p.m.

Location: Grant County Chamber of Commerce – Ulysses, KS

Description: Dr. Yong Bai, Pat Oslund, Shaymala Tamara, and Michael Barnaby met with Gene Plughoft, head of economic development of Grant County.

In & Out

Q: Where does the corn that is being imported to Grant County and the surrounding area go?

A: Most of it by-passes the grain elevators and goes straight to the feed yards. On average it sells for about $0.03 per bushel of corn. The corn that is harvested for livestock feed is usually sent to a feed mill were it is flaked, similar to cornflakes used in cereal, so that the cattle can better digest it and absorb the nutrients from it. There is a lot of corn for feed coming into this area because of all of the feed yards and in the southwest Kansas area alone there are about 3 million head of cattle. The largest feedlot in the nation is Grant County Feeders which on average has about 125,000 head of cattle on there property. They create about 1 million pounds of manure per day, which they will sell as fertilizer if the price of ammonia is high, which depends on the price of natural gas because natural gas is used in the production of ammonia. There is one problem with using manure as fertilizer and that is it will cause a high concentration of phosphate build up on the land, which causes farmers to restrict their use of manure once every three years. There is also a concern of runoff from the land, so you will see farmers use a circle pattern, working from the inside out, when they use manure as fertilizer to combat these problems.

Q: What percentage of corn comes into the surrounding areas by railroad?

A: I would say for Grant County it would be around 15%, and then for an area like Liberal with a heavier rail line it would be around 40%. But if a state like Nebraska has a good corn harvest then it they will truck in more corn to the state and there would be less transported by rail.

Q: Can the supply of corn keep up with the increase in demand for corn?

A: Yes, I believe it will. Now the price will increase with the increase use, which will cut the profit margins of the ethanol plant. But the one thing you must remember is that the corn that is used for feed now, half of it is not even being digested by the cattle. And the part that is not used by the cattle, the starch, is actually the part of the corn that is used for ethanol production. So then we would be using about the same amount of corn that is used to feed the cattle, that is used to produce ethanol.

Q: How many loads of milk per day leave the area and where does it go?
A: Lonestar Dairy produces about 3-4 tanker trucks per day of milk. During the summer the majority of milk is shipped to the south and southeast, while in the winter it goes more north and northeast. One thing that they do at the milk processing plant is that they will dehydrate some of the water out of the milk and make condensed milk, so that they can transport more milk and leave some of the water in the area.

Q: Are you competing with Wisconsin and other states for dairy production?
A: Not really, because Wisconsin has basically reached a plateau as far as milk production is concerned because in Wisconsin they only have small dairy farms which are regulated in size and on average there is only about 100 head of cattle per farm. Pennsylvania was growing as a dairy state, but they now have to deal with urban sprawl, so they have slowed their milk production. Then in California there is an area which has about 40,000 diary cattle, but the problem is that the state of California has a lot of environmental requirements which Kansas does not have. One area though which we are competing with is the panhandle of Texas, who does not have water regulations like Kansas and also they have a lot of money to offer these companies if the locate in Texas.

Q: How many trucks do you expect to come in and out of the agriplex facility?
A: With the size that we anticipate, we expect to have about 120 trucks of grain coming in per day and 150 trucks going out per day. We do expect to have some grain coming in on rail, but only about 30,000 lbs. because of the cost and the fact that we are on a short-line railroad (Cimarron Valley Railroad) that only allows a weight of 350,000 lbs. to be transported over this rail.

Ethanol
Q: Where in Kansas are Ethanol plants being built?
A: Mostly around west and southwest Kansas.

Q: How many of the plants that are being purposed, do you think will actually be built in Kansas?
A: As of right now there are 97 plants being talked about and out of those I believe that only about 10% of those will be built. In the U.S. at the moment there is about 4 billion gallons of ethanol being produced, while there is a demand of about 7.5 billion gallons of ethanol. Now, if the government replaced MTBE with ethanol, it would increase the demand of ethanol to about 10 billion gallons. As of right now most gas mixtures are E10, meaning they are a mixture of 10% of ethanol and 90% of gas. But, General Motors has introduced a new engine that can burn an E85 mixture. If every mixture is changed from E10 to E85 it would cause an increase in demand of ethanol to about 80 billion gallons of ethanol.

Q: What other states are competing with Kansas to build these ethanol plants?
A: Mostly the states in the Corn Belt, Illinois, Iowa, Nebraska, Minnesota, etc. There is also a large push from east cost states to produce ethanol from biomass: tree limbs, grass clippings, leaves, etc.

Q: If ethanol was not subsidized, would the price of ethanol be comparable to the price of regular gas?
A: One thing that is forgotten is that the regular gas that is being produced is actually subsidized already by the government. Right now most of the ethanol plants are supported without government subsidizes and are being backed mostly by private companies. Also, we are looking at keeping our costs down by using milo instead of corn because milo uses less water meaning it will cost less money to pump less water for the milo, rather than pumping a large amount of water to grow corn.
Q: What advantages does Kansas have over these other states, in order to attract these ethanol plants?
A: The biggest advantage is that we are closer to the west than the rest of these states. Also, a third of these states' costs are from drying the distilled grain, but in Kansas there is no need to dry the grain because of the low humidity in the area. Now these states have a cost advantage in producing corn because of their abundant water supply and the fact that they do not have to pump water out of the ground at a cost to them. But, there is a high demand for distiller's grain in the southwest Kansas area, for example, at one plant there was a backlog for demand of distiller's grain, so much so that 300% of the distilled grain was sold before it was even produced.

Q: Can distiller's grain replace flaked corn as feed?
A: Yes it can. A third of distiller's grain comes from one bushel of corn, but that third of corn that produces distiller's grain has the same amount of protein and nutrients as the full bushel of corn for the cattle, the rest of the corn that is not used to feed the cattle can be replaced by fillers (wheat, straw, etc.). So therefore since we would use about the same amount of corn for feed and ethanol production, I think that the net import of corn for feed would not change in Kansas. But, according to ADM, if we use no milo and only corn in the ethanol plant, they believe there would be an increase in the demand of corn by a third.

Q: What is holding back the building of these ethanol plants?
A: One is that it is sometimes hard to get the investment backed by someone, especially with no government subsidizes in place to build these plants. Another is that the main construction company that is used to build these plants, ICM, has a backlog of about two years to build ethanol plants. I also think that there is a psychological factor in place and until gas reaches a high enough price, people do not see a need for it yet. Also, car companies are just now introducing flex-fuel engines, mainly General Motors, which burns regular gas, E10 gas, and E85 gas. And studies have found that the burning of ethanol mixed gas does not hurt an engine, which was previously believed. But, they have recently taken off the E10 stickers on the gas pump and have started to sell it at a higher price, in turn creating a higher profit for the companies that produce ethanol mixed gases, thus making it more profitable to produce ethanol.

Q: What are some of the companies that are providing the funds to build these ethanol facilities?
A: The one in Garden City is being backed by Cargill; ours in Grant County is being backed by North American Bio-energy Resource, and then there are a number that are being backed by large grain companies. Shell is looking at the ethanol production process from a more biomass standpoint (tree limbs, grass clippings, leaves, etc.), with the possibility of using CRP land to produce biomass for ethanol. BP is not into ethanol production, they are looking more into solar power. But, ADM at the moment has a monopoly in ethanol and are waiting out other companies who are building now in order to see the problems that come up with these other companies' plants in order to learn from their mistakes.

Transportation Options
Q: Is there any possibility of using railroads for these plants?
A: Possibly someday, but not right now because we are not on a heavy rail line. We are currently on a light rail line and it is not economically feasible for the local railroad to put in heavy rail because they know if they wait and the demand becomes high enough the government will step in and subsidize the heavy rail line. It is also cheaper to bring gain into Garden City and then have it trucked into Ulysses by about $0.08 per bushel of corn because it uses a different short line railroad that is cheaper, it cost about $2.72 to bring it straight by rail into Ulysses, but only around $2.66 to bring it into Garden City and then have it trucked to Ulysses. Also, if we put a rail loading facility into our agriplex it would cost about $100 per foot of rail, increasing the cost of construction, also, to unload a set of rail cars takes about 3-4 hours, where a truck does not take as long. I would say that we would probably save about $6 million using only trucks and no rail.

Transportation Infrastructure
Q: What is your impression of the highway infrastructure in the southwest Kansas area?
A: It is not very safe to drive on. BP just recently held driver's safety awareness day because they recently did a study that determined that it was more dangerous to drive in the state of Kansas than it was to drive in the city of Houston, TX. This is because of all of the truck traffic on Kansas highways; all of the beef haulers, hog haulers, grain trucks, and wheat being shipped on trucks.

Q: Is the transportation infrastructure sufficient in the area?
A: No, I would like to have U.S. 54 as a four-lane highway, but I doubt it would happen with such low population in the area. To ship commodities it is ideal to have highways that are either super-twos or four-lane highways. There is also a large amount of traffic on U.S. 56 and KS 25 because of the grain traffic and the cut through traffic in the area. It would also help if a lot of the towns on these highways had a by-pass around the city, but that would not happen because people would be afraid it would hurt their small towns' business districts, which rely on highway traffic for business. I also believe that the lack of transportation infrastructure creates transport issues for firms who wish to locate in the area. Right now there is no regional airport only multiple small municipal airports, which creates a problem for business men who wish to visit the area. There is

definitely a need for a regional airport in the area and a need to improve service and rates in the area.

Projection of Growth

Q: Do you think that Grant County and the surrounding areas will grow?

A: Yes, I think they will grow because, for example, 10 years ago there were no dairy farms in this part of the country. Now, in Grant County and the surrounding area there are about 85,000 head of dairy cattle. At about 75,000 head there is a possibility of a milk processing plant and recently it has been announced that we will get a milk processing plant in the Grant County area, that will be tied into the agriplex that we are building. And I believe that in the next 5 years there will be an additional 75,000 head of dairy cattle and possibly another milk processing plant built.

Grant County Agriplex

The argiplex that is being built in Ulysses, KS will integrate one large ethanol plant with several small ethanol plants on local feedlots, a milk processing plant, a carbon plant, an organic greenhouse, a power plant for the large ethanol plant, and possibly a cheese factory. The power plant will generate power only for the ethanol plant. Manure from the feedlots will be produced into bio-oil and used at the power plant as the main source of fuel. There will be a milk plant next to the ethanol plant, which will dehydrate milk and use the excess water in the greenhouse. The water will be filtered through the greenhouse and then transferred to the ethanol plant. Also, the carbon dioxide from the greenhouse will also be used in the production of the ethanol. There will also be heat generated from the carbon plant next to ethanol plant which will be used in the production of ethanol also. The ethanol plant will also produce distiller's grain which will be sent back out to the feedlots, which will have some of their own distiller's grain from the small ethanol plants on site. Also, these small ethanol plants will contribute to the total production of ethanol and would be picked up on milk stops by trucks. One advantage of having the small ethanol plants is that they are more cost efficient in producing ethanol, which will help our bottom-line.

APPENDIX III - INTERVIEW MINUTES

July 15, 2005

Notes from phone call with Dennis Kindsvater:

Dennis Kindsvater is the owner of Kindsvater Inc. (trucking co. in Dodge City). They ship a lot of chilled boxed beef for the processing plants in Dodge City. A quick estimate of 50+ trucks per week of outgoing boxed beef was given.

He would like to help us with our research; and will be driving by Lawrence Tue. or Wed. of next week, if we'd like to visit with him about the business and industry. He may also have some good resources for us, because of his own research. He completed 3 years of undergraduate work at KU in Business; then finished his Bachelor and Masters degrees in Transportation (school of business) at Indiana University. He completed a lot of research related to issues in transportation. He would like to get more of an idea of our project statement, so that he knows what resources will be most beneficial to us.

Dennis emphasized that the Kansas Motor Carriers Association would be a good source.
Also, a good historical reference may be *Steel Trails to Santa Fe* by Les Waters, Indiana University.

July 20, 2005

Meeting Notes: Dennis Kindsvater with Kindsvater Inc. (trucking company) met with Dr. Yong Bai and Christine Atkins in Dr. Bai's office.

D: "de-regulation of transportation" went into effect about 20 years ago
The 1935 Highway Act regulated the trucking industry. A carrier would go before a commission to get a permit to transfer goods, such as cattle. Sometimes the carrier would bring possible customers to testify that there was a need to certify the carrier to transport said goods. Motor carriers would spend a lot of money on attorneys to attain these "certificates."
Side note: Dennis said he was a freshman at KU in 1957. He attended these sessions with his father and grandfather who were in the trucking business.

D: brought up a question from our problem statement: "What are the inherit efficiencies of transportation?" Dennis stated.
His simple answer was that, "It's what we see."
The borders to Japan were closed 2-3 years ago for export of beef, so now the only movement by intermodal transportation is hides for skins.

Side not: D. mentioned that Nat'l Beef, Excel, and Tyson have kill capacities of approximately 10,000, 5,000 and 6,000 head per day. These hides may be shipped long distances.

***We need to ask the meat processing plants about the transportation of livestock to the plant; and boxed beef, by-products and *hides* from the plant.

D. says that currently intermodal is near non-existent because we move boxed beef short distances. Kindsvater, Inc. transports most of their boxed beef loads to Laport, TX. From there it is exported to Europe, etc. The efficiencies of intermodal transportation are such that it's the best choice when shipping to L. A., but not elsewhere; and considering the border to Japan is closed.
Side note: he can talk to us more about why the cattle industry is located in SW KS.

B. asked why boxed beef is moved by truck to TX.

D. The haul might take a train one week. Shipping by train is best for long distances. Transporting by train can reduce loading and unloading when exporting the product. Using truck will get the meat there on the next day.

B. KDOT is interested in the "break-even point" of when using truck becomes for efficient.

D. It is approximately 700 miles to Laport, TX from Dodge City, KS. The shelf life and inventory costs are a concern for business. Also, the time and cost required to load and unload is part of the equation.

***We definitely need to discuss, in-depth, the reasons why meat packers use train vs. truck.

B. When taking into account fuel costs and operating efficiencies … possibility of improving schedule with enough business. What quantity would train companies need in order to get that response time?

D. doesn't see how the train companies could significantly increase delivery time just because they had a huge increase in the amount of refrigerated boxed beef to be shipped. He doesn't foresee a change in the way boxed beef is delivered from KS to TX.

***We can ask the train co.'s about estimated delivery times to various locations, and whether an increase in business could shorten delivery times. Also, we need to ask the meat packers where they are primarily shipping their meat. Making note of various U.S. ports that meat is being shipped from may be a good idea.

Side note: Tyson in Holcomb, KS (next to Garden City) used to be IBP and before that Iowa Beef

D. It takes 7 or 8 lbs of grain to make 1 lb of beef, and only 60% of that beef is made into a consumable product. There is a lot of wear and tear on KS highways because of the transportation of grain through KS from Iowa and Nebraska to Texas. Also, Kansas imports about half of the grain it needs.

***From this discussion it is evident that the transportation of grain is not something to be ignored. It looks like feed yards are shipping in far more grain that cattle and this is a huge part of the equation.

B. How did de-regulation affect your business?

D. At first, badly. Later, it turned out to be beneficial. To start out, farmers would transport goods when it wasn't harvest time, because they had less work and their trucks weren't being used. They would charge less than trucking companies because their only cost was fuel. For a trucking company to stay in business they have to charge enough to cover all expenses and make a profit. High fuel costs have even helped business because Dennis knows costs. The max loaded miles to total mile ratio is optimized to lower costs. Amateur truckers will carry a load out and come back empty handed.

B. How has technology impacted your business?

D. Engine efficiency is great. The air ride technology has reduced product damages. Air ride technology puts a cushion between the axle & truck, frame & seat, and the cab & trailer. (***I may not have that exactly right.)

D. The longevity of the industry will continue in SW KS. Iowa and Illinois produce mass amounts of grain, but cattle don't do well there because of the humidity. The water table is high in SW KS also. Some people have concerns about the Ogaula Aquifer, but we have a plentiful supply of water comparatively. The humidity is low in the region also.

B. Looking at environmental costs … if fuel costs go up, how will this affect your business? Our analysis includes looking at which transportation methods are recommended to be used under particular conditions.

D. Thus far, the fuel cost increase has not changed the propensity of feed yards to use train to move grain and truck to move cattle, nor for meat packers to ship by truck. Dennis does not see this changing no matter how high fuel costs get.

Side note: Wright Co-Op East of Dodge City loads 150 rail cars of grain in hours.

D. It's best to ship grain by train because it's cheaper. Also, a trucking co. cannot make a profit shipping grain. However, there is a lot of grain on the road from NE, IA, and IL to TX.

B. We need to look at this to project the rebuild of roads.

D. No matter what the energy costs and environmental issues the movement of live cattle will not change … despite the fact they were transported by train as late as 1950.

D. Kansas Motor Carrier Association in Topeka will have data on the amounts of grain and live cattle being transported through Kansas.

B. If the demand for meat increases, can SW KS support it?

D. YES. Great conditions: water, dry air, flat, and good feed supply. Cattle start out in pastures, move to wheat pastures, then to feed yards. (*** Dennis was saying something about herds starting out in Eastern states and moving West to Kansas at different stages of their development).

*** We need to ask the feed yards about the "migration" Dennis alluded to. Does it really exist? We could start out by asking them at what age the cattle are sent to them and from which locations.

D. The Kansas Livestock Association headquarters in Topeka may also be a good source. Ask them for a copy of the Feed Yard Index. It's an 8.5 x 11 book with a list of feed yards, their location with map, contact information, etc. They may have info on the quantities of livestock being shipped.

*** These are my comments.

Date: June 15, 2006

Time: 2:00 p.m.

Location: Kansas Livestock Association (KLA) – Topeka, KS

Description: Dr. Yong Bai, Pat Oslund, Chunxiao Liu, and Michael Barnaby met with Rich McKee, Senior Vice President for the Kansas Livestock Association.

Organization Info
Q: How many members does KLA have?
A: We have around 6,000 members with the largest feed yard being Grant Co. Feeders outside of Ulysses with a capacity of 130,000 head. Most of our work involves doing government lobbying and trouble shooting for our members.

Industry Revenue
Q: What is the revenue of the feed yard industry in southwest Kansas?
A: That is also hard to say, but I do know that in 2005 cattle generated $6.09 billion in cash receipts. The revenue generated by a feed yard is dependent on the cost of inputs, the biggest being the cost of feed. On average it costs about $1.50-$2.00 per animal to feed (this includes fillers and veterinarian fees), depending on the price of feed grain. That cost can quickly add up if you have to put cattle into feed yards at an earlier date and are forced to feed them longer. You also have labor inputs that can cut into that revenue.

In & Out
Q: How many feed yards are there in southwest Kansas?
A: The problem with trying to answer that question is where the cutoff is to define a feed yard. What I can tell you is that 90% of the cattle in the state are in the largest 125 facilities in the state, 90% of those 125 are members of the KLA. In a year there is 5.3 million head of cattle on feed in Kansas, with turnover about 2-$2^1/_2$ time per year. They are typically on feed for about 120-150 days, depending on the weather. For example, this year it has been so dry that most cattle that would have been sent out to graze on pasture land is being forced to the feedlots early therefore forcing cattle to be on feed longer and thus cutting into the profits of the feed yards. Typically the cattle are put out to pasture at around 500 lbs. and are then sent to the feed yard at around 750 lbs.

Q: What is the percentage of cattle from outside Kansas?
A: We do not keep those types of records, but if you take the 1.5 million head of cattle in Kansas as of the beginning of the year and you assume that each has a calf and all of those calves are put straight into a feed yard and take that total and minus it from the total cattle on feed it can at least give you a reasonable estimate of how many cattle in the feed yards come from outside of Kansas. As where they come from is hard to say because we receive cattle from every state in the union, even Hawaii and a little from Mexico and Canada. Most of the commodities move north to south, the exception being Texas which is one of the larger cattle states. Missouri is another large cattle state which exports cattle into Kansas. But it is difficult to know with accuracy where the cattle originated from. What I do know is that the bulk of the cattle that is fed in Kansas do not originate in Kansas.

Q: What is the percentage of feed grains from outside Kansas?
A: That is also hard to say, but grains usually move from north to south because it is usually cheaper north, so it will move from the low price area to the high price area because of the laws of supply and demand. The one thing that needs to be remembered is that the landscape of grain is changing; it is being used for things other than for feed and human consumption. One example would be all of the purposed ethanol plants in the area and the question of whether or not there will be enough corn to supply the ethanol plants and to feed all of the cattle in Kansas. It will also affect the price of corn, which could have an impact on how feed yards operate.

Q: What percentage of the grain produced in Kansas go toward the feeding of cattle?
A: Cattle consume 72% of the corn, 16% of the soybeans and 60% of the hay grown in the state. But that will vary with the price of grain.

Q: Do most feed yards have a good relationship with the meat packers?
A: Yes, but like any market they do battle to establish the best possible prices for themselves, and being a transport commodity the power of the market swings with supply. Typically though, most of the feed yards are owned by the meat packers.

Fuel Price
Q: How do the fuel prices impact the feed yard industry?
A: The change in the fuel prices causes a change in how to process the commodity. For example, a majority of the corn for feed is flaked and the steam flakers used to produce the flaked feed uses natural gas, so therefore if the price of natural gas goes up it will cost more to feed the cattle and thus cut into the profit margins when it comes time to sell the cattle and process it. Also, the increase in the price of petroleum will cause an increase to the transportation costs of the feed grain and cattle.

Transportation Infrastructure
Q: Do any of your members have any complaints about the Transportation infrastructure?
A: No, there is more of a concern about the volatility of the fuel price because the price of fuel can change suddenly and cut into the bottom line of the industry. For example, a feed yard can contract to buy a load of cattle next fall and they use the current fuel price to predict the cost to transport the cattle, but if the price increases by the time the cattle needs to be picked up, it can actually cause a loss to the feed yard if the price of fuel increases the cost of transportation. Or, if a trucker has to stay overnight for a pick up, the price of fuel can change in a matter of hours, thus causing an unexpected change to the cost of transporting the cattle.

Transportation Options
Q: Are most of your members satisfied with the service by trucking companies?
A: Yes. Some of our members, mostly the large feed yards, have taken control of the situation by owning their own trucking companies for transporting grain. That is because it is more cost efficient and convenient to do it themselves.

Q: Do any feed yards use the railroads to bring in grain?
A: They do in the panhandles of Oklahoma and Texas, but not in Kansas, it is all done by trucks in Kansas. It may be possible as fuel prices continue to increase.

Distiller's Grain
Q: What are the opinions of your members about ethanol plants and the use of distiller's grain?
A: There have been both good and bad experiences with distillers grain. The biggest problem is that distiller's grain causes them to change their process of storing the grain. They are forced to change from handling wet grain to handling dry grain, which causes a change in the equipment that they use and would cause an increase in costs to the feed yards. There have also been problems with the companies that are building these plants. For example, Panda Energy is having problems with the contract to buy manure from area farmers because first off the contracts for manure are all one-sided and secondly, the farmers typically use the manure for fertilizer and generally do not have excess manure to sell.

Q: Is there any possibility that with the increase in demand for corn, that some will be imported from states farther east like Iowa and Illinois?
A: It is possible, but it would depend on transportation costs.

Projection of Growth

Q: Will the meat industry grow in southwest Kansas?
A: I believe that the number and size of feed yards will grow because many of the neighboring states have more cattle than they can feed or process. Also, with the increase in fuel costs it will force the cattle closer to the supply of grain and the processing plants. The area in which I believe there will be the most growth for feed yards would be in the High Plains area because of the water availability in the region for feed grain and it would lower the transportation costs to move grain to the feed yard. I do not see the amount of cattle processed in the area to increase because at the moment they import about 2 million head of cattle into the state just to be processed.

Q: Do you believe the feed yard companies will expand or merge together?
A: It is hard to say because the industry is size driven and based on an efficiency of scale. There are fewer small feed yards (3,000 head) and more large feed yards. The top 125 largest feed yards average about 20,000-30,000 head. There are some small feed yards who have found a special niche in which to sell their cattle, but for the most part there are fewer small feed yards and more larger, cost efficient feed yards. This is because it is easier for a large feed yard to spread the costs of the operation of 30,000 head than it is for a small feed yard to spread costs over 300 head. Also, technological improvements cause feed yards to become more efficient but at the same time takes away jobs from the industry, but usually the small feed yards cannot afford these technological improvements and thus are forced out of the industry because they are not able to produce at the level of the larger feed yards.

Q: What makes Kansas so attractive for feed yards?
A: There are two reasons why Kansas attracts feed yards: 1.) Kansas has an ideal climate, with low humidity and precipitation and the less severe temperature changes allows for predictable cattle performance; 2.) Kansas has low feed costs because a variety of high quality grains are grown in the state along with plentiful supplies of roughages. Also, Kansas is close to areas where feed grains can be shipped into the state. Also, the fact that the top four packing firms operate in Kansas, which creates a lower cost to transport the cattle to the slaughter houses

Q: Does the southwest Kansas area have enough resources to add more cattle to the area, especially water?
A: Yes, it does. I would say that at the moment the area has a onetime capacity of about 8 million head of cattle and on average the turnover of the cattle is about 0.8 million head of cattle per cycle. There is enough water because cattle drink very little water, for example of all of the water permits given out by the state of Kansas, feed yards account for about 0.4% of these permits. I do not see the state though going much past the onetime capacity of 8 million head because there are other states which are increasing the number of cattle on feed in their states.

Policy Issues
Q: What policy issues cause concerns in the industry?
A: There are always environmental issues which a state could get carried away with causing corporations not to invest in the area, along with tax issues that do the same. But we work with the state legislature who understands the importance of the industry to the state and do a good job to protect the industry.

Q: Does the increase in the price of fuel and water make you concerned that the industry could leave the state.
A: Certainly there is a concern, but I think that with the weather that we have it gives us an advantage. But we still try to do our best to keep the conditions favorable so to avoid losing the industry.

Date: July 6, 2006

Time: 10:00 a.m.

Location: Kansas Motor Carriers Association – Topeka, KS

Description: Dr. Yong Bai, Pat Oslund, Shyamala Tamara, and Michael Barnaby met with Gary Davenport, Director of Safety and Risk Management for the Kansas Motor Carriers Association.

Mr. Davenport explained that he has been with KMCA for 17 years and is a certified director of safety. Before he worked for KMCA he was a truck driver for 9 years; 2 years as a husband/wife team and 7 years with Frito-Lay.

KMCA Background
KMCA has been around for about 70 years to serve the interests of the trucking industry and its allied members. The trucking industry is very diverse and has to deal with a lot of regulations, so there are a lot of issues that affect the trucking industry. KMCA therefore has to have a lot of divisions to deal with the variety of issues that affect the trucking industry. Our divisions include: aggregate carrier, bus, farm to market, movers conference, general commodities, house movers, oilfield fluid carrier, oilfield heavy machinery, private carrier, tank truck, towing and recovery, and truckload. A lot of our members are what we call less than truck load (LTL) carriers, who will generally have more than one type of product loaded on a truck, which will be unloaded at multiple stops. These carriers are not directly related to the livestock industry but are critical to the industry for the transportation of supplies. Our largest division is related directly to the livestock industry, which would be the farm to market division (i.e. livestock grains). With the increase in oil prices we have seen an increase in our oilfield fluid carriers in Kansas, which always happens when the price of oil gets high enough. The average number of trucks that a member of KMCA has is about 7 trucks per carrier.

Kansas Trucking Industry
As of June 22, 2006 there are 9,409 carriers in Kansas, of which 6,604 are private carriers. Private carriers could be construction trucks or trucks used for lawn care. So it can be hard to count which carriers are private truckers or small companies with a lot of regular trucks because anything over 10,000 lbs. must be considered a carrier. There are private carriers, common carriers, and ICC exempt carriers, most farm trucks are considered ICC exempt carriers because they rarely travel out of state. Most livestock transportation is in the category of haul for hire, which is different than other carriers because the larger the trucks used, the cheaper it is to obtain a carriers license. For example, it cost $500 per truck if a carrier is hauling the maximum load allowed on Kansas highways of 85,500 lbs. But if it is a regular truck that is used to haul the cattle it can cost $3,000 to obtain a carriers license. In the state of Kansas there are 402 Kansas based, interstate only carries; 1,499 Kansas based, interstate and private exempt carriers; 11 Kansas based, interstate and exempt carriers; and 466 non-Kansas

based, interstate and private exempt carriers operating in the state of Kansas as of June of 2006.
Nationwide there are around 580,000 carries, with a majority, about 460,000 or 86%, being in the category of very small (1-6 trucks). The same goes for Kansas, where of the 9,409 carriers, about 7,700 of them are in the very small category, while there are only about 800 in the small category (7-19 trucks); 300 in the medium category (20-100 trucks); and only 47 in the large category (100 or more trucks). The problem with these categories, especially the small categories, is that it is hard to distinguish between a private owner-operator and a small farmer with a few trucks used to haul grain to the silos.

According to the American Transportation Research Institute (ATRI), in 2003 the trucking industry drove 1.5 million miles on Kansas roads, representing 5% of all roadway traffic in the state. In 2004, the trucking industry provided about 92,000 jobs in Kansas, with the total trucking industry wages in Kansas exceeding $3.4 billion, with an average annual trucking industry salary of $37,181. Trucks transported about 80% of total manufactured tonnage in the state in 2003. In the U.S. there are 12 million drivers with a CDL license, 158,000 in the state of Kansas. These statistics represent the enormity of the trucking industry. It also shows that if a disease was found in one of the feedlots in southwest Kansas, that the state of Kansas would shut down because every industry in Kansas, especially the trucking industry, relies on the livestock industry.

Driver Info

Q: What does it take to haul livestock?
A: It generally takes a different type of driver with a different mindset. To haul livestock not only does the person have to be a truck driver, but they also have to be a livestock handler, and a lot of drivers do not wish to deal with the hassle of handling the livestock. So, companies have tried to do different things to attract people to the business of hauling livestock, for example, some companies have bought bigger trucks with better equipment for there drivers to use, so as to attract more drivers.

Q: On average, how much does a driver get paid?
A: That is hard to say, because there is such a wide range of pay and different ways in which drivers get paid. If they are owner-operators, then they will usually get paid a percentage of the load. If it is a company driver, then they will usually get paid by the mile, with there being a different rate for loaded miles and empty miles. Also, the bigger the company, the more a driver will get paid. For example, a driver for Wal-Mart or Frito-Lay can make up to six figures, while a driver for a smaller company will make quite a bit less, but they are usually located in areas where the cost of living is relatively low.

Q: Do livestock drivers do only short hauls? Long hauls? Or both?
A: They will typically do both, usually wherever the money is.

Q: What is considered a short haul?
A: That will very among carriers, personally I would consider 500 miles or less a short haul and anything more than 500 miles a long haul.

Q: How many hours does the company allow a driver to drive everyday?
A: Drivers can drive for 11 hours straight, but then they must have 10 continuous hours off, or work for 14 straight hours with 10 continuous hours off. They can drive 70 hours in an 8 day period, but they then must have 34 continuous hours off. If at any point a driver has a continuous 34 hours off, he can restart at 0 hours.

Q: What type of training are drivers required to have?
A: There is no education requirement, but it goes without saying that the driver does need to know what they are doing and must have a good driving record. There is an age requirement though, for example, you can be 18 and drive, but only for intrastate travel, to do interstate travel you must be 21. All drivers must also have a CDL (commercial driver license) license to drive a truck. To receive a CDL you have to take a written exam and a seventeen mile driving test and must have a vehicle inspection of the truck they are going to drive and a basic maneuver test. There are also physical requirements that a driver must pass, like a full body physical, eye test (eyesight must be at least 20/40), they cannot have type 1 diabetes or be color blind and must complete drug and alcohol testing prior to employment and at random times during their employment or if they are involved in an accident. There are also training schools, some that are worthwhile and some that are not, usually associated with area technical colleges.

Trucking/Railroad/Intermodal Transportation Info
Q: How do trucking companies and railroad companies interact?
A: The trucking industry is probably the largest user of the railroads. The LTL carriers use the railroads all the time, especially companies like UPS. These companies will operate hubs with a 500 mile radius and they will piggyback trucks on the railroads to destinations outside of the hub's radius.

Q: What is the potential for intermodal transportation in the meat packing industry in Kansas?
A: Right now railroads move very little beef, if they move anything for the packing industry, it is usually byproducts. The problem with using the railroads is that the trains load a lot and distribute things in a different manner than trucks. Also, a lot of the products transported by the packing industry are time sensitive and railroads take a long time to transport items. Also, railroads only want to transport large quantities because they are more lucrative and the packing industry does not always have enough to fill all of the cars needed to make the transport of the products economically feasible. Really the only possibility to use intermodal transportation would be for non-time sensitive products.

Q: What type of equipment is used for intermodal transportation?
A: There is a special bracing on the trucks and the railcars which is used to lock the container in place. Some trucks and railcars have them and others do not. If they do not they will simply place the entire trailer on the railcar. If it is a special container it will go from a ship to a barge to a truck and then finally to a train. Usually most of the equipment (cranes, containers, etc.) will be owned by the railroad company. I think at the Gardner facility outside of Kansas City, they load about 5,000 trucks per day at their intermodal facility.

Fuel Costs
Q: What is the average fuel mileage for trucks used to ship commodities for the livestock industry?
A: It is hard to say, but I would assume on average about 6-7 miles per gallon, depending on the truck. And on average a trucker will drive about 2,500 – 3,000 miles per week.

Q: How have fuel prices affected your members?
A: As the price has increase the number of trucking companies applying for bankruptcy has increased. There is sometimes a fuel surcharge, but that usually is not enough. Also, EPA regulations can decrease fuel mileage (i.e. catalytic converter). There have been technological advances which help fuel mileage, like APU units which run the electronics and AC in the cab, instead of using the engine and burning fuel. Also, with the high winds in Kansas a lot of the trucks now have skirting on the side of the truck to reduce wind resistance and increase fuel mileage.

Transportation Costs
Q: What is the percentage of direct cost associated with shipping?
A: That is hard to say because there are so many factors that contribute to direct cost. I would say that the biggest operating cost would be insurance because 9/11 took away a lot of insurance companies and also with the decrease in the stock market insurance companies had to increase their rates to make up for the lower returns from financial investments. I believe that the biggest revenue generator is training because if everyone is properly trained then there is less money spent on accidents. For the most part taxes, the price of trucks, and salaries are mostly fixed, but fuel and insurance cost always fluctuate and are hard to predict when making a budget. The standard liability for carries is usually around $1 million. The biggest problem is that there is the view that the trucking industry is rich, which is not the case, but it makes the industry an easy target for lawsuits and therefore creates the need for a lot of insurance.

Highway Infrastructure
Q: Is the highway infrastructure adequate for the trucking industry?
A: Yes, I believe that Kansas has good roads. The most important thing I believe is to maintain them and I think that the Kansas legislature needs to continue the highway bills that were passed long ago and that are about to end soon. Otherwise, Kansas will be stuck in the same situation as Missouri, who fell behind on road construction and are now spending a lot of money to redo all of their roads. But, I believe that KDOT does enough studies and does a good job to make sure that the roads are maintained, but I feel that it must continue.

Ethanol
Q: Is the trucking industry prepared if the ethanol industry takes off?
A: Yes, the trucking industry is well prepared with enough trucks and equipment to haul ethanol. Trucking will have to do a majority of the shipping of ethanol because it cannot be transferred through pipelines, the only questions is how the loading and unloading of the ethanol will be done. But it probably will make people jump into the handling of hazardous materials, which can be hard since there are so many regulations for transporting hazardous materials.

Date: July 6, 2006

Time: 2:00 p.m.

Location: PRI Conference Room, 606 Blake Hall

Description: Dr. Yong Bai, Pat Oslund, Shyamala Tamara, Chunxiao Liu, and Michael Barnaby spoke with Stephen Muncy, Sr. Trainmaster/Road Foreman for BNSF in Wellington, KS. Mr. Muncy held the same position for BNSF in Dodge City, KS.

In & Out

Q: Does your company ship boxed beef?
A: In years past I know that we did down in Amarillo, but as far as Kansas is concern we do very little and it has decreased over the years because of the need to get the product to the market as fast as possible. This is not possible with railroads which take 3-4 days to transport products, while it takes a matter of hours for trucks.

Q: Is the availability of refrigerated cars a barrier to shipping boxed beef via railroads?
A: No, we have quite a bit of refrigerated cars. About 5 years ago we started to replace the old railcars with new super refer cars that are about 90’ and contain GPS tracking. The capacity is defiantly there unless there is a large spike in traffic.

Q: Does BNSF ship grain into southwest Kansas?
A: Yes, and we have actually seen an increase in the amount of corn into southwest Kansas. Last month alone there were three trains, with 110 cars each, that brought corn into the area and we have already had one train this month. The majority goes to the unloading facility in Garden City and some goes to the facility in Wright, just east of Dodge City. The ones coming in now are all for feed, but with all of the purposed ethanol plants we could see an increase in the amount of corn being shipped into the area.

Q: Where does the corn originate from?
A: A majority is from the Sioux City, IA area. There was one train from Nebraska, but I am not sure where in Nebraska though.

Q: Does BNSF require a minimum amount in order to agree to transport products for a company?
A: I do not believe so, but I do know that the people who deal with the budgets do set a minimum number of cars per year that the company must ship in order to be profitable during the year. So if a customer wants to pay for the transport we will ship just about any amount if they are willing to pick up the bill.

Infrastructure

Q: Is the current infrastructure adequate for BNSF’s needs?
A: Yes, I believe that overall we are well positioned and we are currently expanding in places were we need more infrastructure.

Q: Are the packing companies responsible for installing the infrastructure to load and unload trains at their facilities?
A: It is usually a customer issues, they will decide whether or not they want to transport things by rail. I know that Excel is set up to load and unload directly from the rail, Tyson as well. And we have actually seen an increase in business from Tyson in Holcomb, KS. But for the most part it is primarily the customer's responsibility to set up the infrastructure for rail access.

Railroad/Intermodal Transportation Options
Q: How does intermodal transportation work for BNSF?
A: Most of our intermodal is done on what are called trailer on flat cars (TOFC), where we will put the entire trailer on a flat railcar and ship it in that manner.

Q: Is there any TOFC done in Kansas?
A: No, it is not done in Kansas because a majority of the products shipped on TOFC are end-user products and most of the items shipped from Kansas are not conducive to intermodal transportation because of the constant large quantities and traffic that need to be delivered in a timely fashion.

Q: Is a special facility required to do intermodal transportation?
A: Yes, there must be a special intermodal facility that can load and unload the trailers from the railcar, the closest one being in Amarillo, TX. I know that Tyson uses the Amarillo facility quite a bit.

Q: Is there an intermodal facility in the southwest Kansas area?
A: No, the closest would be Amarillo, which is on our transcontinental rail line, or Denver. Since Amarillo is on the transcontinental line it has a large switch station and therefore runs 24 hours a day. It would not be possible to do such a thing in Dodge City because there is not enough traffic going through to keep it constantly staffed. As of now the Dodge City yard only runs two shifts per day because of the low amount of traffic that comes through the area.

Q: What are the major barriers baring southwest Kansas from having an intermodal facility?
A: The biggest I would say would be the cost efficiency of it because right now companies receive faster and better service from the trucking companies.

Q: What is the closest intermodal facility to Dodge City?
A: There would be about three that are about the same distance from Dodge City and they are Kansas City, Denver, and Amarillo.

Q: Are these intermodal facilities very high-tech?
A: Yes they can be very large with a lot of technology instituted into them, but that all depends on how much demand there is in the area for intermodal transportation.

Q: Is there a transfer point that trains must go to before they jump onto a transcontinental line?
A: Yes, going west they must first go to Pueblo, CO and then they travel south to Amarillo, TX where they then jump onto a transcontinental rail line. If the train is heading east it will travel to Kansas City to catch a transcontinental rail line.
Q: How many days does it take a train to get to the west coast?
A: On average about 4-5 days.

Q: Is BNSF currently pursuing any possibilities of transporting boxed beef?
A: I am not exactly sure, but we pursue any business opportunities that we think will be profitable.

Q: Is there potential to move boxed beef on the railroads using intermodal transportation?
A: I believe there is but it would depend on how economically feasible it would be on both ends and that is something that I cannot answer.

Q: How does the company work with the short-line railroads in southwest Kansas?
A: They will deliver cars to us and we have a designated place in our rail yard where we keep them at for their daily interchange. We will ship various manifests for these short-line railroads.

Q: Could a short-line railroad move hazardous materials, like ethanol?
A: Yes.

Q: How is BNSF's relationship with grain companies?
A: It is based on a lot of communication and we have a good relationship so that we can contact each other to help service one another. They will usually contact our Fort Worth location and tell them how many trains they need. What we then do here is estimate the time it will take to load the train and get it back out onto the tracks.

Transportation Costs
Q: Who pays for the unloading of the railcars?
A: Ultimately it is the customer who pays because it is included in the price of shipping.

Q: What are some of BNSF's major cost elements?
A: They would be the typical elements like infrastructure costs, equipment costs, employee costs, and fuel costs.

Expansion
Q: Does BNSF plan to expand in the southwest Kansas area?
A: No.

Q: Does BNSF plan to expand in Kansas?
A: Yes, we plan to expand the transcontinental line and are expanding another mainline that goes through Emporia, KS.

Q: Does BNSF pay for most of its expansion or does it receive government assistance?
A: We receive some from the government, but usually not very much. For the most part the company pays for its own expansion.

Fuel Info
Q: Has BNSF seen an increase in business from meat packers since there has been an increase in fuel prices?
A: Yes, we have seen an increase in the amount of byproducts shipped by rail, especially tallow, because it is so hard to find enough trucks to transport it.

Q: Has BNSF seen an increase in business in general since there has been an increase in the fuel prices?
A: Yes.

Q: What is the fuel mileage for the trains?
A: I am not sure about that because everywhere we send trains they are close enough that we do not have worry about refueling them. I do know that the average train will carry about 3,000-4,000 gallons of fuel and the newer ones will carry about 6,000 gallons of fuel.

Ethanol Info
Q: Does BNSF plan to participate in the transportation of ethanol?
A: Yes, we are very interested in the ethanol industry because of the large amount of rail traffic that is associated with these ethanol plants. We plan on bringing the corn in and taking the ethanol out of these plants.

Q: How is the ethanol loaded and unloaded?
A: That I am not really sure, but I assume that it is similar to how grain is loaded. The train will be switched to a loading track that will run along the side of the ethanol plant and it will then be pumped through a pipeline into the tanker cars, which run as unit trains that run loaded and unloaded.

Q: What is the size of the tanker cars used to move ethanol?
A: I am not sure of the exact dimensions, but I think that they are about 60’-70’ long and carry about 100 tons, as do the refer cars.

Q: What is the destination of the ethanol?
A: Most of it goes out to the west coast, but some will stay here in Kansas.

Date: July 20, 2006

Time: 11:00

Location: PRI Conference Room, 606 Blake Hall

Description: Dr. Yong Bai, Pat Oslund, Shyamala Tamara, Chunxiao Liu, and Michael Barnaby conducted a phone interview with Mark Davis, Director of Regional Public Relations for Union Pacific Railroad.

In & Out

Q: What products does your company ship nationwide and in Kansas?

A: We are lucky in the fact that we ship about 5 or 6 commodities, compared to most major railroad companies who typically only ship about 3 or 4 different commodities. Our commodity categories consist of: energy, which is coal; agriculture, which includes grain and food; automobile; chemical; intermodal; and industrial products, like timber and sand.

In Kansas the biggest category is agriculture because we ship a lot of grain, particularly wheat, out of Kansas. Our largest customers in Kansas are Cargill, Continental Grain, Scoular Grain and DeBruce Grain. We also carry a lot of automotive parts and finished cars to and from the GM facility in Kansas City. I would say that with our 2,300 miles of rail we cover all four quadrants of Kansas equally well. The way the rail lines are set up we not only reach the major cities in the state but we also service quite a few of the smaller communities.

Q: Does Union Pacific transport any boxed beef, nationwide or in Kansas?

A: We have seen a resurgence in the frozen boxed car business, so much so that railroads have upgraded their refrigerated fleets. A majority of these fleets had not been upgraded since the 1970's. The newer refrigerated cars can handle more capacity, they are more energy efficient, and they reduce the number of incidents because of the high-tech GPS and the two-way technology that can monitor products from the time that they are loaded until it reaches its final destination. The technology has become so high-tech that we can not only check the temperature of the railcar while in transit, but we can also tell when the door of the railcar opens or if the cooling unit is not working properly. All of this information goes back to a central monitoring location where it will signal an alarm if something goes wrong with a railcar while in transit.

Overall we have seen an increase in the transport of frozen boxed beef in Arkansas and Texas, primarily Tyson in Arkansas. As far as Kansas is concerned I am not aware of any boxed beef that we transport in Kansas. But, that is not to say that there is not some that we do ship, but I am just not aware of any at this moment.

Q: What are the restrictions for shipping boxed beef?

A: Boxed beef overall is easy to handle. The major challenge that I see would be whether or not a plant is located near a rail line. A plant needs to have a rail spur near the plant so that we can place a car in an area where it can be loaded and not slow up our traffic flow.

Q: Is Union Pacific involved in shipping grain?
A: Yes, that is a huge part of the company. We move a lot of grain for agriculture and for ethanol. Union Pacific has been involved for the last three years in the growth of the ethanol industry. We are actively involved in helping these plants to achieve their capacity by helping them to best locate these plants at a location where we can best serve both of our needs. For example, we had one company that wanted to locate a plant in central Nebraska along our mainline. The area in which they chose would have slowed down the line, which carries on average 150 trains per day. But if they would have moved west two miles it would have been fine. So we feel that we can help these plants in planning for how best to reach their full potential.

Q: Does Union Pacific transport unit cars of corn in and out of Kansas?
A: Yes. Most of it is wheat out and we will bring in some corn.

Q: How long does it take to get from Liberal to the west and east coasts?
A: To get to somewhere like Los Angles, it would take about 3-4 days. To go east to somewhere like Chicago it would take about 5 days because you have to go through the two largest rail terminals in Kansas City and Chicago. To get to somewhere like New York, it would take about 8 days even if it was expedited. It might be a little faster east if it is a unit-train because they by-pass terminals because all the cars are carrying the same commodity.

Infrastructure
Q: Where are Union Pacific's mainlines in Kansas?
A: There is one that travels southwest to northeast through Liberal up to Kansas City. Then there is one that goes through south central Kansas through Wichita and down into Texas. And then there is one that runs north from Kansas City to St. Joseph, MO and on into Nebraska. Also, included with those lines are track rights to a Burlington Northern Santa Fe rail line that goes through Marysville and on into Nebraska. Those trackage rights are negotiated and we are allowed to run on them for a fee.

Q: What rail lines does Union Pacific travel the most on in Kansas?
A: The route that we use mostly to go from east to west would be the rail line that goes through Liberal. That line has about 15 trains that travel on it per day. Then there is the southern line that goes through Wichita and south on into Oklahoma and Texas. On average that line has about 10 trains that travel on it per day. Then there is the line that runs just north of I-70 through Hays and Oakley and on toward Denver that has actually seen an increase in use over the last five years. That line now has about 7 trains running on it per day, where back in 2000 it had only about 2 trains per day running on it. The reason for the increase on that line has to with the increase in automobile shipments between Denver and Kansas City.

Q: Does Union Pacific work with short line railroads?
A: Yes, if they connect with a UP line then we will work with them. Short line railroads really are just branch lines of the major railroads. Over the last 10 years this industry has grown because of the major railroads wanting to get back to their core operations. What I mean by that is the major railroads wanted to keep most of the rail lines open but it cost too much to maintain it for our use. But if you have a short line railroad that can come in and who will only use the rail line occasionally so there is the minimal amount of maintenance needed for the rail line, then the line can be profitable for the short line and it would not have to be abandon. This is a win-win situation for everybody involved because it not only benefits the railroad industry, but also the community by keeping the rail line in operation which can help them with possible business opportunities. Therefore UP certainly encourages short line railroads because not only do they help us, but they help our customers.

Q: Are the rail lines that the short line railroads run on owned by Union Pacific?
A: Yes, those lines are usually owned by major railroad companies and the short line railroad companies either buy the track rights or will buy the entire rail line to operate on.

Fuel Info
Q: With the increase in fuel prices, has Union Pacific seen an increase in business?
A: I would say no because we have not identified any growth in our business due to the increase in fuel prices because we too are affected by the increase in price. Union Pacific is the nation's largest consumer of diesel fuel, so a small change in fuel prices can cause us to make or lose a lot of money by just the smallest fluctuation in the price. Up until about a year and a half ago we did not recoup any fuel costs from our customers, but now we have no choice but to try to recoup fuel costs. This of course angered our customers, but it would not make business sense if we did not try to recoup fuel costs when the price gets too high.
Overall, we are seeing an increase in the amount of business we do nationwide. In the last 3-4 years we have seen an increase in our business, so much so that we have had to watch that we do not go over our capacity and tie up our rail lines. We also just set a record for June for the number of cars loaded of 864,168. So overall we have seen an increase in our overall business.

Q: What percentage of total cost does fuel costs account for?
A: That is hard to say because it varies based on how the contract is written for each customer. It also varies by the commodity and the starting and ending destination of the commodity.

Transportation Costs
Q: How does Union Pacific quote its shipping price, by the car or by the ton?
A: We do it by car. There are a lot of other variables that go into our quotes: type of railcar; type of service; and destination to name a few. We now have to think like a business, which was not the case when we were government regulated, and that is something that our customers are not use to. Since deregulation we have had to change the way we deal with our customers. We now have to be business savvy and decide whether or not something is economically feasible for us to ship and also we have to take into account the liability of shipping certain things. So now we have to act more like our customers and be more business savvy because like any other business if we do not act like a business we will go out of business.
Q: Does Union Pacific have a minimum requirement of cars or tons to ship via railroad?
A: No, we will ship any amount if the customer is willing to pay for it.

Q: Who pays for the loading and unloading of the railcars?
A: The customer does since that is done on their property. When a customer needs a refrigerated car, they will call us and we will assign a car and deliver it to the customer and they will load it at their own leisure. Once the car has been loaded we will tell the customer when we can pick up the railcar and how long it will take to get to the final destination.

Ethanol Info
Q: Are railroads a good way to move ethanol?
A: Yes, they are probably the most economical way to move because ethanol cannot be moved in pipelines because they corrode the pipes and trucks can only hold about a third of what a railcar can hold.

Q: Can the rail lines support an increase in traffic from ethanol?
A: If the plants are carefully located then we can. The problem that we run into, especially with these ethanol plants, is they believe that if they build it we will service them, which is not always the case. If a plant is located in an area where it could tie up traffic, then we will not stop at that plant because it will slow all of our trains on that track.

Q: How does the planning process for the location of the ethanol plants occur?
A: The customer will come to us with a location area and ask for suggestions for where along the line they should place their plant. We will suggest an area and it will be placed in an area that is good for all parties involved and where we can serve it so that it can be big enough to be economically feasible for us and the customer.

Expansion

Q: Does Union Pacific have any plans to build new rail lines or reestablish any abandoned rail lines in Kansas?

A: Not that I am aware of. If a line is abandoned it is abandoned for a reason, usually because it is no longer profitable, so rarely will we reestablish an abandoned rail line. And in order to build a new rail line it will cost about $1.2 million per mile to build and that is without the cost to purchase the land. So in order for UP to build a new line, it would have to profitable enough to cover the high cost of building it.

Q: Does Union Pacific have any plans to invest in their current rail lines to increase capacity on the rail lines?

A: Yes. On average we spend about $1.3 billion to maintain our 32,400 miles of track and are currently working on a $400 billion capacity project to double the capacity on our rail line from El Paso, TX to Los Angles. When the project is done it will be able to carry 45 trains per day, including the 15 that come from the track that goes through Liberal. This added capacity will make it faster to transport commodities out west. We will continue to spend money on capacity depending on how the economy is going.

Intermodal Transportation

Q: What are the barriers that prevent locating an intermodal facility in southwest Kansas?

A: I would say that the biggest reason is because of the number of shippers in the area and the location of the area. There is not enough intermodal traffic in the area for there to be an intermodal facility. Also, there are intermodal facilities in Kansas City, Oklahoma City, Tulsa, and Denver, so most of the intermodal traffic goes to these locations, leaving very little for a southwest Kansas intermodal facility. A lot of intermodal has to do with location.

Q: Would Union Pacific be supportive of an intermodal facility in the southwest Kansas region?

A: That I am not sure about, again it would depend if it would be economically viable. In the past we use to beg for business, but now we have to be careful about what business we take because we have so much traffic now that we do not want to slow ourselves up by taking on more business than we can handle. We have had so much business in the last few years that we have been constantly hiring so that we can keep up with all of our traffic demands.

Q: Are these intermodal facilities expensive to set up?

A: Not really. And actually a shipper does not need an intermodal facility in the area to transport commodities using intermodal transportation. A company can truck its commodities by truck to an intermodal facility and then have them shipped by rail to its final destination. But usually it is cheaper to send it all by truck than to ship it to an intermodal facility by truck and then by train to its final destination. Also, because of time issues, intermodal may not be the best option.

APPENDIX IV - DETAILED DESCRIPTION OF FEED YARDS IN KANSAS

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Grant County Feeders	PO Box 1087	Ulysses	67880	Grant	37.49650	-101.48080	140000	Finishing Feedlot
Cargill Cattle Feeders LLC	PO Box 938	Leoti	67861	Wichita	38.58820	-101.37600	135000	Finishing Feedlot
Cactus Feeders of Kansas dba Ulysses Feed Yard	1765 E. Road 21	Ulysses	67880	Grant	38.38550	-98.37630	90000	Finishing Feedlot
Garden City Feed Yard, LLC	1805 West Annie Scheer Rd	Garden City	67846	Finney	37.43850	-101.33500	88000	Finishing Feedlot
Supreme Cattle Feeders, L.L.C.	RR1, Box 64	Kismet	67859	Seward	37.86230	-100.89460	85000	Finishing Feedlot
Cattle Empire, LLC #2	Route 1, Box 109A	Satanta	67870	Haskell	37.26320	-100.91220	84500	Finishing Feedlot
Heritage Feeders Sublette	HCR1, Box 41	Sublette	67877	Haskell	37.58360	-100.98880	75000	Finishing Feedlot
Cactus Feeders of Kansas dba Syracuse Feed Yard	PO Box 1226	Syracuse	67878	Hamilton	37.71410	-100.82480	66000	Finishing Feedlot
Fairleigh Feed Yard, Inc.	7400 S. Falcon Rd.	Scott City	67871	Scott	38.35660	-101.48640	62150	Finishing Feedlot
Bartlett Cattle Company, L.P. (Bartlett III)	HCR 1 - Box 14	Sublette	67877	Haskell	37.97860	-101.71790	60000	Finishing Feedlot
Ford County Feed Yard, Inc.	12466 Hwy 400	Ford	67842	Ford	38.37100	-101.00790	57000	Finishing Feedlot
Ulysses Feedyard East	10925 South Road P	Ulysses	67880	Grant	37.56910	-100.87940	56000	Finishing Feedlot
Cattle Empire, LLC #1	Route 1 - Box 109A	Satanta	67870	Haskell	37.43850	-101.26210	55000	Finishing Feedlot
Royal Beef, Division Of Irsik & Doll	11060 N. Falcon Rd.	Scott City	67871	Scott	37.67060	-99.74960	55000	Finishing Feedlot
Midwest Feeders	05013 13 Road	Ingalls	67853	Gray	38.63160	-101.00790	52700	Finishing Feedlot
Hy-Plains Feedyard	PO Box 356	Montezuma	67867	Gray	37.62710	-100.93410	52300	Finishing Feedlot
Liberal Feeders, LP	Route 2, Box 150	Liberal	67901	Seward	38.31310	-100.89750	48000	Finishing Feedlot
Hitch Feeders II, Inc.	521 50th Road	Satanta	67870	Haskell	37.93490	-100.45560	47500	Finishing Feedlot
Sublette Feeders	PO Box 917	Sublette	67877	Haskell	37.56910	-100.53320	46000	Finishing Feedlot
Winter Feed Yard, Inc.	Ft. Dodge Road	Dodge City	67801	Ford	37.40950	-101.26210	45000	Finishing Feedlot
Deerfield Feedyard LLC	PO Box 237	Deerfield	67838	Kearny	37.03010	-100.82150	45000	Finishing Feedlot
Hoxie Feedyard, Inc.	P.O. Box 65	Hoxie	67740	Sheridan	37.67060	-101.00700	43000	Finishing Feedlot
Western Feed Yard, Inc.	548 South Road I	Johnson	67855	Stanton	37.52550	-100.73370	42430	Finishing Feedlot
Lane County Feeders	Po Box 607	Dighton	67839	Lane	37.74310	-99.95010	42000	Finishing Feedlot
Brookover Feed Yard	PO Box 917	Garden City	67846	Finney	37.99310	-101.11420	40000	Finishing Feedlot
Ingalls Feedyard, Inc.	10505 U.S. Highway 50	Ingalls	67853	Gray	39.40100	-100.56290	40000	Finishing Feedlot
Pioneer, Inc.	1021 Co. Rd. "cc"	Oakley	67748	Logan	38.60270	-100.47430	40000	Finishing Feedlot
Pratt Feeders, LLC.	Po Box 945	Pratt	67124	Pratt	37.56910	-101.69950	40000	Finishing Feedlot
Decatur County Feed Yard, LLC	Route 3 Box 9	Oberlin	67749	Decatur	37.92040	-100.62020	38000	Finishing Feedlot
Great Bend Feeding, Inc.	Route 5 Box 150	Great Bend	67530	Barton	39.09660	-100.80650	35000	Finishing Feedlot
Brookover Ranch Feedyard, LLC (Brookover Land Enterprises)	P.O. Box 917	Garden City	67846	Finney	37.71410	-98.76560	35000	Finishing Feedlot
Reeve Cattle Company, Inc.	P.O. Box 1036	Garden City	67846	Finney	39.90830	-100.52570	35000	Finishing Feedlot
Kearny County Feeders, Inc.	PO Box 109	Lakin	67860-0109	Kearny	37.99310	-100.91290	35000	Finishing Feedlot
Haw Ranch Feedlot	PO Box 248	Turon	67583	Reno	37.84770	-100.49220	35000	Finishing Feedlot
Heritage Feeders Larned	P0 Box 134	Larned	67550	Pawnee	37.97860	-101.27880	33000	Finishing Feedlot
Irsik & Doll Feedyard	8220 E. Highway 50	Garden City	67846	Finney	37.90590	-100.80320	32000	Finishing Feedlot
Cattle Empire, LLC, Location #3	Route 1, Box 49	Satanta	67870	Haskell	37.86230	-98.40660	32000	Finishing Feedlot
Golden Belt Feeders - Kinsley	Po Box 156	Kinsley	67547	Edwards	38.41450	-98.83640	31000	Finishing Feedlot
Hays Feeders, LLC	PO Box 310	Hays	67601	Ellis	37.87680	-100.89460	30000	Finishing Feedlot
Beef Land, Inc.	12500 S. Beef Land Road	Garden City	67846	Finney	37.39500	-101.04350	30000	Finishing Feedlot
Finney County Feedyard, Inc.	4170 N. Finney Co. Feeders Rd.	Garden City	67846	Finney	37.87680	-99.35790	30000	Finishing Feedlot
Gray County Feed Yard	23405 State Rd. 23	Cimarron	67835	Gray	37.94950	-100.74830	30000	Finishing Feedlot
Sunbelt Feeders, Inc.	PO Box 38	Hugoton	66951	Smith	38.12390	-99.08350	30000	Finishing Feedlot
Mid America Feedyard, Inc.	251 N.W. 10th Ave., #4	Great Bend	67530	Barton	38.93680	-99.39960	28000	Finishing Feedlot
Premier Cattle Company, LLC	State Lake Road M.	Syracuse	67878	Hamilton	37.24870	-101.29280	27800	Finishing Feedlot
Golden Belt Feeders	Route 3, Box 107	St John	67576	Stafford	37.77210	-100.71540	26250	Finishing Feedlot
Ward Feed Yard, Inc.	Po Box H	Larned	67550	Pawnee	37.67060	-100.35100	26000	Finishing Feedlot
Premium Feeders, Inc.	Hwy 36	Scandia	66966-0230	Republic	38.00760	-100.76660	25000	Finishing Feedlot
Brookover Cattle Company, Inc.	4000 E Road 200	Scott City	67871	Scott	38.40000	-98.79960	24000	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Crist Feedyard	553 W. Road 40	Scott City	67871	Scott	38.00760	-101.80930	22500	Finishing Feedlot
Pawnee Valley Feeders, Inc.	Po Box 116	Hanston	67849-0116	Hodgeman	38.12390	-98.77250	22000	Finishing Feedlot
Ox Town Cattle Feeders, LLC	PO Box 428	Tribune	67879	Greeley	38.15300	-99.06520	21000	Finishing Feedlot
Barton Co Feeders,Inc.	1164 Se 40 Road	Ellinwood	67526	Barton	38.19660	-99.65060	20000	Finishing Feedlot
Haw Ranch Feedlot II	PO Box 248	Potwin	67123	Butler	38.31310	-100.84230	20000	Finishing Feedlot
Maverick Feeders, Llc	11995 Quaker Road	Dodge City	67801	Ford	39.79170	-97.80970	20000	Finishing Feedlot
Howell Country Feeders	PO Box 1661	Dodge City	67801	Ford	38.38550	-98.17390	20000	Finishing Feedlot
Cimarron Feeders of Kansas, L.L.C.	18745 16 Road	Cimarron	67835	Gray	38.64610	-101.76250	20000	Finishing Feedlot
D M & M Feedlot	PO Box 668	Cimarron	67835	Gray	37.67060	-99.85900	20000	Finishing Feedlot
Knight Feedlot, Inc.	1768 Ave. J	Lyons	67554	Rice	38.32760	-100.91590	20000	Finishing Feedlot
Stampede Feeders, Inc.	5503 E. Road 210	Scott City	67871	Scott	38.53030	-101.50480	20000	Finishing Feedlot
HRC Feedyards, Inc.	Po Box 186	Scott City	67871	Scott	38.29860	-98.56030	20000	Finishing Feedlot
K C Feeders, Division of Crist Feedyard, Inc.	553 W. Road 40	Scott City	67871	Scott	37.93490	-97.07120	20000	Finishing Feedlot
Whitham Farms Feedyard, Lp	Route 2, Box 200	Leoti	67861	Wichita	38.55920	-100.84230	20000	Finishing Feedlot
Heritage Feeders L.P.	26059 Victory Road	Parsons	67357	Labette	37.77210	-100.16880	18000	Finishing Feedlot
Solomon Valley Feeders, Llc	P.O. Box 89	Beloit	67420	Mitchell	37.80110	-100.38740	18000	Finishing Feedlot
Winger Feed Yard, Inc.	6372 N. Road H.	Johnson	67855	Stanton	38.55920	-100.80550	18000	Finishing Feedlot
Thomas County Feeders, Inc.	1762 US 83	Colby	67701	Thomas	37.77210	-100.36920	18000	Finishing Feedlot
Stoneman Cattle Co.	884 Road 350	Allen	66833	Lyon	38.48690	-101.02630	17600	Finishing Feedlot
Miller Feed Yard, Inc.	PO Box 459	Satanta	67870	Haskell	38.47240	-101.04480	17500	Finishing Feedlot
Boot Hill Feeders	Route 1 Box 48	Jetmore	67854	Hodgeman	37.32150	-101.69160	17000	Finishing Feedlot
Kan Sun Feeders, LLC	Route 1 Box 60	Leoti	67861	Wichita	37.30690	-101.56470	17000	Finishing Feedlot
River Bend Feed Yard Inc	Box 448	Ulysses	67880	Grant	39.44450	-98.01290	15500	Finishing Feedlot
Ashland Feeders, Pratt Feeders dba	HC 1 - Box 152	Ashland	67831	Clark	38.67250	-96.21670	15000	Finishing Feedlot
Lakin Feed Yard, Inc.	Po Box 1026	Lakin	67860	Kearny	37.67060	-101.68130	15000	Finishing Feedlot
Fowler Feeders/Valley Cattle	5113 23rd Road	Fowler	67844	Meade	37.37460	-95.13130	15000	Finishing Feedlot
Century Feeders Inc	6845 Road 17	Goodland	67735	Sherman	39.37200	-100.87930	15000	Finishing Feedlot
Young Cattle Company #1	Route 1, Box 57	Tribune	67879	Greeley	37.42400	-101.07990	14000	Finishing Feedlot
Stanley, Rex Feedyard, Inc.	10763 106 Road	Dodge City	67801-6577	Ford	38.03670	-101.29710	13500	Finishing Feedlot
Mull Farms & Feeding, Inc.	Route 1 Box 74	Pawnee Rock	67567	Barton	38.26970	-101.56000	13000	Finishing Feedlot
Diamond O Feeders	Route 1 - Box 67	Jetmore	67854	Hodgeman	38.29860	-101.48640	13000	Finishing Feedlot
Clark County Feedyard, Inc.	Hcr 1 Box 24	Minneola	67865	Clark	38.61720	-101.52320	12500	Finishing Feedlot
Cedar Bluff Cattle Feeders	Route 2, Box 71	Ellis	67637	Ellis	37.05920	-101.67350	12500	Finishing Feedlot
HRC Feed Yard #3	Po Box 186	Scott City	67871	Scott	38.26970	-101.50480	12500	Finishing Feedlot
Rocking E Feeders LLC	439 East Road 4	Ulysses	67880	Grant	37.94950	-100.03480	12200	Finishing Feedlot
Sauvage Feedyard, LLC	Route 1 - Box 27	Danbury	69026		37.35070	-101.45600	12000	Finishing Feedlot
Cheyenne Feeders LLC	Rt 2 Box 109	St Francis	67756	Cheyenne	37.97860	-100.58360	12000	Finishing Feedlot
Callicrate Cattle Company	Po Box 748	St Francis	67756	Cheyenne	37.07380	-101.74600	12000	Finishing Feedlot
Ranger Feeders II	P.O. Box 880	Dighton	67839	Lane	37.84770	-101.29710	12000	Finishing Feedlot
Sellers Farm Inc	1420 Avenue N	Lyons	67554-9001	Rice	39.40100	-101.75410	12000	Finishing Feedlot
Wilroads Feed Yard	11449 Lariat Way	Dodge City	67801	Ford	37.40950	-100.25990	11500	Finishing Feedlot
Black Diamond Custom Feeders,	1333 S. 2500 Road	Herington	67449-5021	Dickinson	38.34210	-101.54160	10500	Cow-Calf
Beef Belt Feeders, Inc.	1350 East Road 70	Scott City	67871	Scott	37.71410	-101.73590	10500	Finishing Feedlot
Mcpherson County Feeders	758 Pioneer Rd	Marquette	67464	McPherson	38.61720	-101.70730	10000	Finishing Feedlot
Meade County Feeders L.L.C.	10096 18th Road	Meade	67864	Meade	38.70440	-96.80770	10000	Finishing Feedlot
Bar W Feeders	Route 1 - Box 29A	Kismet	67859	Seward	37.14670	-100.58590	10000	Finishing Feedlot
Schwarz Feedlot Inc.	1326 County Road 37-hc1, Box 80	Menlo	67753	Thomas	37.80110	-100.11410	10000	Finishing Feedlot
Mann's ATP Inc (Clyde)	7865 NW 80th St	Potwin	67123-9652	Butler	38.22570	-98.99210	9999	Finishing Feedlot
Circle Feeders	PO Box 1255	Garden City	67846	Finney	38.02220	-100.14460	9999	Finishing Feedlot
Diamond C Cattle Co.	12561 East Road 22	Satanta	67870	Haskell	38.28420	-101.43120	9999	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Baalman Feedyard	HC 1 Box 62	Menlo	67753	Thomas	37.14670	-101.51030	9980	Finishing Feedlot
Dodge City Feeders	11430 Lariat Road	Dodge City	67801	Ford	38.79150	-99.69580	9950	Finishing Feedlot
J & G Cattle Co.	Rural Route 1	Pawnee Rock	67567	Barton	38.47240	-100.97110	9500	Finishing Feedlot
Smith Cattle, Inc.	PO Box 399	Tribune	67879	Greeley	37.35070	-100.04210	9500	Finishing Feedlot
Flint Hills Feedlot	1620 Road 210	Emporia	66801	Lyon	37.68510	-101.35320	9500	Finishing Feedlot
Graham County Feedyard L.L.C.	Po Box 219	Penokee	67659	Graham	39.66190	-101.73990	9000	Finishing Feedlot
Cadillac Feeders	660 S. Willow Rd.	Scott City	67871	Scott	39.69090	-101.85200	9000	Finishing Feedlot
St. Francis Feedyard, LLC	HC1 Box 5	St Francis	67756	Cheyenne	37.71410	-99.95010	8000	Finishing Feedlot
Bear Creek Feeders, LLC.	PO Box 1088	Syracuse	67878	Hamilton	39.99520	-100.52570	8000	Cow-Calf
Ottawa County Feeders, Inc.	1444 Mulberry Rd.	Minneapolis	67467	Ottawa	37.55460	-101.13460	8000	Finishing Feedlot
Rooks County Feeders LLC	2070 22nd Road	Plainville	67663	Rooks	37.92040	-100.32750	8000	Finishing Feedlot
Cow Camp, Inc.	PO Box 103 - 1611 100 Ave	Ramona	67475	Marion	38.03670	-101.93740	7999	Finishing Feedlot
Quality Feeders, Inc.	425-B SW 20 Ave.	Great Bend	67530	Barton	39.92220	-99.58050	7600	Finishing Feedlot
Shaw Feed Yard Inc.	Po Box 655	Ashland	67831	Clark	39.31400	-100.73040	7500	Finishing Feedlot
Doll Land & Cattle Inc.	5355 N Doll Rd	Ingalls	67853	Gray	37.26320	-100.76710	7500	Finishing Feedlot
Rawlins County Feeders ,LLC.	P.O. Box 26	Mcdonald	67745	Rawlins	38.37100	-100.87910	7500	Finishing Feedlot
RDC Feeders, Inc.	331 County Road F	Brewster	67732	Thomas	37.94950	-101.60810	7500	Finishing Feedlot
Carpenter Cattle Company Inc	2257 Co. Road 2	Brewster	67732	Thomas	38.47240	-97.78740	7500	Finishing Feedlot
Pratt Livestock, Inc.	30274 East Highway 54	Pratt	67124	Pratt	37.33610	-100.33210	7200	Finishing Feedlot
Porter Farms	3309 Road W 7 - Rr 1, Box 64	Reading	66868	Lyon	38.47240	-100.40060	7042	Cow-Calf
Medway Replacement Heifers	Box 52	Syracuse	67878	Hamilton	37.32150	-99.66140	7000	Cow-Calf
Penner Cattle	6904 13 Road	Ingalls	67853	Gray	37.93490	-96.97970	6750	Finishing Feedlot
5 N Feeders	4652 North Road L	Johnson City	67855	Stanton	37.93490	-100.93120	6500	Finishing Feedlot
Floyd Feed Yard	6190 N. Road G.	Johnson City	67855	Stanton	39.28500	-100.61870	6500	Finishing Feedlot
Coake Feeding Company, Inc.	PO Box 628	Dodge City	67801	Ford	38.51580	-101.76250	6000	Finishing Feedlot
Plunkett Feedlot	P.O. Box 1025	Syracuse	67878	Hamilton	37.19040	-100.64030	6000	Finishing Feedlot
Central Feeders, Inc.	2240 Avenue P	Lyons	67554	Rice	37.72860	-99.11180	6000	Finishing Feedlot
Smoky Hill Feedlot	11513 S. Soderborg Rd.	Falun	67442	Saline	37.16120	-100.69460	6000	Cow-Calf
Kansas Feed Yard, Inc.	2505 South Juniper Rd	Scott City	67871	Scott	37.75760	-99.95010	6000	Finishing Feedlot
Kimrock Feeders, LLP	PO Box 169	Cimarron	67835	Gray	37.83320	-101.97400	5000	Finishing Feedlot
County Line Feeders	RR 1 Box 22	Almena	67622	Norton	38.47240	-100.69510	5000	Finishing Feedlot
Dudrey Cattle Company	PO Box 65	St John	67576	Stafford	37.75760	-100.31450	5000	Finishing Feedlot
Handke Farms Inc.	16725 Hwy 159	Muscotah	66058-3017	Atchison	38.26970	-101.54160	4999	Finishing Feedlot
7 W Feeders	10587 Saddle Rd	Dodge City	67801	Ford	38.62910	-95.97690	4999	Finishing Feedlot
Withers Feed Yard	2298 90th Road	Copeland	67837	Gray	38.73340	-101.63960	4999	Finishing Feedlot
Hachmeister Cattle Co.	3080 Highway 18	Natoma	67651	Osborne	39.14000	-97.65920	4999	Finishing Feedlot
Krebs Feedlot	712 Ora	Scott City	67871	Scott	37.74310	-101.75420	4999	Finishing Feedlot
Livengood, J.L., Farms, Inc.	6020 Road #3	Kanorado	67741	Sherman	39.28500	-99.20410	4999	Finishing Feedlot
G & S Feeders, Inc.	P.O. Box 527	Macksville	67557	Stafford	38.61720	-97.08810	4999	Finishing Feedlot
Bott Family Farms	1665 First Rd. - Box 109	Palmer	66962	Washington	39.71990	-101.85200	4999	Finishing Feedlot
Sagebrush Feeders, Inc.	PO Box 137	Ingalls	67853	Gray	37.74310	-101.73590	4995	Finishing Feedlot
Jewell County Feeders, LLC	RR 2 Box 71	Mankato	66956	Jewell	38.29860	-98.81800	4990	Finishing Feedlot
Adams Cattle Company	PO Box 218	Maple Hill	66507	Wabaunsee	39.19800	-101.34460	4990	Finishing Feedlot
Ruff Farms, Inc.	Route 1 - Box H7 B	Hanston	67849	Hodgeman	38.63160	-97.80580	4950	Finishing Feedlot
Meyer Land & Cattle Company	Po Box 305 - 108 S. Main	Sylvan Grove	67481	Lincoln	39.74890	-101.36630	4950	Finishing Feedlot
Circle K Corporation	1909 Lincoln	Great Bend	67530	Barton	38.03670	-100.56530	4900	Finishing Feedlot
CSA Cattle Co.	Route 1 Box 12	Leoti	67861	Wichita	39.44450	-101.36320	4900	Finishing Feedlot
Kleysteuber & Gillen Inc	13060 S. Road No. 20	Garden City	67846	Finney	37.13210	-99.84270	4800	Finishing Feedlot
Cimarron Feeders	6306 20 Road - HC 03, Box 6C	Cimarron	67835-9018	Gray	37.21950	-101.22030	4700	Finishing Feedlot
Bills, Frank	Route #2	Severy	67137	Greenwood	37.27780	-101.63720	4700	Finishing Feedlot
Cranston Cattle Co.	P.O. Box 461	Colby	67701	Thomas	37.65610	-98.67450	4600	Finishing Feedlot
Perrier Feedyard - Whirlwind	10550 Whirlwind Road	Dodge City	67801	Ford	38.08030	-101.18730	4500	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Albin Feedlot	973 County Rd. 66	Quinter	67752	Gove	39.34300	-101.75410	4500	Finishing Feedlot
Ingalls Feedyard East	10505 U.S. Hwy 50	Ingalls	67853	Gray	37.64160	-101.75420	4500	Finishing Feedlot
Decker Brothers Livestock	10331 W Road 215	Scott City	67871	Scott	37.80110	-101.99110	4500	Finishing Feedlot
Huck Farm Feedlot	1018 Russel	Scott City	67871	Scott	37.92040	-100.43730	4500	Finishing Feedlot
Wedel Feedlot	Route 1 - Box 71	Leoti	67861	Wichita	37.62710	-101.88170	4500	Finishing Feedlot
H & B Dairy Replacements LLC	6630 E. Road 130	Scott City	67871	Scott	38.47000	-96.06910	4225	Cow-Calf
Dillwyn Acres	355 NW 30 Ave.	Great Bend	67530	Barton	38.16760	-101.97400	4000	Finishing Feedlot
Nelson Land And Cattle Company	RR 3 Box 43	Ellis	67637	Ellis	37.16120	-101.02090	4000	Finishing Feedlot
G & G Cattle, Inc.	RR 1, Box 131	Holcomb	67851	Finney	38.08030	-101.35200	4000	Finishing Feedlot
Triangle H Grain & Cattle Co.	1955 W. Plymell Rd.	Garden City	67846	Finney	38.45560	-95.14660	4000	Finishing Feedlot
C J Feeders	11751 Highway 400	Dodge City	67801	Ford	38.57370	-100.89750	4000	Finishing Feedlot
Peddicord Feedlot, Inc.	5615 Peddicord Rd	Wamego	66547	Pottawatomie	38.55920	-100.95270	4000	Cow-Calf
Peterson Feedlot, LP	20505 Hunting Rd.	Wamego	66547-9588	Pottawatomie	37.08840	-101.70970	4000	Finishing Feedlot
Golden Belt Feeders - Alden	735 Ave X	Alden	67512	Rice	37.45300	-101.37150	4000	Finishing Feedlot
Farmers & Ranchers Livestock	PO Box 2595	Salina	67402-2595	Saline	38.29860	-98.08190	4000	Finishing Feedlot
Brookover Cattle Co., Inc.	400 E Road 200	Scott City	67871	Scott	37.74310	-99.95010	4000	Finishing Feedlot
H & H Farms, Inc.	P.O. Box 564	Colby	67701	Thomas	37.62710	-101.69950	4000	Finishing Feedlot
Winter Livestock Inc.	1414 E Trail	Dodge City	67801	Ford	37.62710	-101.59010	3750	Finishing Feedlot
Mull Farms & Feeding, Inc.	Rural Route 1	Pawnee Rock	67567	Barton	37.17580	-100.62210	3500	Finishing Feedlot
Walker Feedlot, Inc.	612 Lark Road	Hope	67451	Dickinson	38.92230	-101.39900	3500	Finishing Feedlot
Diepenbrock, Gary	2953 Vista Rd	Lincolnville	66858	Marion	38.02220	-98.73590	3500	Finishing Feedlot
2K Feeders	12786 NW Shumway Rd.	Burns	66840	Marion	39.57350	-95.51790	3500	Finishing Feedlot
Harkness Cattle & Land Inc.	11551 S. Venison Rd.	Scott City	67871	Scott	37.62710	-100.69720	3500	Finishing Feedlot
Livengood Brothers Partnership	6235 Road #24	Goodland	67735	Sherman	37.67060	-100.07760	3500	Finishing Feedlot
Hume Feedlot	10600 South Road V	Manter	67862	Stanton	37.67060	-100.95230	3500	Finishing Feedlot
Rose, Dewayne	870 29th Road	Mahaska	66955	Washington	37.77210	-100.22340	3500	Finishing Feedlot
Darwin Deets/Farm	1361 Frontage Rd.	Yates Center	66783	Woodson	38.50130	-100.89750	3500	Finishing Feedlot
Circle Bar Cattle Company	Route 1, Box 100	Satanta	67870	Haskell	37.83320	-101.90080	3490	Cow-Calf
Kohman, Roger	161 Penn Ave	Scott City	67871	Scott	39.57430	-97.07850	3400	Finishing Feedlot
Rock Creek Ranch	23754 SW Pickrell	Douglass	67039	Butler	39.19800	-99.05520	3250	Finishing Feedlot
Ferguson Bros., Inc.	779 E. 1400 Rd.	Kensington	66951-9745	Smith	37.86230	-99.02860	3150	Finishing Feedlot
Edwards Land Investment	Route 1 Box 74	Pawnee Rock	67567	Barton	37.80110	-100.47850	3000	Finishing Feedlot
Hornung Cattle	Rr 1 - Box 92a	Offerle	67563	Edwards	37.71410	-102.02750	3000	Finishing Feedlot
Goetz And Sons Feedlot	Route 1, Box 26	Park	67751	Gove	38.12390	-99.68720	3000	Finishing Feedlot
Young Cattle Company #3	Route 1, Box 68	Tribune	67879	Greeley	38.57370	-101.35760	3000	Finishing Feedlot
Kurr Cattle Co.	9025 S. Mission Rd.	Sedgwick	67135	Harvey	37.77210	-100.73370	3000	Finishing Feedlot
Cat House Feeders	255 County Road 50	Dighton	67839	Lane	37.58360	-100.11410	3000	Finishing Feedlot
Double B And S Cattle Co.	10320 Wrangler Rd.	Fowler	67844	Meade	37.75660	-96.04340	3000	Finishing Feedlot
Hinchman Ranch	312 Dd Avenue	Council Grove	66846	Morris	39.93660	-99.63670	3000	Cow-Calf
David Ranch & Feedlot	P.O. Box 233	Lenora	67645	Norton	39.80620	-98.31580	3000	Finishing Feedlot
R & L Feeders	1018 W. 160th Drive	Osborne	67473	Osborne	38.99490	-98.43690	3000	Finishing Feedlot
Griffith of Iuka	80425 NE 10th Ave.	Iuka	67066	Pratt	37.92040	-100.30920	3000	Finishing Feedlot
Broken D Farms, Inc.	Diamond Rd	Courtland	66939	Republic	39.44450	-100.82340	3000	Finishing Feedlot
Zimm's Feedlot	1650 Avenue R	Sterling	67579	Rice	39.84970	-100.14190	3000	Finishing Feedlot
Wiechman Feedyard, LP	4030 N. Highway 83	Scott City	67871	Scott	38.44340	-100.95270	3000	Cow-Calf
Storm Feed Yard	512 Russell Street	Scott City	67871	Scott	39.09480	-96.01080	3000	Finishing Feedlot
Allen Feedlot	Route 1, Box 95	Hoxie	67740	Sheridan	37.54000	-98.74740	3000	Finishing Feedlot
Purvis Feedlot	340 Jackrabbit Road	Weskan	67762	Wallace	38.28420	-98.85480	3000	Finishing Feedlot
Glenn Coberly Feedlot	691 County Road 54	Gove	67736	Gove	38.57370	-101.10000	2999	Finishing Feedlot
Smith Brothers Feeders LLC	PO Box 1350	Elkhart	67950	Morton	38.82060	-100.30670	2999	Finishing Feedlot
Cattle Care Services	HC 01 Box 2W	Hugoton	67951	Stevens	38.55920	-101.54160	2999	Finishing Feedlot
Stephens Farms, Inc.	1551 County Rd. 32	Menlo	67753	Thomas	38.54480	-100.76870	2999	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Sumner Feedlot	Po Box 70	Norcatur	67653	Decatur	37.83320	-100.43730	2950	Finishing Feedlot
Heritage Cattle, Inc.	3725 W. Road E.	Garden City	67846	Finney	39.23820	-96.21240	2660	Finishing Feedlot
Harris Farm And Ranch, Inc.	HC2 - Box 40	Tribune	67879	Greeley	37.83320	-101.29710	2600	Finishing Feedlot
Doonan And Sons, Inc.	P.O. Box 1466	Great Bend	67530	Barton	37.94950	-101.11420	2500	Finishing Feedlot
Nelson Circles, Inc.	Rr 2 Box 91	Lewis	67552	Edwards	38.28420	-100.86070	2500	Finishing Feedlot
4S Feeders (Schneider, Ed & Marvin)	1965 Ave K	Kanopolis	67454	Ellsworth	37.10290	-101.45600	2500	Finishing Feedlot
Post Feed Yard	10629 Valley Road	Dodge City	67801	Ford	39.29630	-96.23100	2500	Finishing Feedlot
Evans Cattle, Inc. (West Lot)	798 County Rd 52	Gove	67736	Gove	39.92090	-95.34920	2500	Cow-Calf
Evans Cattle, Inc. - East Yard	798 County Rd 52	Gove	67736-9715	Gove	37.81560	-101.99110	2500	Finishing Feedlot
Stewart, Tom	1361 County Road 82	Quinter	67752	Gove	38.68960	-101.72570	2500	Finishing Feedlot
Arrowhead Feeders	18148 H Road	Meade	67867	Gray	39.19800	-97.23110	2500	Finishing Feedlot
Foote Cattle Co.	10811 W 215th St	Bucyrus	66013	Miami	38.54480	-100.89750	2500	Finishing Feedlot
Blue Hill Feeders, Inc.	468 County 412 Drive	Lucas	67648	Russell	37.16120	-101.51030	2500	Finishing Feedlot
Ryan, Patrick J.	801 E 5th Street	Scott City	67871	Scott	37.26320	-100.74900	2500	Cow-Calf
Hess Cattle Co Inc	3501 N. Grant Rd.	Scott City	67871	Scott	39.32850	-100.99100	2500	Finishing Feedlot
Nightengale Cattle Co.	9961 West Road 270	Scott	67871	Scott	37.80110	-100.84300	2500	Finishing Feedlot
Wettstein, Wayne	Route 1, Box 133	Liberal	67901	Seward	39.09660	-99.65870	2500	Finishing Feedlot
Sweet Farms	Route 1 - Box 535	Colby	67701	Thomas	38.28420	-100.86070	2500	Finishing Feedlot
Cooper Feedlot	2503 County Rd. 32	Rexford	67753	Thomas	37.81560	-100.84300	2500	Finishing Feedlot
Knox Farms Inc	PO Box 278	Brewster	67732	Thomas	37.71410	-99.89540	2500	Finishing Feedlot
Whitham Farms Feedyard, Lp	Route 2 - Box 200	Leoti	67861	Wichita	37.55460	-100.69720	2500	Finishing Feedlot
Classic Feeders, Inc.	Po Box 146	Little River	67457	Rice	38.84960	-97.62230	2400	Finishing Feedlot
Bekemeyer Enterprises, Inc.	Hwy 36	Washington	66968	Washington	38.06580	-99.79700	2160	Finishing Feedlot
Clark Feedlot	70056 Ne 110th St.	Preston	67569-9801		38.32540	-95.55250	2000	Finishing Feedlot
Bryan Enterprises, Inc.	P.O. Box 110	Greeley	66033	Anderson	37.74310	-100.00470	2000	Finishing Feedlot
Hanson Farming Co.	Route 1, Box 47	Pawnee Rock	67567	Barton	38.68960	-97.12490	2000	Finishing Feedlot
Schriner Farms, Inc.	1312 NW 60 Rd.	Albert	67511	Barton	39.31400	-101.62380	2000	Finishing Feedlot
Mayden Feedlot	1400 Ave and Eden Rd.	Abilene	67410	Dickinson	37.42400	-101.97280	2000	Finishing Feedlot
J O Cattle Company - (Finish Yard)	P O Box 7	Holcomb	67851	Finney	38.26970	-100.89750	2000	Finishing Feedlot
Finest Beef Grower Yard	11352 112 Road	Dodge City	67801	Ford	38.52790	-96.40120	2000	Finishing Feedlot
Perrier Feed Yard - Mullberry	1900 Lamesa	Dodge City	67801	Ford	38.32760	-100.71350	2000	Finishing Feedlot
Bixenman Brothers.	Rural Route 2 - Box 32	Grainfield	67737	Gove	39.92220	-99.56180	2000	Finishing Feedlot
Stephens Ranch Feedlot	Route 1, Box 51	Grinnell	67738	Gove	39.99460	-99.63670	2000	Finishing Feedlot
Thornton Cattle Co.	1355 WW Road	Copeland	67837	Gray	38.03670	-101.16900	2000	Cow-Calf
Sand Creek Land & Cattle, LLC	302 NE 48th	Newton	67114	Harvey	38.73340	-97.69640	2000	Finishing Feedlot
Cottonwood Corral	Route 2, Box 242	Jetmore	67854	Hodgeman	37.40950	-101.31680	2000	Finishing Feedlot
Braum Cattle Co.	1471 Road 200	Emporia	66801	Lyon	39.80630	-98.62630	2000	Finishing Feedlot
Chisholm Feeders	Route 1, Box 73	Lehigh	67073	Marion	39.35750	-101.13990	2000	Cow-Calf
O.K. Corral	1055 Kiowa Rd.	Mcpherson	67460	McPherson	39.98020	-97.22850	2000	Finishing Feedlot
Meade County Feeders II, LLC	14072 11 Road	Plains	67869	Meade	38.00760	-96.96140	2000	Finishing Feedlot
Gans Inc., Cattle Pens	612 North Nelson - Box 218	Bennington	67422	Ottawa	38.50130	-96.97770	2000	Finishing Feedlot
Owen Unruh Cattle Co Inc	12421 N. Grant Rd.	Scott City	67871	Scott	38.68960	-96.86730	2000	Finishing Feedlot
Smoky River Cattle Co	HC 1 Box 555	Sharon Springs	67758	Wallace	37.74310	-99.20290	2000	Finishing Feedlot
Howard C. Wilson Trust	P.O. Box 638	Sharon Springs	67758-0638	Wallace	37.91640	-95.72930	2000	Finishing Feedlot
Bekemeyer Enterprises	Route 1 - Box 56	Washington	66968	Washington	37.36520	-101.36530	2000	Finishing Feedlot
Sealock Inc.	Route 2 Box 127	Hoxie	67740	Sheridan	37.87680	-102.04720	1999	Finishing Feedlot
Wedel, Gary	17830 NW Diamond Rd	Burns	66840	Marion	37.48200	-96.85220	1800	Finishing Feedlot
Diedrick Farms, Inc.	688 Evergreen Rd.	Tescott	67484	Ottawa	39.63230	-97.19100	1700	Finishing Feedlot
Four N, Inc.	8831 S. Woodlawn Rd	Newton	67114	Harvey	39.60330	-97.30350	1600	Finishing Feedlot
CB Farms	30142 NE 100th Ave.	Preston	67583	Reno	39.87870	-97.11600	1550	Finishing Feedlot
Nicholson Ventures Feedyard	11089 Whirlwind Rd.	Dodge City	67801	Ford	38.34210	-100.98950	1500	Finishing Feedlot
Pine Tree Feeders, LLC	2136 S. Spencer Rd.	Newton	67114	Harvey	37.86230	-99.22990	1500	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Hahn's Inc.	Route 1, Box 34	Hanston	67849	Hodgeman	39.96560	-99.71150	1500	Finishing Feedlot
Roenbaugh Cattle Pens	Route 1 - Box 72	Haviland	67059	Kiowa	39.92220	-99.80510	1500	Finishing Feedlot
Helendale Ranch	2043 Highway 40	Oakley	67748	Logan	39.90770	-99.41210	1500	Finishing Feedlot
Manhattan Livestock Comm. Co. Inc.	8424 E Hwy 24	Manhattan	66502	Riley	39.89320	-99.07530	1500	Finishing Feedlot
Cheney Feed Yard	12500 S. Kansas Road	Scott City	67871	Scott	39.98010	-99.71150	1500	Finishing Feedlot
Doran, James V	Po Box 335	St John	67576	Stafford	39.60360	-99.95480	1500	Finishing Feedlot
L-Bo Land & Livestock	Po Box 186	Scott City	67871	Scott	39.96570	-97.90340	1400	Finishing Feedlot
Murphy, Roger F Irrevocable Trust	Rr 5, Box 150	Great Bend	67530	Barton	39.15450	-100.37670	1350	Finishing Feedlot
Syracuse Commission Co. Inc.	P.O. Box 129	Syracuse	67878	Hamilton	39.34300	-98.66430	1350	Finishing Feedlot
Reinert Feed Yard	304 Crawford - PO Box 92	Ensign	67841	Gray	37.93490	-97.47370	1200	Finishing Feedlot
Suiter Farms	P.o. Box 85	Macksville	67557	Stafford	38.26970	-98.19230	1200	Finishing Feedlot
H & D Cattle Company	Hc 61	Tipton	67485	Mitchell	38.50130	-97.87940	1100	Cow-Calf
Kniebel Farms	2574 T Ave	Herington	67449	Dickinson	37.80110	-98.72910	1000	Cow-Calf
3-B Cattle Company	Route 3 - Box 10	Beloit	67420	Mitchell	38.48690	-100.87910	1000	Cow-Calf
Esslinger Ranch, Inc.	RR 3 Box 45	Norton	67654	Norton	39.70490	-99.95480	1000	Cow-Calf
T P Land & Cattle					38.48690	-101.02630	999	Finishing Feedlot
Cohoon Feedlot	35555 E. Omey Road	Kalvesta	67856		37.33590	-95.73750	999	Finishing Feedlot
Culwell, Theron	Route 2 - Box 120	St Francis	67756	Cheyenne	38.08030	-98.93720	999	Finishing Feedlot
Lang Cattle Co., LLC	Box 144	Minneola	67865	Clark	37.13210	-100.67650	999	Finishing Feedlot
Pike Feeders	Hcr 1 - Box 120	Minneola	67865	Clark	39.58950	-101.04870	999	Finishing Feedlot
Gardiner Angus Ranch	HC1 Box 290	Ashland	67831	Clark	38.87870	-100.15860	999	Finishing Feedlot
Spur Feeders, Inc.	Route 2	Concordia	66901	Cloud	39.70480	-97.09730	999	Finishing Feedlot
Blair Ranch	Route 1 - Box 128a	Atlanta	67008	Cowley	38.80610	-100.47330	999	Finishing Feedlot
Stapp Farms, Inc.	RR 1, Box 128	Norcatur	67653	Decatur	37.10290	-101.00280	999	Finishing Feedlot
KSU Agricultural Research Ctr.	1232 240th Ave.	Hays	67601-9228	Ellis	39.82070	-97.11600	999	Finishing Feedlot
Homeier Farms	12th and Ave B	Ellsworth	67439	Ellsworth	38.53030	-101.00790	999	Finishing Feedlot
Owens, Larry	10833 106 Road	Dodge City	67801	Ford	39.76160	-96.49250	999	Finishing Feedlot
Stanley Starter Yard	10763 106 Road	Dodge City	67801	Ford	38.16760	-98.16880	999	Finishing Feedlot
Ochs, Henry Cattle Company	Rr 2, Box 23	Grainfield	67737	Gove	37.89130	-97.08950	999	Finishing Feedlot
Ochs, Dan	Route 2, Box 25	Grainfield	67737	Gove	38.42890	-98.00830	999	Finishing Feedlot
Gassmann, Gary	3051 County Road 42	Grainfield	67737	Gove	37.72860	-97.65400	999	Finishing Feedlot
Wartman Cattle	04005 K Rd	Ingalls	67853	Gray	38.77700	-100.41780	999	Finishing Feedlot
Steele Cattle Inc.	Route 1	Tribune	67879	Greeley	37.21950	-101.94540	999	Finishing Feedlot
Hoffman & Riley	Hcr Box 19	Tribune	67879	Greeley	39.79170	-97.28470	999	Finishing Feedlot
Zimmerman, Joe	424 NW 90 Rd	Harper	67058	Harper	39.48800	-98.14320	999	Finishing Feedlot
3M Farms, Inc.	Hcr 1 - Box 84	Sublette	67877-9604	Haskell	39.35750	-97.04500	999	Finishing Feedlot
Triple A Ranch Feedyard - Ungles Yard	Rt 1 Box 13-B	Satanta	67870	Haskell	38.79150	-100.41780	999	Finishing Feedlot
Cure, Inc.	Box 124	Hanston	67849	Hodgeman	39.66030	-95.98650	999	Finishing Feedlot
Shriwise, Clare, Inc.	Route 2 - Box 116	Jetmore	67854	Hodgeman	39.21250	-98.57130	999	Finishing Feedlot
Ochs Farm & Cattle	Route 1, Box 106	Jetmore	67854	Hodgeman	37.99310	-97.03460	999	Finishing Feedlot
Greene Farms, Inc.	Rr 1 - Box 4	Jewell	66949	Jewell	38.73340	-98.14070	999	Finishing Feedlot
Upland Acres Inc	6097 Sw 60th Avenue	Kingman	67068	Kingman	37.45300	-101.71770	999	Finishing Feedlot
Spring Valley Farm	1626 Turkey Creek Rd	Marion	66861	Marion	39.99460	-99.54310	999	Finishing Feedlot
Nelson, Armin	1886 11th Ave.	Mcpherson	67460	McPherson	38.53030	-101.48640	999	Finishing Feedlot
Reimer Farms	20164 Q Road	Meade	67864	Meade	39.34300	-100.80480	999	Finishing Feedlot
Felan Farms Inc.	P.O. Box 37	Plains	67869	Meade	37.80110	-100.93410	999	Finishing Feedlot
BG Feeders	Route 1, Box 108	Glen Elder	67446	Mitchell	39.22700	-96.59830	999	Finishing Feedlot
Pruitt Farms, Inc.	Route 4 Box 84	Beloit	67420	Mitchell	37.37930	-95.88250	999	Finishing Feedlot
Mapes Farms LLC	RR 1, Box 92	Norton	67654	Norton	39.83580	-100.41360	999	Finishing Feedlot
Tyler Harting & Sons Land & Cattle	Rt. 3, Box 53	Norton	67654	Norton	37.77210	-99.18470	999	Finishing Feedlot
Ambrosier Ranch	Rt.3, Box 68	Norton	67654	Norton	39.12560	-101.43600	999	Finishing Feedlot
Brooks Farm	RR 2 Box 29	Norton	67654	Norton	38.73110	-94.71430	999	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Clydesdale, Robert	Hc #63, Box 184	Edmond	67645	Norton	39.93660	-99.07530	999	Finishing Feedlot
Pawnee County Cattle Co., Inc.	Box 387	Larned	67550	Pawnee	39.98010	-100.16060	999	Finishing Feedlot
Blume, Larry	9010 Water Mill Rd	Wamego	66547	Pottawatomie	37.92040	-101.77270	999	Finishing Feedlot
H D Farms	30215 NE 20th Ave.	Pratt	67124	Pratt	37.45300	-101.71770	999	Finishing Feedlot
H D Farms	30215 NE 20th Ave.	Pratt	67124	Pratt	37.33590	-95.73750	999	Finishing Feedlot
Novak, Joe	1780 190 Rd	Belleville	66935	Republic	37.59810	-100.09590	999	Finishing Feedlot
Limestone Trail Cattle Feeders	940 Limestone Trail	Scandia	66966	Republic	38.64610	-101.08160	999	Finishing Feedlot
H2O Farms	Route 1 Box 14	Macksville	67557	Stafford	39.47350	-98.18040	999	Finishing Feedlot
Smith, Terry	130390 NW 110th St.	Macksville	67557	Stafford	37.17580	-100.54960	999	Finishing Feedlot
Walker, David T.	Box 724	Johnson	67855	Stanton	37.20490	-101.31090	999	Finishing Feedlot
Shore Cattle	6788 E. Rd. 24	Johnson	67855	Stanton	38.42890	-101.83610	999	Finishing Feedlot
Walt Farms	1064 C Road	Collyer	67631	Trego	39.92220	-99.59930	999	Finishing Feedlot
Whitham Farms Feedyard, L.P. - Krey Lot	Rt 2	Leoti	67861	Wichita	38.32760	-98.63400	999	Finishing Feedlot
Stotts, Roger	Rr 1 - Box 136c	Greensburg	67054	Kiowa	37.42400	-100.47850	996	Finishing Feedlot
I-X Ranch	10500 W Hwy 50	Holcomb	67851	Finney	38.36880	-95.12810	995	Finishing Feedlot
Robertson Farms	N. Hwy 27 - Po Box 550	Tribune	67879	Greeley	39.90770	-97.47220	995	Finishing Feedlot
Rockers Farms	29645 NW Marshall Road	Garnett	66032	Anderson	38.79150	-97.28910	990	Finishing Feedlot
High C Farms Inc	1213 NW 80th Ave.	St John	67530	Barton	37.27780	-100.45900	990	Finishing Feedlot
Klaassen Farms	10399 N.w. Meadowlark Rd.	Whitewater	67154	Butler	39.22700	-100.60010	990	Finishing Feedlot
Molitor, Kirk	Rr 1 - Box 38a	Offerle	67563	Edwards	39.82070	-97.11600	990	Finishing Feedlot
Schmitt, Daniel	Rr 2 - Box 111	Kinsley	67547	Edwards	38.73340	-101.67670	990	Finishing Feedlot
Tilton Feedlot	HC2 - Box 21	Quinter	67752	Gove	38.31310	-99.07560	990	Finishing Feedlot
Polifka, David	2099 County Rd 70	Quinter	67752	Gove	37.71410	-99.98650	990	Finishing Feedlot
Davignon Farms	Rr 1, Box 103b	Hill City	67642	Graham	38.35660	-97.73220	990	Finishing Feedlot
Billips Farms	RR 2, Box 74C	Hill City	67642	Graham	38.24020	-99.96160	990	Finishing Feedlot
Richard Herman Farms Inc.	1389 310th Ave.	Hill City	67642	Graham	37.97860	-101.02270	990	Finishing Feedlot
Nuss, J.D.	Route 2, Box 217	Jetmore	67854	Hodgeman	37.62710	-100.13230	990	Finishing Feedlot
Carlson, Ronnie	Rt 1 Box 168	Lincolnville	66858	Marion	39.21250	-100.52560	990	Finishing Feedlot
Lewis Cattle Company	5124 21 RD	Fowler	67844	Meade	39.43000	-99.35300	990	Finishing Feedlot
Thiessen Cattle Co., Doug Thiesson	12 Circle Drive - Rr 2	Beloit	67420	Mitchell	38.44110	-96.10600	990	Finishing Feedlot
Ward Feed Yard (Grower Yard)	P.o. Box H	Larned	67550	Pawnee	39.02390	-97.52970	990	Finishing Feedlot
Greving Farms Inc.	979 West 1100 Road	Prairie View	67664-6439	Phillips	38.93680	-101.75070	990	Finishing Feedlot
Brethour Brothers Ranch	Route 1 - Box 18	Wamego	66547	Pottawatomie	39.35750	-100.48840	990	Finishing Feedlot
Gosselin, Gaylen	432 Hwy 18	Palco	67657	Rooks	38.66060	-101.00790	990	Finishing Feedlot
Minnix, Wanda	8101 West Road 40	Scott	67871	Scott	38.10940	-97.32730	990	Finishing Feedlot
Lehmann Farms, Inc.	Route 1, Box 22	Gaylord	67638	Smith	39.41550	-97.97570	990	Finishing Feedlot
Schultz, Larry	Rr 3 Box 273	St Francis	67756	Cheyenne	39.32540	-96.41710	980	Finishing Feedlot
Waters Farm	Hc1 Box 27	Bird City	67731	Cheyenne	37.20490	-100.71280	980	Finishing Feedlot
Long, Elden & Sons	RR 1 Box 120	Norcatur	67653	Decatur	39.02390	-97.80740	980	Finishing Feedlot
Roberts, Garry	RR 3 - Box 90	Quinter	67752	Gove	38.40000	-98.68920	980	Finishing Feedlot
Coburn, Sammie A.	HC 2 Box 15	Quinter	67752	Gove	37.45300	-101.64480	980	Finishing Feedlot
Quinkan Land & Cattle	2551 Co Rd 70	Quinter	67752	Gove	39.86420	-97.07850	980	Finishing Feedlot
Bar M Farms	Rt 1 Box 3	Grinnell	67738	Gove	39.21250	-99.63220	980	Finishing Feedlot
Mann Cattle Company, Inc.	2334 Rd 70	Quinter	67752	Gove	39.57430	-97.30350	980	Finishing Feedlot
Epp Farms Inc	2925 Ne 48th	Newton	67114-9429	Harvey	37.10290	-100.60400	980	Finishing Feedlot
Busenitz Feedlot (Lester)	14632 NW Santa Fe Lk. Rd.	Newton	67114	Harvey	39.05300	-97.58530	980	Finishing Feedlot
Grinnell Grain Company	2903 US Hwy 83	Oakley	67748	Logan	37.96400	-99.88850	980	Finishing Feedlot
Kendig, Larry	902 N. Apollo	Osborne	67473	Osborne	37.14670	-100.65840	980	Finishing Feedlot
B-K Cox Farms, Inc.	1439 West Granite Road	Long Island	67647	Phillips	38.08030	-97.03460	980	Finishing Feedlot
Willems, John	Rr 1, Box 51	Goodland	67735	Sherman	39.70480	-97.28470	980	Finishing Feedlot
T-Bar Ranch Ltd	Po Box 458	Goodland	67735	Sherman	38.45560	-95.53400	980	Finishing Feedlot
Mosbarger Farms	6265 Road 23	Goodland	67735	Sherman	37.14670	-100.65840	980	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
G.H.K. Farms	Route 1, Box 13b	Colby	67701	Thomas	39.29950	-96.76580	980	Finishing Feedlot
Simons Farms, Inc.	Route 1 - Box 58	Marienthal	67863	Wichita	37.93490	-97.56510	980	Finishing Feedlot
Beaver Springs Ranch	HC 2 Box 10	Mcdonald	67754		37.93490	-97.27240	975	Finishing Feedlot
MRT Partnership (Merle Wait)	P. O. Box 545	Protection	67127	Comanche	39.93670	-97.04100	975	Finishing Feedlot
J-Bar Farms, Inc	17637 NW Prairie Creek Rd.	Newton	67114	Harvey	39.93660	-99.71150	975	Finishing Feedlot
K Bar K Ranch	Route 1 - Box 62	Lane	66042	Franklin	37.71410	-98.51050	960	Finishing Feedlot
Selfridge, Jim					37.97860	-101.75440	950	Finishing Feedlot
777 Ranch		Eureka			37.26320	-101.65540	950	Finishing Feedlot
Twin Cedars Ranch	11963 SW Roundup Rd.	Kiowa	67070	Barber	37.30200	-94.65880	950	Finishing Feedlot
Standish Bros.	NW 80th Avenue	St John	67530	Barton	39.11110	-100.71400	950	Finishing Feedlot
Penner, Bruce	13618 Nw Meadowlark Rd.	Whitewater	67154	Butler	37.96400	-98.93720	950	Finishing Feedlot
El Jay Cattle Co. Inc.	Route 1 - Box 51	Cedar Point	66843	Chase	38.25480	-98.75420	950	Finishing Feedlot
Crawford, Raymond	Rr 1 - Box 13	Elmdale	66850	Chase	39.74830	-97.22850	950	Finishing Feedlot
Shrauner, Randy	Route 1, Box 56	Protection	67127	Comanche	37.17580	-100.65840	950	Finishing Feedlot
Chase, Kenneth	2946 Eden Rd	Abilene	67410	Dickinson	38.15300	-99.66890	950	Finishing Feedlot
Walker Feedlot, Inc.	612 Lark Road	Hope	67451	Dickinson	37.29240	-98.66440	950	Finishing Feedlot
Morgan Creek Farms LLC	877 Quail Road	Hope	67451	Dickinson	38.61720	-97.14330	950	Finishing Feedlot
Grabbe Farms Feedlot	436 240th Ave	Hays	67601	Ellis	39.41550	-97.19390	950	Finishing Feedlot
S-K Cattle Co	18420 N Big Lowe Rd	Holcomb	67851	Finney	39.50250	-97.56620	950	Finishing Feedlot
Flying O Feeders LLC	6880 County Rd. O	Quinter	67752	Gove	37.43500	-95.82480	950	Finishing Feedlot
Baalman, Murray J.	Route 1 - Box 53	Grinnell	67738	Gove	39.35750	-101.12130	950	Finishing Feedlot
Prather Farms, Inc.	5023 County Road H	Gove	67736-6017	Gove	37.37980	-101.43780	950	Finishing Feedlot
Randles, Todd	3411 East Rd 9	Ulysses	67880	Grant	37.93490	-101.11420	950	Finishing Feedlot
Young, Verdell	Rural Route	Tribune	67879	Greeley	37.81560	-99.07540	950	Finishing Feedlot
Blanchat Cattle Co.	Route 1 - Box 51a	Danville	67036	Harper	37.56910	-100.02300	950	Finishing Feedlot
Klaassen, Vernon	6733 South Emma Creek Rd	Sedgwick	67135	Harvey	39.93660	-99.56180	950	Finishing Feedlot
Dudley And Acre		Ionia	66949	Jewell	38.24020	-98.13220	950	Finishing Feedlot
Crawford Farms Inc	Po Box 314	Lincoln	67455	Lincoln	38.29860	-100.91590	950	Finishing Feedlot
Rocking L Farms	Rr 1 Box 62	Pleasanton	66075	Linn	38.02220	-97.30900	950	Finishing Feedlot
Fuller Farms	1953 Rd M	Emporia	66801	Lyon	39.50250	-97.56620	950	Finishing Feedlot
Delong, David	1285 Road 210	Emporia	66801	Lyon	38.12390	-99.19330	950	Finishing Feedlot
Kroupa Feedlot	2044 260th St	Marion	66861	Marion	39.79240	-100.63780	950	Finishing Feedlot
Thiessen, Marlin	14358 NW River Valley Road	Burns	66840	Marion	39.00940	-100.19560	950	Finishing Feedlot
Berghaus, Dean	Po Box 602	Meade	67864	Meade	38.12390	-97.38220	950	Finishing Feedlot
Medlin Farms	26805 W. 363rd	Osawatomie	66064	Miami	38.26970	-97.25370	950	Finishing Feedlot
Medlin Farms	26805 W. 363rd	Osawatomie	66064	Miami	38.48690	-101.02630	950	Finishing Feedlot
Schmitt, Dale	Route 3 - Box 32	Beloit	67420	Mitchell	38.37100	-98.81800	950	Finishing Feedlot
Gant, Kevin	1747 S 1800 Rd	Wilsey	66873	Morris	37.96400	-97.10780	950	Finishing Feedlot
Harzman, Don	288 Co. 685 Ave	Downs	67437	Osborne	37.54000	-98.74740	950	Finishing Feedlot
Musil, E. Lee	Hc2 - Box 4	Burdett	67523	Pawnee	37.65610	-100.20520	950	Finishing Feedlot
Josefiak, Dale & Richard	Route 1 - Box 40	Rozel	67574	Pawnee	38.18210	-97.82120	950	Finishing Feedlot
Circle 3 Cattle	1293 East Yankee Road	Kirwin	67644	Phillips	38.68960	-99.18610	950	Finishing Feedlot
Schneider, Lloyd	1807 W 1300 Road	Logan	67646	Phillips	38.08030	-98.77250	950	Finishing Feedlot
6-S Cattle Co.	10168 SW 20th Ave.	Pratt	67124	Pratt	37.39500	-101.48080	950	Finishing Feedlot
Fisher, C.K. & A.B.	Rural Route 2	Mcdonald	67745	Rawlins	39.31400	-98.45960	950	Finishing Feedlot
Lazy H Ranch	Box 62	Mcdonald	67745	Rawlins	38.96580	-96.62260	950	Finishing Feedlot
Gehrt, Delmer	Route 3	Manhattan	66502	Riley	39.19450	-96.51010	950	Finishing Feedlot
Moran, Paul	RR 1 Box 12	Alexander	67513	Rush	37.94950	-98.99210	950	Finishing Feedlot
Yeager Feelot	P O Box 472	Scott City	67871	Scott	37.90590	-101.15070	950	Finishing Feedlot
Duff Land & Cattle	1350 East Road 70	Scott City	67871	Scott	39.76290	-99.78640	950	Finishing Feedlot
Doornbos Cattle	Route 7	Scott City	67871	Scott	37.08840	-100.58590	950	Finishing Feedlot
Schmitt, Loren	Po Box 371	Scott City	67871	Scott	38.42890	-98.83640	950	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Vulgamore Land & Cattle - East Yard	8250 S Mesquite Rd	Scott	67871	Scott	37.29240	-101.70970	950	Finishing Feedlot
Dannie Bahm Farms	9991 North Eagle Rd.	Scott City	67871	Scott	37.05920	-100.98470	950	Finishing Feedlot
Vulgamore Land & Cattle - West Yard	Route 2 - Box 184	Scott City	67871	Scott	39.41550	-98.06870	950	Finishing Feedlot
Kirchhoff Cattle	Box 176	Cedar	67628	Smith	38.67510	-96.81210	950	Finishing Feedlot
New Hope Farms, Inc.	Route 2 - Box 151	Kensington	66951	Smith	38.67250	-96.17980	950	Finishing Feedlot
Mueller Cattle	Route 1 - Box 9	Hugoton	67951	Stevens	39.86420	-97.15350	950	Finishing Feedlot
Ken Kammer Farm	1851 Cr-2	Brewster	67732	Thomas	38.16760	-97.82120	950	Finishing Feedlot
Selby Feedlot	3495 County Rd. 66	Brewster	67732	Thomas	39.69030	-97.04100	950	Finishing Feedlot
Double L Farms	Po Box 193	Washington	66968	Washington	39.60330	-97.43470	950	Finishing Feedlot
Pannbacker, B. (Camp Creek Feedlot)	2109 18th Road	Washington	66968	Washington	39.61780	-97.09730	950	Finishing Feedlot
Graff & Sons	Route 1, Box 3	Marienthal	67863	Wichita	39.09660	-100.93610	950	Finishing Feedlot
Schlitz, J.F., Jr.	Rr 1 - P.o. Box 47	Menlo	67746		37.94950	-97.96760	900	Finishing Feedlot
Vanlandingham, Dick	330 E. Copeland	Kingman	67078		38.60270	-101.92810	900	Finishing Feedlot
Ensminger Seed	3521 N. Dakota Road	Moran	66755	Allen	37.67060	-98.14600	900	Finishing Feedlot
Neumann-Wheatley Farms, Inc.	60382 Se 80th Ave.	Isabel	67065-9431	Barber	39.71940	-99.86120	900	Finishing Feedlot
Miller Feeders, Inc.	128 N. 4th	Kiowa	67070	Barber	39.66130	-98.12830	900	Finishing Feedlot
Larson Farms	14790 Fancy Creek Rd.	Randolph	67447	Clay	37.10290	-99.91520	900	Finishing Feedlot
Yost, Clark	Box 267	Wilmore	67155	Comanche	37.71410	-98.67450	900	Finishing Feedlot
Hunt, Don	Route 2	Arkansas City	67005	Cowley	38.15300	-99.08350	900	Finishing Feedlot
Larson Land & Cattle, Inc.	Route 2 - Box 61	Oberlin	67749	Decatur	37.51100	-100.15050	900	Cow-Calf
Cross Brothers, Inc.	Route 1 - Box 52	Lewis	67552	Edwards	37.24870	-100.31400	900	Finishing Feedlot
Taylor, Dale E.	Rural Route	Tribune	67879	Greeley	37.84770	-100.62020	900	Finishing Feedlot
Collinge Cattle Co.	Hc-1 - Box 100	Hamilton	66853	Greenwood	37.62710	-101.97280	900	Finishing Feedlot
Rock Creek Cattle #2	PO Box 128	Hanston	67849	Hodgeman	38.09490	-99.92500	900	Finishing Feedlot
King Farm, Inc.	Route 1 - Box 95	Jetmore	67854	Hodgeman	37.56910	-101.11630	900	Finishing Feedlot
Jennison Ranch	239 North Hickock Road	Healy	67850-5068	Lane	39.87870	-99.87990	900	Finishing Feedlot
Brooks, Brian	234 N Lane Scott Rd	Healy	67850	Lane	38.44340	-97.71380	900	Finishing Feedlot
G-M Cattle	185 N. Hwy. 23	Dighton	67839	Lane	39.29630	-96.28690	900	Finishing Feedlot
DeLong Farms	2485 Burlingame Road	Admire	66830	Lyon	37.48200	-96.74280	900	Finishing Feedlot
Cure, Inc.	R.R.2, Box 50	Burdett	67523	Pawnee	37.30690	-100.71280	900	Finishing Feedlot
Keast Brothers Farms	R.R.3, Box 119	Larned	67550	Pawnee	38.10940	-98.91890	900	Finishing Feedlot
Shrack Cattle Company	100226 Nw 10th Ave./rr1-po Bx 22	Iuka	67066	Pratt	37.42400	-99.96830	900	Finishing Feedlot
Mcreynold's Farms	1757 31st Road	Woodston	67675	Rooks	37.69960	-100.09590	900	Finishing Feedlot
Rolling Hills Ranch	625 North Hedville	Salina	67401	Saline	38.09490	-99.72380	900	Finishing Feedlot
Taylor Ranch	Rt 1 Box 81	Hoxie	67740	Sheridan	38.13850	-100.25430	900	Finishing Feedlot
Eckhardt Farms Partnership	2365 Road 64	Goodland	67735	Sherman	37.71410	-98.69270	900	Finishing Feedlot
Hofer Brothers, Inc.	RR 1 Box 35	Cedar	67628	Smith	37.37980	-100.80340	900	Finishing Feedlot
G & H Inc.	Rr 2 - Box 157	St John	67576	Stafford	37.78660	-100.11410	900	Finishing Feedlot
Rocking Q Farms	3440 Road 66	Brewster	67732	Thomas	38.86420	-98.27030	900	Finishing Feedlot
Mayer, Willard & Gladys	Route 1, Box 109	Alta Vista	66834	Wabaunsee	39.87870	-97.15350	900	Finishing Feedlot
Mayer Ranch	R.r. 1, Box 109	Alta Vista	66834	Wabaunsee	37.64160	-99.02070	900	Finishing Feedlot
Wendland, Merlin	15860 Bodaville Road	Barnes	66933	Washington	37.39500	-101.64480	900	Finishing Feedlot
Stuenkel, Kevin	1941 1st Road	Greenleaf	66943	Washington	38.48690	-101.48640	900	Finishing Feedlot
Steenbock, Marvin L.	284 Indian Rd.	Longford	67458-7571	Clay	39.73270	-95.98650	890	Finishing Feedlot
Wood, Raymond	Route 2	Chapman	67431	Dickinson	39.89320	-97.60340	870	Finishing Feedlot
Neb-Kan Feeders	S of Union & 270th	Clyde	66938	Cloud	38.95130	-96.60410	850	Cow-Calf
Bar S Bar, Inc.	Box 549	Tribune	67879	Greeley	39.86480	-100.22680	850	Finishing Feedlot
Stalker, Inc	Rt 2 Box 30-c	Satanta	67870	Haskell	39.57500	-101.73990	850	Finishing Feedlot
H & H Feeders	Rural Route	Jetmore	67854	Hodgeman	39.77720	-97.77220	850	Finishing Feedlot
Headrick, Rex	Route 2, Box 202	Jewell	66949	Jewell	39.43000	-98.12460	850	Finishing Feedlot
York Brothers	Po Box 218	Healy	67850	Lane	39.76290	-100.08570	850	Finishing Feedlot

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Pember Feedyard	Hc 61, Box 46	Ness City	67560	Ness	39.82080	-99.56180	850	Finishing Feedlot
K & S Cattle, Inc.	11110 S. Haven Rd.	Haven	67543	Reno	39.76290	-100.16060	850	Finishing Feedlot
Pringle Pre-conditioning Feedlot	557 Highway 75	Yates Center	66783	Woodson	39.79170	-97.43470	850	Finishing Feedlot
Tracy Farms	328 S Argonia Rd.	Argonia	67004	Sumner	39.24150	-100.39530	840	Finishing Feedlot
Rogers Hereford Ranch	Rr 1 - Box 26	Long Island	67647	Phillips	39.27050	-98.12460	820	Cow-Calf
Cahoj Farms	Route 1	Stratton	69043		37.81560	-98.98430	800	Finishing Feedlot
Copenhaver & Copenhaver					39.79170	-96.90980	800	Finishing Feedlot
Stigge, Lavern					37.72860	-99.33050	800	Finishing Feedlot
Mosier, Bryan	814 SE 50 Road	Ellinwood	67526	Barton	38.50130	-96.88570	800	Finishing Feedlot
Grimm Farms Inc.	2774 Dewberry Road	Morrill	66515-9409	Brown	39.87740	-95.96770	800	Finishing Feedlot
Mcclure Feedlot	22548 Sw Adams Road	Douglass	67039	Butler	39.12560	-100.52890	800	Finishing Feedlot
Williams, Steve	Route 1	Whitewater	67154	Butler	39.77720	-96.89110	800	Finishing Feedlot
Silver Crest Farms Feedlot	Williard Zweygardt	St. Francis	67756	Cheyenne	39.63250	-98.40170	800	Finishing Feedlot
Hirsch Land & Cattle Co	Rr 1 Box 186	Glasco	67445	Cloud	39.16900	-100.15340	800	Finishing Feedlot
Wood, Harvey	Po Box 302	Solomon	67480	Dickinson	39.00940	-99.69580	800	Finishing Feedlot
Pauly Land & Cattle Company, Inc.	Route 1, Box 59	Denton	66017	Doniphan	39.86420	-97.09730	800	Finishing Feedlot
Nunemaker-Ross, Inc.	1616 N. 1700 Rd.	Lawrence	66044	Douglas	39.40100	-97.19390	800	Cow-Calf
Pete's Feedyard	Box 572	Dodge City	67801	Ford	39.63250	-99.89860	800	Finishing Feedlot
McColm, Robert	Rr	Bucklin	67834	Ford	38.02220	-100.10800	800	Finishing Feedlot
Franklin County Livestock Commission Co	3619 Highway 59	Ottawa	66067	Franklin	39.97880	-96.02400	800	Finishing Feedlot
Sutcliffe, Stewart And Powers	1361 County Rd. 82	Quinter	67752	Gove	37.84770	-98.88230	800	Finishing Feedlot
Mendenhall & Sons	5076 Cty Rd N	Gove	67736	Gove	39.99460	-99.52440	800	Finishing Feedlot
Bleumer Farms, Inc.	14909 6 Road	Ingalls	67853	Gray	38.48690	-101.76250	800	Finishing Feedlot
Voth Farms, Inc.	259 East 130th	Newton	67114	Harvey	37.74310	-99.56740	800	Finishing Feedlot
Wendling Farms	6713 S. Old Settlers Rd.	Halstead	67056	Harvey	39.86420	-99.54310	800	Finishing Feedlot
Cow Camp Ranch	3553 Upland Rd	Lost Springs	66859	Marion	37.99310	-101.05930	800	Finishing Feedlot
Toll Farms	2453 10th Ave.	Lindsborg	67456	McPherson	37.97860	-97.10780	800	Finishing Feedlot
Batman Farms	18080 L Road Box 669	Meade	67864	Meade	39.39810	-96.13800	800	Finishing Feedlot
Griffith & Griffith Farms	Box 87	Clayton	67629	Norton	38.86420	-99.32550	800	Finishing Feedlot
Showalter, CB	8803 East Arlington Rd	Haven	67543	Reno	39.64680	-97.77220	800	Finishing Feedlot
Showalter & Sons	Route 1, Box 9	Alexander	67513	Rush	37.40950	-100.27810	800	Finishing Feedlot
Rocking H Ranch	198 N. 1250 Rd.	Berryton	66409	Shawnee	39.95110	-99.58050	800	Finishing Feedlot
Norden Bros., Inc.	2070 E 1300 Road	Kensington	66951	Smith	37.26320	-98.08430	800	Finishing Feedlot
Nichols Feedyard	Route 1	Gaylord	67638	Smith	38.31310	-96.99610	800	Finishing Feedlot
Ferguson Kerry & Roy	2051 121 Rd	Kensington	66951	Smith	38.31310	-101.06320	800	Finishing Feedlot
Waugh Farm & Ranch	Route 1 - Box 112	Wellington	67152	Sumner	39.79170	-96.92850	800	Finishing Feedlot
Mc Kee, Harold	Box 190	Brewster	67732	Thomas	37.81560	-100.09590	800	Finishing Feedlot
Riedel Feedyard	RR 2 Box 14G	Wakeeney	67672	Trego	39.92090	-96.36130	800	Finishing Feedlot
Stigge, Alan	1455 18th Rd	Washington	66968	Washington	39.99320	-96.00520	800	Finishing Feedlot
Parman, J.D.					38.24020	-100.03480	750	Finishing Feedlot
Beef Productions, Inc.	Route 1 - Box 22	Strong City	66869	Chase	39.28500	-99.93000	750	Finishing Feedlot
Feight, Gene & Son	Route 1	Clyde	66938	Cloud	39.93530	-95.87400	750	Finishing Feedlot
Jacobson Ranch	672 Key Rd	Hope	67451	Dickinson	39.44450	-98.05010	750	Finishing Feedlot
K. Hineman Company	116 S. Longhorn Rd	Dighton	67839	Lane	38.03670	-99.43110	750	Finishing Feedlot
Leffler Farms, Inc.	2431 Road C.	Americus	66835	Lyon	39.15450	-100.20920	750	Finishing Feedlot
Caywood Farm, Inc.	1845 8th Road	Raymond	67573	Rice	38.98040	-100.26970	750	Finishing Feedlot
Schmidt, Geral	506 Ponderosa	Sterling	67579	Rice	38.68700	-96.05070	750	Finishing Feedlot
Cedar Creek Ranch	7715 Hwy 13, Barnes Rd And Casement Rd	Manhattan	66502	Riley	38.13850	-98.88230	750	Finishing Feedlot
E & K Farms	Rr1 Box 62	St John	67576	Stafford	38.29860	-98.04510	750	Finishing Feedlot
Brooks Ranch	Route 2, Box 66	Brewster	67732	Thomas	38.19660	-99.02860	750	Finishing Feedlot
Aue, Dale, Jr.	368 - 315th St	Morrill	66515	Brown	39.15450	-101.60520	700	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Seymour Farms	Hc #1 Box 96	Bird City	67731	Cheyenne	38.57370	-101.21040	700	Finishing Feedlot
Boos, Clarence	Route 1	Denton	66017	Doniphan	38.55920	-100.97110	700	Finishing Feedlot
Dowling, Dean	11515 Valley Road	Dodge City	67801	Ford	38.06100	-95.05170	700	Finishing Feedlot
Millershaski, Daryl	19603 11 Road	Ingalls	67853	Gray	39.79240	-101.83330	700	Finishing Feedlot
Double Arrow Ranch	Rural Route	Jetmore	67854	Hodgeman	38.64610	-98.59720	700	Finishing Feedlot
Aufdemberge Farms	Rr 2 Box 66	Lincoln	67455	Lincoln	39.94980	-95.89280	700	Finishing Feedlot
Hanschu, Rick	133 Quail Road	Ramona	67475	Marion	39.63230	-98.35330	700	Finishing Feedlot
Nikkel, Kermit	Route 1	Canton	67428	McPherson	39.45900	-98.75740	700	Finishing Feedlot
Stubby, Loren L.	1212 8th Avenue	Mcpherson	67460-6049	McPherson	38.73340	-97.32610	700	Finishing Feedlot
Hiebert, Terry	141 East 290th St	Canton	67428	McPherson	39.43000	-98.66430	700	Finishing Feedlot
Pakkebier Farms LLC	HC 63, Box 138	Lenora	67645	Norton	38.09490	-97.29070	700	Finishing Feedlot
Osborne Livestock Comm Inc	P. O. Box 88	Osborne	67473	Osborne	39.92220	-99.59930	700	Finishing Feedlot
Fisher, C.K. & Sons	Hc #2 - Box 100	Mcdonald	67745	Rawlins	39.34300	-101.06540	700	Finishing Feedlot
Showalter, CB	8803 East Arlington Rd	Haven	67543	Reno	39.06570	-96.01080	700	Finishing Feedlot
Valley View Farms	RR	Alexander	67513	Rush	37.13210	-96.70670	700	Finishing Feedlot
W & S Ranch, Inc.	Route 3, Box 1A	Smith Center	66967	Smith	38.03670	-97.05290	700	Finishing Feedlot
Lazy Heart D Ranch	Rr	Brewster	67732	Thomas	39.31400	-101.82850	700	Finishing Feedlot
Flat Land Farms Inc	R.R. 1 Box 75	Leoti	67861	Wichita	39.16900	-99.78110	700	Finishing Feedlot
Langenegger And Son	Box 87	Newton	67114	Harvey	39.11110	-100.65840	690	Finishing Feedlot
Haslouer, Ralph & William	1202 Lark Road	Hope	67451	Dickinson	37.16120	-100.64030	650	Finishing Feedlot
Schweizer Dairy	24216 W. 43rd	Sterling	67579	Rice	39.82070	-98.27830	650	Finishing Feedlot
Sweat Acres, Inc.	Rural Route 1 - Box 23	Cedar	67628	Smith	39.09660	-100.60290	650	Finishing Feedlot
Thomas, Dr. John C.	Box 1049	Meade	67864	Meade	39.84970	-96.94730	640	Finishing Feedlot
Mueller Farms, Inc					38.55680	-94.88830	600	Finishing Feedlot
Gorthy, Paul					38.66060	-101.94650	600	Finishing Feedlot
Triple S Feedlot	Route 1	Moran	66755	Allen	38.15300	-98.90060	600	Finishing Feedlot
Green Acres	210 North 9th	Kiowa	67070	Barber	37.46420	-96.28020	600	Finishing Feedlot
M & O Farms	1780 Horned Owl Rd	Hiawatha	66434	Brown	38.44340	-99.25970	600	Finishing Feedlot
Trentman Feedlot	Box 218	Fairview	66425	Brown	37.21950	-99.49820	600	Finishing Feedlot
Flying N Inc.	1923 - 215th Road	Hiawatha	66434	Brown	38.54230	-94.90670	600	Finishing Feedlot
J.M.R. Cattle Co.	417 SW 120th	Augusta	67010-9802	Butler	37.90590	-96.99800	600	Finishing Feedlot
Snyder Riverview Farm, Inc.	Hc 1 - Box 144	Bird City	67731	Cheyenne	39.99470	-97.15350	600	Finishing Feedlot
Chestnut, Richard	1314 15th Rd.	Clay Center	67432	Clay	39.86300	-96.08020	600	Cow-Calf
Martin, Don	2060 Broughton Road	Clay Center	67432	Clay	39.82070	-96.94730	600	Finishing Feedlot
Martin, Don A.	2060 Broughton Road	Clay Center	67432	Clay	38.09490	-97.14440	600	Finishing Feedlot
Hayden Hereford Farms	418 West 6th Street	Concordia	66901	Cloud	39.73440	-101.29160	600	Finishing Feedlot
W M Martin Farms Inc	P O Box 2	Glasco	67445	Cloud	39.27050	-97.84540	600	Finishing Feedlot
Thiel, Brian	Rr4 Box 190	Winfield	67156	Cowley	39.57430	-97.09730	600	Finishing Feedlot
David, Walter	Route 2, Box 20	Dexter	67038	Cowley	38.24890	-95.52790	600	Finishing Feedlot
Helmkamp & Helmkamp	Rural Route 3	Oberlin	67749	Decatur	38.08030	-97.12610	600	Finishing Feedlot
Temple Farms, Inc.	Rr 1 - Box 24	Norcatur	67653	Decatur	37.35040	-95.75560	600	Finishing Feedlot
Whitehair, William	1112 2200 Ave.	Abilene	67410	Dickinson	37.05500	-94.82230	600	Finishing Feedlot
Romberger, Dean And Son	Route 1	Solomon	67480	Dickinson	39.64700	-98.45790	600	Finishing Feedlot
Gugler & Gugler	2368 2000 Ave	Chapman	67431	Dickinson	39.06570	-96.49240	600	Finishing Feedlot
Haley Feedlot, Kenneth	10662 111 Road	Dodge City	67801	Ford	39.02390	-97.27060	600	Finishing Feedlot
Kinderknecht, Tom	Rr 1 - Box 63	Park	67751	Gove	37.14220	-94.78600	600	Finishing Feedlot
Conover Ranch	Rt. 2, Box 66	Satanta	67870	Haskell	39.79240	-101.38500	600	Finishing Feedlot
Bartcher, Gary	Route 1, Box 131	Esbon	66941	Jewell	38.89320	-100.28820	600	Finishing Feedlot
Molz, Otis	Rt. 1 - Box 495	Deerfield	67838	Kearny	38.41450	-100.91590	600	Finishing Feedlot
Stapleton - Delzer Ranch	Rr 1, Box 178	Mullinville	67109	Kiowa	38.03670	-97.43710	600	Finishing Feedlot
Superior Investment Company Inc	Po Box 833	Parsons	67357	Labette	38.49890	-95.12810	600	Finishing Feedlot
Meyer Land & Cattle Company	Po Box 305	Sylvan Grove	67481	Lincoln	37.06950	-95.00410	600	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Mather Cattle Company	2420 US 83	Oakley	67748	Logan	38.44340	-100.91590	600	Finishing Feedlot
Christiansen Ranch, Gary	566 290th Street	Durham	67438	Marion	37.14220	-94.78600	600	Finishing Feedlot
Christiansen Ranch, Merrill	South Side Of 290th St.	Durham	67438	Marion	37.40570	-94.87750	600	Finishing Feedlot
Carlson, Duane	Rr1 Box 174a	Lincolnville	66858	Marion	39.36900	-96.47290	600	Finishing Feedlot
Bina, Dean A.	Route 3 - Box 149	Marion	66861	Marion	38.36880	-95.05430	600	Finishing Feedlot
Bluestem Farms	843 N. Holly Road	Peabody	66866	Marion	38.25480	-96.81510	600	Finishing Feedlot
Nelson Farms Of Windom	156 Dakota Road	Windom	67491	McPherson	39.79170	-97.07850	600	Finishing Feedlot
Thiessen, Doug	Rr 2, Po Box 114	Beloit	67420	Mitchell	38.80610	-98.15920	600	Finishing Feedlot
Brazle, Frank (Home)	Route 3 - Box 84a	Chanute	66720	Neosho	38.48690	-100.67670	600	Finishing Feedlot
Mishler, John	RR 1 Box 181	Ransom	67572	Ness	37.12760	-94.84050	600	Finishing Feedlot
Spring Creek Ranch	RR 1, Box 166	Almena	67622	Norton	37.17580	-101.22030	600	Finishing Feedlot
Krouse Cattle Company	Route 1	Onaga	66521	Pottawatomie	38.10940	-97.07120	600	Finishing Feedlot
Knight, Donald	Rural Route 1	Lyons	67554	Rice	39.08210	-98.17770	600	Finishing Feedlot
Scott, Gregory	Box 21	Paradise	67658	Russell	38.33980	-96.51200	600	Finishing Feedlot
See Cattle Co	6611 East Road 210	Scott City	67871	Scott	38.02220	-97.08950	600	Finishing Feedlot
Haffner Feedlot	P.O. Box 295	Hoxie	67740	Sheridan	37.27780	-97.86680	600	Finishing Feedlot
Maxwell Brothers Livestock	Route 2, Box 54	Smith Center	66967	Smith	38.32540	-95.27570	600	Cow-Calf
R1 Ranch	Route 1 - B0x 29	St John	67576	Stafford	37.19040	-97.10550	600	Finishing Feedlot
Smith, Charles And Son	Rr 1, Box 88	Macksville	67557	Stafford	39.35750	-98.73880	600	Finishing Feedlot
Shore, Gail M.	267 E 50th St South	Wellington	67152	Sumner	39.66150	-99.07530	600	Finishing Feedlot
Tole, David P.	1028 County Road S	Levant	67743	Thomas	38.79150	-100.23260	600	Finishing Feedlot
Mckee, Jon	Route 2 - Box 190	Brewster	67732	Thomas	38.14770	-94.61220	600	Finishing Feedlot
Mueller Farms, Inc.	413 N Denver Avenue	Hanover	66945	Washington	38.44340	-96.66480	600	Finishing Feedlot
Keil, W. Benson (lot #1)	Rr 2 - Box 119	Concordia	66901	Cloud	39.35750	-101.43770	575	Finishing Feedlot
Snavely, Larry	588 K 106	Minneapolis	67467	Ottawa	38.70440	-97.10390	560	Finishing Feedlot
Cottonwood Lane Farm	1821 5th St.	Clay Center	67432	Clay	38.74800	-99.34400	550	Finishing Feedlot
Monnich Farms	2776 L Ave.	Herington	67449	Dickinson	38.19660	-99.54090	550	Finishing Feedlot
Zerr, Clem	Rr 1 - Box 82	Grinnell	67738	Gove	38.47240	-99.49890	550	Finishing Feedlot
Deines Brothers	Route 1 - Box 92	Ramona	67475	Marion	37.61260	-101.29860	550	Finishing Feedlot
Five Star Farm, Inc.	Hc 02 - Box 52	Burdett	67523	Pawnee	37.74310	-100.93410	550	Cow-Calf
Wolf Brothers, Inc.	2203 Co. Rd. 80	Quinter	67752	Gove	37.13210	-98.61000	540	Finishing Feedlot
Rundus, Wesley					38.58820	-96.64640	500	Finishing Feedlot
Overmiller, Gerald					38.44340	-96.97770	500	Finishing Feedlot
Nichols, Darren	2235 Limestone Rd	Wells	67488		39.89320	-99.05660	500	Finishing Feedlot
Wellman Ranch					38.50130	-98.11870	500	Finishing Feedlot
Puriton, Leonard					38.31090	-95.42330	500	Finishing Feedlot
Corpstein Brothers					37.93090	-96.18710	500	Finishing Feedlot
Powell Ranch	9555 N. Dewey Rd.	Kalvesta	67856		37.93090	-95.21660	500	Finishing Feedlot
Hahn's Inc. - Parr Facility					37.55460	-98.58340	500	Finishing Feedlot
Sterling, Robert	P.o. Box 6	Hardtner	67057	Barber	38.02220	-99.74210	500	Finishing Feedlot
Schlessiger, Jack F.	RR 1 - Box 111	Claflin	67525	Barton	37.84770	-98.79080	500	Finishing Feedlot
Shriver Ranch	9300 S.e. Gray Rd.	Leon	67074	Butler	39.96430	-96.02400	500	Finishing Feedlot
Fuller , Ray	4219 Se 20th	El Dorado	67042	Butler	37.36520	-99.15380	500	Finishing Feedlot
Cedar Ridge Feedlot	9443 Sw 80th St.	Augusta	67010	Butler	39.32850	-97.11950	500	Finishing Feedlot
Keller, Albert Farms	Rt 1 Box 476	St Francis	67756	Cheyenne	38.45560	-96.14290	500	Finishing Feedlot
Douthit Farms, Inc.	Rr 3 Box 160	St Francis	67756	Cheyenne	38.92020	-96.45540	500	Finishing Feedlot
River Valley Ranch	Hc 1 - Box 11	St Francis	67756	Cheyenne	38.47000	-96.10600	500	Finishing Feedlot
Martin, Don A.	2060 Broughton Ranch	Clay Center	67432	Clay	38.79150	-100.43630	500	Finishing Feedlot
Martin, Timothy	836 14th Road	Clay Center	67432	Clay	38.71890	-97.04840	500	Finishing Feedlot
Mastin, John (Lisa Strauss Trust)	1694 154th Road	Concordia	66901	Cloud	39.37200	-101.43770	500	Finishing Feedlot
Birdzell, Lloyd	Rr 3 - Box 114	Winfield	67156	Cowley	39.28500	-100.67450	500	Finishing Feedlot
Thiel, Daryl & Marcia	Rt 4 Box 192a	Winfield	67156	Cowley	38.93480	-96.45540	500	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Simon Brothers	189 N. 70th	Girard	66743	Crawford	38.53030	-98.41310	500	Finishing Feedlot
Sandou, Marcellus	Rural Route 3	Hope	67451	Dickinson	38.67510	-101.00790	500	Finishing Feedlot
North Farms	649 140th Avenue	Hays	67601	Ellis	38.37100	-100.97110	500	Finishing Feedlot
Mense, Rodney	Rr1, Box 58	Grinnell	67738	Gove	39.80620	-97.07850	500	Finishing Feedlot
Tuttle Farms	2133 County Road 80	Quinter	67752	Gove	38.13850	-98.27860	500	Finishing Feedlot
Roemer & Son Farms, Inc.	3833 County Road S	Grainfield	67737	Gove	39.74720	-96.04270	500	Finishing Feedlot
Goddard Feedlot	2869 A 170th Ave.	Penokee	67659	Graham	39.48800	-96.91470	500	Finishing Feedlot
Triad Of The Southwest, Inc.	17903 17 Road	Cimarron	67835	Gray	39.79180	-99.07530	500	Finishing Feedlot
Miller, Dan Farm	P O Box 668	Cimarron	67835	Gray	39.32850	-99.03660	500	Finishing Feedlot
Claassen, R. Dwight	3003 E. 1st	Newton	67114	Harvey	37.16240	-95.64690	500	Finishing Feedlot
Ewy, Earl	Rr 1 - Box 52	Halstead	67056	Harvey	39.34300	-100.30230	500	Finishing Feedlot
Hubin Feedlot	Box 189	Jetmore	67854	Hodgeman	37.26360	-95.88250	500	Finishing Feedlot
Flavin, Maurice and/or Kriley, Gary	Rt. 1 Box 5	Esbon	66941	Jewell	38.53030	-100.47430	500	Finishing Feedlot
Mckinzie, Leonard B.	5018 W. 96th Terr.	Overland Park	66207	Johnson	39.64580	-95.79900	500	Finishing Feedlot
Wehrman And Heller	Box 60, Rural Route 1	Sylvan Grove	67481	Lincoln	37.94950	-99.17500	500	Finishing Feedlot
Meyer Land & Cattle (MLC II)	Po Box 149 - 108 S. Main	Sylvan Grove	67481	Lincoln	38.00760	-97.05290	500	Finishing Feedlot
Fowler, Harry	1546 Road P	Emporia	66801	Lyon	37.96400	-97.45540	500	Cow-Calf
Funk, Kenneth	Route 2 - Box 232	Hillsboro	67063	Marion	38.97840	-94.99210	500	Finishing Feedlot
Peters, James	Box 60	Lehigh	67073	Marion	38.95130	-96.62260	500	Finishing Feedlot
Hajek, Martin & John	Rr 1 - Box 56	Tampa	67483	Marion	37.13210	-97.05110	500	Finishing Feedlot
Klingenberg, Vernon	Rt 1 Box 41a	Peabody	66866	Marion	39.31400	-101.60520	500	Finishing Feedlot
Preheim, James	310 Sycamore	Peabody	66866	Marion	39.06750	-100.26970	500	Finishing Feedlot
Doyle Creek Farms (Busenitz, Clarence)	542 Mustang	Peabody	66866	Marion	38.96580	-97.04840	500	Finishing Feedlot
3-H Farms	892 6th Road	Herkimer	66508	Marshall	37.35040	-95.77370	500	Finishing Feedlot
Busenitz, Tim	23715 N.w. 108th St.	Inman	67546	McPherson	39.41550	-97.15670	500	Finishing Feedlot
Home Place	Rt 2 Box 1	Canton	67428	McPherson	38.82060	-97.75190	500	Finishing Feedlot
Woodruff Farms	235 South First	Minneapolis	67460	McPherson	38.18210	-99.61410	500	Finishing Feedlot
Duerksen Place	1636 N. Main	Mcpherson	67460	McPherson	37.78660	-98.72910	500	Finishing Feedlot
Schmitt, Eugene H.	Po Box 5	Tipton	67485	Mitchell	37.42400	-101.69950	500	Finishing Feedlot
Flyin A Partnership	Hcr 63 - Box 123	Densmore	67645	Norton	37.61260	-98.82030	500	Finishing Feedlot
Thompson, David	18363 S. Urish Rd	Burlingame	66413	Osage	38.44340	-101.17360	500	Finishing Feedlot
Meyer Brothers	4819 W 201st St.	Osage City	66523	Osage	39.79170	-96.74110	500	Finishing Feedlot
Carswell, Darwin	2386 West 60th Drive	Alton	67623	Osborne	39.50250	-98.29210	500	Cow-Calf
Wagner, Eugene	Route 2	Downs	67437	Osborne	38.60270	-100.54790	500	Finishing Feedlot
Spring Valley Farms	878 E. Santa Fe Rd.	Agra	67621	Phillips	38.37100	-100.93430	500	Finishing Feedlot
Mc Kee, Jimmy	Route 2, Box 25	Mcdonald	67745	Rawlins	38.45790	-101.65200	500	Finishing Feedlot
Magnuson, Claire	Route 1, Box 65	Partridge	67566	Reno	38.60270	-97.60340	500	Finishing Feedlot
Farney, Jack (JK Farney Farms)	23816 W. 56th	Sterling	67579	Rice	39.27050	-97.00780	500	Finishing Feedlot
Mcatee, Harvey	Rural Route 1, Box 236	Bushton	67427	Rice	39.56050	-96.91470	500	Finishing Feedlot
Grecian, Kendal L.	1133 A 350th Ave.	Palco	67657	Rooks	38.60270	-100.67670	500	Finishing Feedlot
Oborny, Tim	Rr 1 - Box 70	Bison	67520	Rush	37.93490	-97.10780	500	Finishing Feedlot
Bar S Ranch, Inc.	Rural Route 1	Paradise	67658	Russell	37.42400	-98.14600	500	Finishing Feedlot
Aylward, Edward	3300 N Holmes Rd	Salina	67401	Saline	39.67600	-98.94440	500	Finishing Feedlot
Schamberger, Clarence	Route 2 - Box 56	Hoxie	67740	Sheridan	39.15450	-97.21250	500	Finishing Feedlot
Wilson And Son Feedlot	Rural Route 3, Box 66	Goodland	67735	Sherman	38.19660	-99.21160	500	Finishing Feedlot
McKenzie, Kelly	Route 3, Box 2	Smith Center	66967	Smith	37.03010	-98.51940	500	Finishing Feedlot
Bloomfield, Steven	2875 Frontier	Clifton	66937	Washington	39.44450	-100.73040	500	Finishing Feedlot
Wiles, Robert E.	Route 1, Box 97	Marienthal	67863	Wichita	38.03670	-96.99800	500	Finishing Feedlot
Jost, Clinton	2646 AA Ave	Burdick	66838	Morris	39.71990	-100.18950	480	Finishing Feedlot
Henningson, Robbie	RR 1, Box 126	Norcatur	67653	Decatur	39.38650	-99.70670	475	Cow-Calf
Benoit Feeders	Hc#1 - Box 3	Damar	67632	Rooks	38.48690	-97.03290	475	Cow-Calf
Bornholdt Farms	272 Cimarron	Inman	67546	McPherson	39.18350	-100.24640	460	Cow-Calf

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Garten, Clarence	2305 Fair Road	Abilene	67410	Dickinson	38.25480	-97.34560	450	Finishing Feedlot
Bemis, Taylor G.	861 W. Hwy. 40	Hays	67601	Ellis	38.53030	-97.75060	450	Finishing Feedlot
Neal Farms	172 Ellis Terr	Williamsburg	66095	Franklin	39.79170	-96.90980	450	Finishing Feedlot
Rock Creek Cattle Co	1955 US Hwy 24	Penokee	67659	Graham	39.05300	-100.26970	450	Cow-Calf
Woody Brook Farm	1135 N Alamo Rd	Newton	67114	Harvey	38.26970	-101.10000	450	Cow-Calf
Griffith Cattle Farm	8227 North Rock Road	Walton	67151	Harvey	39.84970	-99.05660	450	Finishing Feedlot
Carlson, Ronnie	R1 Box 168	Lincolnville	66858	Marion	38.47240	-99.51730	450	Finishing Feedlot
Train, Paul And Emory	Rural Route 2	Lindsborg	67456	McPherson	38.89320	-100.43630	450	Finishing Feedlot
Kelley, Quentin	Rural Route 3	Beloit	67420	Mitchell	38.58820	-96.99610	450	Finishing Feedlot
Pearson, Fred	8530 West 245th Street	Osage City	66523-8490	Osage	39.83520	-97.11600	450	Finishing Feedlot
Irvin, John H.	Rr 1 - Box 9	Mccracken	67556	Rush	39.86300	-95.70530	450	Finishing Feedlot
Swanson, Romaine	4349 S. Kipp Rd.	Gypsum	67448	Saline	39.14000	-97.21250	450	Finishing Feedlot
Bienhoff, Curtis	Rr 1 - Box 40	Kensington	66951	Smith	39.69040	-98.85080	450	Cow-Calf
James L. Fox Farms	Rr 1, Box 108	St John	67576	Stafford	39.21250	-97.90120	450	Finishing Feedlot
Miller, Wayne C.	788 Castle Rock Rd	Quinter	67752	Gove	39.58880	-97.26600	449	Cow-Calf
Wolf Dairy LLC	7820 Co. Rd. Y	Quinter	67752	Gove	39.48800	-99.70670	440	Cow-Calf
Henke, Randy	1572 Co 388 Dr	Osborne	67473	Osborne	39.19800	-100.61870	440	Cow-Calf
Koehler, Edward					38.26970	-98.35790	400	Finishing Feedlot
Roe, Lauren	Route 1	Superior	68978		38.19660	-98.16880	400	Finishing Feedlot
Arnoldy Bros.					38.21120	-99.59580	400	Finishing Feedlot
Campbell, Clifford					37.59810	-99.93190	400	Finishing Feedlot
Roberts, Marvin	Box 116	Shields	67874		37.13210	-100.54960	400	Finishing Feedlot
Kickapoo Tribes	Route 1	Horton	66439	Brown	39.32850	-101.41910	400	Finishing Feedlot
Blackston, B.	5761 SW 120th	Augusta	67010	Butler	38.55920	-101.48640	400	Finishing Feedlot
Entz, Wayne	Rr 1 Box 193a	Whitewater	67154	Butler	38.61720	-97.05130	400	Finishing Feedlot
Stevens & Graves Farm	Rr 1 Box 468	St Francis	67756	Cheyenne	37.94950	-98.86400	400	Finishing Feedlot
Thomas, Larry W.	2672 Osage Road	Clay Center	67432	Clay	39.23820	-96.56600	400	Finishing Feedlot
Hammond, Dusty	999 2nd Road	Longford	67458	Clay	39.93530	-95.81780	400	Finishing Feedlot
Bauer Farms, Inc.	1072 23rd Rd.	Morganville	67468	Clay	38.35660	-97.76900	400	Finishing Feedlot
Combes, David L	2678 W 333rd St	Lebo	66856	Coffey	39.76290	-98.73850	400	Finishing Feedlot
Schwab, Bill	Rr 1 - Box 31	Norcatur	67653	Decatur	39.67600	-99.73020	400	Finishing Feedlot
Lohoefner, Jerry	Rural Route 1	Oberlin	67749	Decatur	38.48690	-97.36420	400	Finishing Feedlot
Aylward, Robert	Rural Route 2	Solomon	67480	Dickinson	38.02220	-99.88850	400	Finishing Feedlot
Morgan, Lorna Morgan Trust, Jeff Morgan	877 Quail Road	Hope	67451	Dickinson	39.20910	-96.19380	400	Finishing Feedlot
Faulds, James	Route 1	Dodge City	67801	Ford	39.74720	-95.25550	400	Finishing Feedlot
Judd Ranch, Inc.	423 Highway K68	Pomona	66076	Franklin	37.05920	-97.17800	400	Finishing Feedlot
Bitterlin, Harlan	816 Walker Road	Milford	66514-9199	Geary	39.96430	-95.74280	400	Finishing Feedlot
Quinter Livestock Inc.	5821 County Rd CC	Park	67751	Gove	39.18350	-100.35810	400	Finishing Feedlot
Ochs, Randal	Rr 1 - Box 32	Park	67751	Gove	39.80620	-97.07850	400	Finishing Feedlot
Heier, David	Route 1, Box 151	Quinter	67752	Gove	39.16900	-97.26840	400	Finishing Feedlot
Holaday Feedlot	Box 74	Grinnell	67738	Gove	37.13210	-100.54960	400	Finishing Feedlot
Zerr Farms	Route 1 - Box 21	Park	67751	Gove	38.77700	-97.12250	400	Finishing Feedlot
Kuttler, JV & Sons	Box 40	Tribune	67879	Greeley	38.09490	-97.56510	400	Finishing Feedlot
Lauterbach, Dean M.	R 1 Box 27	Attica	67009	Harper	38.47240	-99.55410	400	Finishing Feedlot
Unrau Farms	Route 2 - Box 169	Newton	67114	Harvey	39.84850	-95.66780	400	Finishing Feedlot
Brubacher, E.J., Jr.	Route 1	Walton	67151	Harvey	39.60330	-97.13480	400	Finishing Feedlot
Cossman, Doug	Route 2 - Box 52	Jetmore	67854	Hodgeman	39.76340	-101.38500	400	Cow-Calf
Hahn's Inc. East Lot	Rt. 1 Box 34a	Hanston	67849	Hodgeman	39.63230	-97.49100	400	Finishing Feedlot
Greene Farms, Inc.	PO Box 24	Jewell	66949	Jewell	39.50250	-96.93330	400	Finishing Feedlot
Heath Farms, Inc.	Po Box 974	Dighton	67839	Lane	39.08030	-95.01060	400	Finishing Feedlot
C.J. Beef & Grain, Inc.	Hc 2 Box 110	Dighton	67839	Lane	39.90640	-95.72410	400	Finishing Feedlot
Good, Harold	2066 North 270th Road	Barnard	67418	Lincoln	39.82130	-100.35760	400	Cow-Calf

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Gier, Leonette	Rt 1 Box 254	Sylvan Grove	67481	Lincoln	39.70490	-99.05660	400	Finishing Feedlot
Schertz, Larry F.	Hc1 - Box 53	Monument	67747	Logan	39.38650	-101.36320	400	Cow-Calf
Bernhardt, Jim	2629 Nighthawk Road	Marion	66861	Marion	39.99320	-95.93020	400	Finishing Feedlot
Busenitz, Jeff	1331 E. 60th St	Peabody	66866	Marion	39.61690	-95.94900	400	Finishing Feedlot
Wildcat Cattle Co.- Main	557 190th	Hillsboro	67063	Marion	39.34300	-97.13810	400	Finishing Feedlot
Riddell Feed Lot	Rr 2 - Box 182	Mcpherson	67460	McPherson	39.44450	-98.70160	400	Finishing Feedlot
Flying N Farms	35910 W 263rd St.	Paola	66071	Miami	37.93490	-96.72360	400	Finishing Feedlot
File, Gordon	Rr 2 - Box 116	Beloit	67420	Mitchell	38.03670	-97.10780	400	Finishing Feedlot
Edelman, Phillip And Lyle	Route 3	Sabetha	66534	Nemaha	37.97860	-97.94930	400	Finishing Feedlot
Edelman, Morris	Route 1	Bern	66408	Nemaha	38.96580	-98.10360	400	Finishing Feedlot
Brazle, Frank K. (Hasty)	Route 3 - Box 84a	Chanute	66720	Neosho	38.77700	-97.15950	400	Finishing Feedlot
Cady, Inc.	Box 346	Osborne	67473	Osborne	37.81560	-100.71540	400	Finishing Feedlot
Zuker, Kelley S.	1162 Nugget Road	Minneapolis	67467	Ottawa	39.93530	-95.83650	400	Finishing Feedlot
Hurtig Farm (Virginia)	1268 Cloud Road	Delphos	67436	Ottawa	39.64700	-99.03790	400	Finishing Feedlot
W-W Cattle	5877 N.e. 140 Ave.	Pretty Prairie	67570	Reno	39.31400	-99.57640	400	Finishing Feedlot
Tammen, Jeanette	Rr#2, Box 8297	Timken	67575	Rush	39.73270	-96.11770	400	Finishing Feedlot
Ed Junior Farm, Inc.	Rr 1, Box 70	Bison	67520	Rush	37.30690	-100.22330	400	Finishing Feedlot
Boese, Ray A.	13414 W 23 N	Wichita	67223	Sedgwick	39.05300	-100.17710	400	Finishing Feedlot
Linnebur Farms	14715 W. 61st North	Colwich	67030	Sedgwick	39.86480	-100.26420	400	Finishing Feedlot
Robben, Robert	4402 S. 151st West	Wichita	67227	Sedgwick	39.87740	-96.04270	400	Finishing Feedlot
Shaw Brothers Cattle Lot	Rr	Selden	67757	Sheridan	37.13210	-100.54960	400	Finishing Feedlot
Blue View Farms	RR 1 Box 109	Kanorado	67741	Sherman	39.15450	-98.01290	400	Finishing Feedlot
Devlin, Douglas	Rr 2 - Box 147	Lebanon	66952	Smith	38.34210	-97.36420	400	Finishing Feedlot
Zable, Loren	Route 1 - Box 535	Gaylord	67638	Smith	37.17690	-95.88250	400	Finishing Feedlot
Double T T Feeders	519 S Argonia Rd.	Argonia	67004	Sumner	38.68960	-97.14330	400	Finishing Feedlot
Broken Ladder Cattle Co. Inc.	Hc1 - Box 455	Sharon Springs	67758	Wallace	39.02390	-100.25120	400	Cow-Calf
Cline Farm & Cattle	455 Road 9	Weskan	67762	Wallace	38.28420	-97.87940	400	Finishing Feedlot
Arnold Baker Farm	2593 Rifle Rd.	Wells	67488		37.94530	-95.38140	399	Finishing Feedlot
Arnold Baker Farm	2593 Rifle Rd.	Wells	67488		39.96560	-99.52440	399	Finishing Feedlot
Mills Dairy Cattle	15777 W 199th St	Olathe	66062	Johnson	39.92090	-96.15520	375	Cow-Calf
Wilgers, Calvin	Rural Route 1	Washington	66968	Washington	39.81950	-96.00520	375	Finishing Feedlot
Lindeman, Oliver	Rural Route	Menlo	67746		38.61720	-99.88540	350	Finishing Feedlot
Klaassen, K. John	9108 Se 36th	Whitewater	67154	Butler	39.29630	-96.39850	350	Finishing Feedlot
Miller, Bruce	Rr - Box 31	Zenda	67154	Butler	38.54480	-97.75060	350	Finishing Feedlot
Adams, Douglas A.	958 Osage Rd	Clay Center	67432	Clay	39.89320	-96.89110	350	Finishing Feedlot
Longa Saya Farm	2940 T Avenue	Herington	67449	Dickinson	38.44110	-95.20190	350	Finishing Feedlot
Reiff Farms	944 Hwy 15	Hope	67451	Dickinson	39.77610	-95.61160	350	Finishing Feedlot
Anthony Livestock	624 S. Jennings	Anthony	67003	Harper	39.93730	-100.65650	350	Finishing Feedlot
Harper, Joe	8426 S. Ridge Rd.	Sedgwick	67135	Harvey	37.92040	-97.07120	350	Finishing Feedlot
Mason, Richard & Barbara	1810 North Main	Kingman	67068	Kingman	39.09660	-100.36220	350	Finishing Feedlot
Gier, Robert A	Rt 1 Box 250a	Sylvan Grove	67481	Lincoln	39.31400	-97.00780	350	Finishing Feedlot
J.D.Miller and Sons	1066 Road 130	Emporia	66801	Lyon	39.32850	-97.90120	350	Cow-Calf
Leonard Bina	Box 31	Lincolnville	66858	Marion	39.11110	-98.91820	350	Finishing Feedlot
Foote Cattle Co.	14100 W. 223rd St	Bucyrus	66013	Miami	37.94530	-96.51680	350	Cow-Calf
Peterson, Dan R.	Rr 2 - Box 34	Burdick	66838	Morris	39.60330	-97.62220	350	Finishing Feedlot
Krehbiel Farms	23306 S. K-17 Hwy.	Pretty Prairie	67520	Rush	38.45790	-96.99610	350	Finishing Feedlot
Atwood Farms	11625 Sw 89th St.	Auburn	66402	Shawnee	39.38650	-101.21430	350	Finishing Feedlot
Shaw, Gerald Rex	Rr	Selden	67757	Sheridan	39.00940	-98.45540	350	Finishing Feedlot
Brown, Harold And Greg	RR1	Leoti	67861	Wichita	38.90770	-97.17800	350	Finishing Feedlot
Grimm Farms	2774 Dewberry Road	Morrill	66515-9409	Brown	37.92040	-98.75420	340	Finishing Feedlot
Atwell, Leroy	Rural Route 3	Norton	67654	Norton	37.14670	-96.74290	330	Finishing Feedlot
Pearson Cattle Co.	8530 W. 245th St.	Osage City	66523	Osage	37.36010	-95.25850	330	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Miller Feedlot Inc.	19280 River Bend Rd	Wamego	66547	Pottawatomie	39.77790	-101.64650	330	Cow-Calf
Bloom, Lewis C	1901 Frontier Rd	Clay Center	67432	Clay	37.03010	-98.48310	325	Finishing Feedlot
L&M Jahnke & Sons Partnership	11855 Sherman Rd	Leonardville	66449-9660	Riley	39.89380	-100.20810	320	Finishing Feedlot
Conard, Terry	RR 2, Box 8270	Timken	67575	Rush	39.66150	-98.94440	310	Cow-Calf
Headrick, Steven	Po Box 66	Superior	68978		39.32850	-97.06360	300	Finishing Feedlot
Lemon, Ronald E.	Route 1 - Box 58c	Studley	67759		39.84850	-95.72410	300	Finishing Feedlot
Barten Farms	753 900 Ave	Carlton	67429		37.92040	-98.13220	300	Finishing Feedlot
Tillberg, Eldon	4533 W Mcreynolds Rd	Smolan	67479		38.08030	-99.90680	300	Finishing Feedlot
National Bank Of America					39.21250	-97.32420	300	Finishing Feedlot
Sothers E. M. & Sons					39.14000	-97.51030	300	Finishing Feedlot
Robinson, Ray					39.87870	-96.70360	300	Finishing Feedlot
Schrock, William	604 Drum	Kiowa	67070	Barber	37.13210	-97.01480	300	Finishing Feedlot
Romine, James	Route 1 - Box 108	Great Bend	67530	Barton	39.82070	-96.68480	300	Finishing Feedlot
Randall, Melvin	Route 1	Pawnee Rock	67567	Barton	37.68350	-96.57170	300	Finishing Feedlot
Fort Scott Livestock Market	Po Box 270	Fort Scott	66701	Bourbon	39.73390	-99.16890	300	Finishing Feedlot
Knudson Farms, Inc.	Rr 5 - Box 83	Hiawatha	66434	Brown	38.87870	-96.97440	300	Finishing Feedlot
Blackston, Guy L.	5668 Sw 120th	Augusta	67010	Butler	39.33990	-96.30550	300	Finishing Feedlot
Mills Ranch, Inc.	Rr 3 - Box 167	St Francis	67756	Cheyenne	37.66890	-95.36930	300	Finishing Feedlot
Feikert, Bruce	Hc1 Box 51	St Francis	67756	Cheyenne	37.69960	-97.78150	300	Finishing Feedlot
Leach, Gary & Merilie	Hc1 Box 28	Bird City	67731	Cheyenne	37.55460	-98.05490	300	Finishing Feedlot
Matson, Douglas	679 6th Road	Longford	67458	Clay	39.74720	-95.48040	300	Finishing Feedlot
Hammond, Dusty	999 2nd Road	Longford	67458	Clay	39.67480	-95.96770	300	Finishing Feedlot
Martin, Don A.	2060 Broughton Road	Clay Center	67432	Clay	39.19800	-100.61870	300	Finishing Feedlot
Carpenter, Kim	1091 16th Rd	Clay Center	67432	Clay	38.54480	-97.08810	300	Finishing Feedlot
Fredrickson, George	Route 3	Concordia	66901	Cloud	37.81560	-100.00470	300	Finishing Feedlot
Blankenship, Pamela Trust	Rt 3, Box 79	Udall	67146	Cowley	39.41550	-98.77600	300	Finishing Feedlot
Drake, Don	Rr 1 - Box 155	Winfield	67156	Cowley	39.57430	-97.07850	300	Finishing Feedlot
Bruce, Herbert	Route 2	Arkansas City	67005	Cowley	39.31400	-97.23110	300	Finishing Feedlot
Moore, Harvey	Po Box 292	Burden	67019	Cowley	37.50810	-95.00500	300	Finishing Feedlot
South Creek Farms	720 West Hall	Oberlin	67749	Decatur	37.20490	-97.44990	300	Finishing Feedlot
May Family Farms	Route 2 - Box 109	Oberlin	67749	Decatur	39.02390	-97.34460	300	Finishing Feedlot
Wurm, Arlo	Route 2	Oberlin	67749	Decatur	38.13330	-95.98570	300	Finishing Feedlot
Brenneman, Greg	Rural Route 2	Solomon	67480	Dickinson	38.68960	-99.40690	300	Finishing Feedlot
Zumbrunn, Dennis R.	3052 Quail Road	Chapman	67431	Dickinson	38.41220	-96.06910	300	Finishing Feedlot
Brockmeier, Eldred	1974 800 Ave.	Hope	67451	Dickinson	39.63140	-95.91150	300	Finishing Feedlot
Lorson, William	945 Highway 4	Hope	67451	Dickinson	37.01140	-94.80420	300	Finishing Feedlot
Ferguson Farms	1448 3450 Ave	Abilene	67410	Dickinson	39.90770	-97.58470	300	Finishing Feedlot
Noel, Gregg	3029 Gulf Road	Abilene	67410	Dickinson	39.90770	-98.66370	300	Finishing Feedlot
Morgan, Jeff	877 Quail Rd	Hope	67451	Dickinson	38.45790	-97.12490	300	Finishing Feedlot
Bottiger, Kenneth	Route 1	Denton	66017	Doniphan	39.19800	-97.78950	300	Finishing Feedlot
Sylvester Ranch, Inc.	1906 Kingman Rd.	Ottawa	66067	Franklin	37.05500	-94.85870	300	Finishing Feedlot
Hermreck, Virgil	995 Delaware Terrace	Williamsburg	66095	Franklin	37.25840	-94.71330	300	Finishing Feedlot
Lyons Creek Ent. Inc	1820 Wolf Road	Junction City	66441	Geary	39.85030	-101.75860	300	Finishing Feedlot
Jamison Herefords	Route 1	Quinter	67752	Gove	38.13330	-96.55340	300	Finishing Feedlot
Graham, Roland	Rural Route	Quinter	67752	Gove	37.90590	-100.03480	300	Finishing Feedlot
Entz, Arlen	17930 NW Meadowlark Rd.	Newton	67114	Harvey	39.57350	-96.34260	300	Cow-Calf
Hiebert Family Farms	271 30th Ave	Newton	67114	Harvey	39.39810	-96.15660	300	Finishing Feedlot
The Bacon Place	9719 E Strond Rd	Burrton	67020	Harvey	38.65800	-95.33110	300	Finishing Feedlot
Davis, Victor R.	P.O.Box 950	Sublette	67877	Haskell	38.12390	-98.27860	300	Finishing Feedlot
Doyle, Joe & Dan	19320 240 Rd	Holton	66436	Jackson	39.43000	-97.28700	300	Finishing Feedlot
Mocking Bird Hill Farm, c/o Frank Mackey	20050 - S. Hedgelane Rd	Spring Hill	66083	Johnson	39.97880	-96.06140	300	Cow-Calf
Moore, Richard	17965 Rosewood	Stilwell	66085	Johnson	37.22930	-94.78600	300	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Eckhart, John	Rr 1 - Box 5b	Lincoln	67455	Lincoln	39.90770	-96.87230	300	Finishing Feedlot
Morrical Dairy	Route 2 - Box 11	Beverly	67423	Lincoln	39.57430	-97.56590	300	Finishing Feedlot
Morrical Brothers	Rr 1 - Box 54	Beverly	67423	Lincoln	38.77700	-99.52920	300	Finishing Feedlot
Huelsman, Bernard	Rural Route 1, Box 97	Oakley	67748	Logan	38.05120	-96.96140	300	Finishing Feedlot
Huelsman, Edwin	Rural Route 1	Oakley	67748	Logan	37.35040	-95.88250	300	Finishing Feedlot
Shields, Kenneth	2828 300 St	Lincolnville	66858	Marion	37.14220	-94.71330	300	Finishing Feedlot
Christiansen, Gordon	Rr 2 Box 4	Durham	67438	Marion	37.08400	-94.82230	300	Finishing Feedlot
Bina, Laverne E.	1914 230th Rd	Marion	66861	Marion	37.04050	-94.85870	300	Finishing Feedlot
Miesse, Scott	Rt 3 Box 111	Marion	66861	Marion	37.12760	-95.02230	300	Finishing Feedlot
Gillet, Douglas	Rr 2 - Box 64	Peabody	66866	Marion	38.40000	-97.08810	300	Finishing Feedlot
Wiebe, Ted	14166 Nw Purity Springs Rd.	Burns	66840	Marion	39.24150	-100.45120	300	Finishing Feedlot
Loewen, Charles	Rr 2 Box 84	Hillsboro	67063	Marion	38.47240	-97.47460	300	Finishing Feedlot
Cow Camp Inc (Brunner, Lauren)	Route 1, Box 69	Ramona	67475	Marion	38.48690	-99.14920	300	Finishing Feedlot
Lehner Place	Rt 2 Box 1	Canton	67428	McPherson	37.05500	-94.87690	300	Finishing Feedlot
Shields, Dennis	R2 Box 70	Lindsborg	67456	McPherson	38.19660	-98.33350	300	Finishing Feedlot
Gasper, Neal M.	Route 1 - Box 12	Cawker City	67430	Mitchell	39.37200	-97.17530	300	Finishing Feedlot
Kresin, Robert	Rr 1 Box 89	Glen Elder	67446	Mitchell	38.96580	-100.56590	300	Finishing Feedlot
Flying W	Rr 2 - Box 36	Beloit	67420	Mitchell	39.97880	-96.36130	300	Finishing Feedlot
Schroeder Bros.	Route 1, Box 26	Tipton	67485	Mitchell	38.95130	-96.91880	300	Finishing Feedlot
Adams Farms	P.o. Box 53 - Rr 4	Beloit	67420	Mitchell	38.74800	-97.15950	300	Finishing Feedlot
Heller, Ron	Hrc 61 Box 83	Hunter	67452	Mitchell	38.73110	-95.78860	300	Finishing Feedlot
Wichers, R.A. Cattle Trust	P. O. Box 602	Beloit	67420	Mitchell	39.67640	-101.34760	300	Finishing Feedlot
Shulthis Properties	Po Box 506	Independence	67301	Montgomery	39.79170	-97.11600	300	Finishing Feedlot
C.H. White & Sons	P.O. Box C	Council Grove	66846	Morris	37.30200	-94.67700	300	Finishing Feedlot
Jost, Clinton	2646 Aa Ave	Burdick	66838	Morris	37.05500	-94.98590	300	Finishing Feedlot
Sigle 6 Bar Ranch	1926 Kansas Highway 177	Council Grove	66846-9733	Morris	38.34210	-97.32730	300	Finishing Feedlot
Bloom, Ronald	Route 1 Box 73	Goff	66428	Nemaha	39.54600	-98.21760	300	Cow-Calf
Aberle, Kenneth	Route 2	Sabetha	66534	Nemaha	39.90770	-99.52440	300	Cow-Calf
Terrel, Richard & Terri	Route 3, Box 103	Sabetha	66534	Nemaha	39.37200	-97.84540	300	Finishing Feedlot
Haverkamp, Kevin	RR 1, Box 212	Wetmore	66550	Nemaha	39.41550	-98.08730	300	Finishing Feedlot
Terrel, Richard L. & Terri	Rural Route 3 Box 103	Sabetha	66534	Nemaha	38.35660	-99.22290	300	Finishing Feedlot
Brazle, Frank (Schultz Place)	Route 3 - Box 84a	Chanute	66720	Neosho	39.06750	-101.06570	300	Finishing Feedlot
Kinney, Darrel	13055 Berryton Rd	Carbondale	66414	Osage	38.03670	-97.56510	300	Finishing Feedlot
Markley, Gerald	Route 1	Burlingame	66413	Osage	39.92090	-95.85530	300	Finishing Feedlot
Woodbury Farms	23285 S. Stubbs	Quenemo	66528	Osage	37.24390	-94.71330	300	Finishing Feedlot
Bruce, Jim	Rural Route 2	Minneapolis	67467	Ottawa	37.15670	-94.71330	300	Finishing Feedlot
Larson, Dean	251 K-18	Tescott	67484	Ottawa	39.83400	-95.46170	300	Finishing Feedlot
Larson, Ralph	160 N 48th Road	Tescott	67484	Ottawa	39.03850	-100.84360	300	Finishing Feedlot
Gotti, Michael W.	539 Buffalo Road	Tescott	67484	Ottawa	38.57370	-97.01450	300	Finishing Feedlot
Kindall, Sherryl	1729 Oxbow	Minneapolis	67467	Ottawa	38.86200	-95.95530	300	Finishing Feedlot
Morris, James L.	Rr 2 Box 21	Logan	67646	Phillips	37.80110	-100.56970	300	Cow-Calf
Schemper, Douglas A.	Box 5	Long Island	67647	Phillips	37.81560	-99.00250	300	Finishing Feedlot
Schooler Farms	Rr 2 Box 16b	Logan	67646	Phillips	38.35660	-98.15550	300	Finishing Feedlot
Kaine, William	609 Elm	Wamego	66547	Pottawatomie	38.19660	-97.23580	300	Finishing Feedlot
Blocker, John	6118 East Arlington Rd	Haven	67543	Reno	38.50130	-98.32110	300	Finishing Feedlot
The Bacon Place	3616 S Mayfield Rd	Hutchinson	67501-8621	Reno	38.16760	-97.69320	300	Finishing Feedlot
Graber Cattle	P.o. Box 6	Pretty Prairie	67570	Reno	38.06580	-99.83360	300	Finishing Feedlot
Engelland, John A	1680 Ave T	Sterling	67579	Rice	39.77610	-95.93020	300	Finishing Feedlot
Stout, Sam	2475 11th Rd.	Sterling	67579	Rice	39.89320	-96.70360	300	Finishing Feedlot
Miller, Cecil W.	Rural Route 2, Box 67	Lyons	67554	Rice	39.89380	-101.75860	300	Finishing Feedlot
Visser Farms, Inc.	N. 60th Street	Riley	66531	Riley	38.24020	-97.36390	300	Finishing Feedlot
Von Dracek Brothers	Route 2 Box 8256	Timken	67575	Rush	38.26970	-97.69540	300	Cow-Calf

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Dickinson, Kirk	2324 370th Ave.	Gorham	67640	Russell	38.09490	-100.32750	300	Finishing Feedlot
Roe, Steve	2513 Simmons	Salina	67401	Saline	38.29860	-97.91620	300	Finishing Feedlot
Oleen Cattle Co	6944 W. Thorstenberg Rd	Falun	67442	Saline	37.15670	-94.62240	300	Finishing Feedlot
Brown, Delos	5448 E Campbell Rd	New Cambria	67470	Saline	38.99490	-100.17710	300	Finishing Feedlot
Kern Livestock	8472 W. Magnolia	Salina	67401	Saline	38.65800	-95.94000	300	Finishing Feedlot
Bar Diamond Bar Farm & Ranch	30916 W. 39th South	Cheney	67025	Sedgwick	39.61780	-97.60340	300	Finishing Feedlot
May, Jerome	30916 W. 39th St. South	Cheney	67025	Sedgwick	39.79180	-99.05660	300	Finishing Feedlot
Reno, Earl	Rr Ii, Box 60	Cheney	67025	Sedgwick	39.63250	-99.69280	300	Finishing Feedlot
James, Don	Rr 2 - Box 126	Hoxie	67740	Sheridan	39.83530	-99.76770	300	Finishing Feedlot
Albers, Stan	Box 82	Hoxie	67740	Sheridan	38.53030	-99.16760	300	Finishing Feedlot
Sealock, Phillip	RR 2 Box 127	Hoxie	67740	Sheridan	38.37100	-97.43780	300	Finishing Feedlot
Arment, Galen	Route 1, Box 18	Smith Center	66967	Smith	39.93670	-96.89110	300	Finishing Feedlot
Wire, Robert	Rural Route 2	Smith Center	66967	Smith	37.32150	-96.96050	300	Finishing Feedlot
Weber, Paul R.	P.o. Box 214	Wellington	67152	Sumner	39.90640	-95.83650	300	Finishing Feedlot
Wheeler Farm	Rr 1 - Box 15	Oxford	67119	Sumner	39.03850	-97.71490	300	Finishing Feedlot
Ginn, David	424 W. 110th St. So.	Caldwell	67022	Sumner	37.92040	-98.13220	300	Finishing Feedlot
Clewell Farms	1002 E 110 Ave N	Belle Plaine	67013	Sumner	37.75760	-100.35100	300	Finishing Feedlot
Graff, Theodore Feedlot	Box 65	Marienthal	67863	Wichita	38.87870	-100.12160	300	Finishing Feedlot
Whitehair, Kirk	1021 2500 Ave.	Abilene	67410	Dickinson	38.12390	-97.01630	299	Finishing Feedlot
Entz, Clifford	Rr 2 Box 165	Peabody	66866	Marion	38.15300	-99.66890	299	Finishing Feedlot
Mattas, Gary	2929 15th Ave.	Lindsborg	67456	McPherson	38.61720	-97.58500	299	Finishing Feedlot
Remus, Loren	Rr 1 - Box 107	Glen Elder	67446	Mitchell	39.40100	-100.04170	299	Finishing Feedlot
2 B Ranch	418 Dd Ave	Council Grove	66846	Morris	39.31400	-97.71510	299	Finishing Feedlot
Fulmer Feedyard	22450 Shortt Rd	Belvue	66407	Pottawatomie	38.24020	-97.40050	299	Cow-Calf
Day, Robert (Bob Day Cattle Company)	626 SE 85th Street	Wakarusa	66546	Shawnee	39.74840	-98.75730	299	Finishing Feedlot
Bina, Raymond	Po 142 R#1	Lincolnville	66858	Marion	39.37200	-98.47820	295	Finishing Feedlot
Reedy, Leonard & Judith	Rr 2 Box 122	Concordia	66901	Cloud	37.29240	-100.38650	290	Cow-Calf
Keil, W. Benson (lot #2)	Rr 2 - Box 119	Concordia	66901	Cloud	38.15300	-97.12610	290	Finishing Feedlot
Keil, W. Benson (ESP Lot)	Rr 2 - Box 119	Concordia	66901	Cloud	38.70200	-95.80710	290	Finishing Feedlot
Bush Brothers	1421 Road 400	Allen	66833	Lyon	39.77720	-97.77220	290	Finishing Feedlot
Schroeder Brothers	Rr 1 - Box 26	Tipton	67485	Mitchell	37.68510	-101.22570	290	Finishing Feedlot
Schroeder Brothers	Rr 1 - Box 26	Tipton	67485	Mitchell	37.56910	-100.89770	290	Finishing Feedlot
Wesley Farms Inc	2297 Granite Rd Box 97	Bennington	67422	Ottawa	38.47240	-101.76250	290	Finishing Feedlot
Bauer, Bruce	1471 15th Road	Clay Center	67432	Clay	38.77470	-95.99230	280	Finishing Feedlot
Robson, John	618 1300 Ave.	Abilene	67410	Dickinson	39.45630	-96.43570	280	Cow-Calf
Reynolds Livestock	600 N. Van Buren	Abilene	67410	Dickinson	39.70490	-99.84250	280	Finishing Feedlot
Neibling Farms, Inc.	307 - 255 Rd	Highland	66035	Doniphan	39.98010	-100.14190	280	Finishing Feedlot
Pflughoeft, Alan K./Sandra L.	1085 Avenue J	Ellsworth	67439	Ellsworth	37.80110	-100.36920	280	Finishing Feedlot
Dalebanks Angus Inc	Rt 1 Box 16	Eureka	67045	Greenwood	38.52790	-96.36430	280	Finishing Feedlot
Schmitt, Ralph	311 Arnold, Box 35	Tipton	67485	Mitchell	39.00940	-100.45480	280	Finishing Feedlot
Pfrang, Gary	Route 1 - Box 50	Goff	66428	Nemaha	39.98070	-101.59050	280	Cow-Calf
Carls, Dale	9035 SW Morrill	Wakarusa	66546	Shawnee	38.93680	-97.65930	280	Finishing Feedlot
Norden, Evelyn	P.O. Box 266	Kensington	66951	Smith	37.80110	-98.45580	280	Finishing Feedlot
Milligan, Randy	1369 14th Road	Clay Center	67432	Clay	38.18210	-99.35790	275	Finishing Feedlot
Peterson Farms	Rr 1 Box 59	Sylvan Grove	67481	Lincoln	38.92230	-97.30760	275	Finishing Feedlot
Peterson Farms	Rr 1 Box 59	Sylvan Grove	67481	Lincoln	39.15450	-97.10080	275	Finishing Feedlot
Hett, Glen R.	Rr 3 - Box 113a	Marion	66861	Marion	39.22700	-100.04170	275	Finishing Feedlot
Miller, Ben	City Route	Natoma	67651	Osborne	39.96560	-99.52440	275	Finishing Feedlot
Christiansen, Ryan R.	2478 27th Ave.	Gypsum	67448	Saline	37.77210	-100.20520	275	Finishing Feedlot
Weber, Vincent	Rural Route 3, Box 70	Fredonia	66736	Wilson	39.73270	-96.15520	275	Finishing Feedlot
Zook, Clyde					39.84970	-99.05660	260	Finishing Feedlot
Robson, John	1100 Ave And Eden Rd	Abilene	67410	Dickinson	39.73380	-96.94730	260	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Wood, Roger W.	Rr#2, Box 113	Meriden	66512	Jefferson	39.38650	-98.55270	260	Finishing Feedlot
Creed Cattle Co	1066 East 130th Ave. N	Mulvane	67110	Sedgwick	38.71650	-96.15900	260	Finishing Feedlot
WaKeeney Livestock Commission Co. Inc.	Box 905 - 1st St & Railroad St.	Wakeeney	67672	Trego	38.02220	-96.90650	252	Finishing Feedlot
Prochaska, Brett A.	84 Prairie Road	Ada	67414		38.50130	-96.92250	250	Finishing Feedlot
Bunnel, Russell	16118 SW Maryland Rd	Welda	66091	Anderson	38.40000	-97.32730	250	Finishing Feedlot
Rieger, Bernard	Route 1	Powhattan	66527	Brown	37.81560	-97.12550	250	Finishing Feedlot
Schlepp, Spencer	HC1 Box 42	St Francis	67756	Cheyenne	38.93680	-97.27060	250	Finishing Feedlot
Diamond Lazy D Ranch	153 - 9th Road	Oak Hill	67432	Clay	38.70200	-96.34420	250	Finishing Feedlot
Blake Farms	1147 Jayhawk Rd.	Clay Center	67432	Clay	38.26750	-96.16140	250	Finishing Feedlot
Blake Farms	1147 Jayhawk Rd	Clay Center	67432	Clay	37.14670	-98.08430	250	Finishing Feedlot
Visser, Virgil	Route 1	Wakefield	67487	Clay	38.68960	-100.40060	250	Finishing Feedlot
Yenni, Vernon	Route 1	Wakefield	67487	Clay	39.41550	-101.21430	250	Finishing Feedlot
Visser, Kenneth	Route 1	Wakefield	67487	Clay	38.48690	-100.56630	250	Finishing Feedlot
Sump, Grant Or Scott	2063 27th Rd.	Green	67447	Clay	38.06580	-98.84570	250	Finishing Feedlot
Willmann, Elmer	1681 - 17th Road	Clay Center	67432	Clay	38.00760	-99.87020	250	Finishing Feedlot
Willmann, Gail	1675 - 16th Road	Clay	67432	Clay	37.94950	-100.05310	250	Finishing Feedlot
Law, Bevin	287 Frontier Rd.	Longford	67458	Clay	38.58820	-97.62180	250	Finishing Feedlot
Sump, Grant Or Scott	2063 27th Rd.	Green	67447	Clay	38.70440	-97.08540	250	Finishing Feedlot
Mc Adams, Rodney	217 22nd Road	Morganville	67468	Clay	38.63160	-100.91590	250	Finishing Feedlot
Thurlow, Robert Dean	238 Valleyview Road	Wakefield	67487	Clay	37.75760	-96.96150	250	Finishing Feedlot
Mccormick, Charley A.	842 24th Rd. N.w.	Lebo	66856	Coffey	37.97860	-97.07120	250	Finishing Feedlot
Slead Farms, Inc.	286 N.w. 24th Rd.	Lebo	66856	Coffey	39.29950	-98.53400	250	Finishing Feedlot
Foltz, Joe	Route 3	Abilene	67410	Dickinson	39.81950	-96.39880	250	Finishing Feedlot
Whitehair, Paul L.	112 Highland Drive	Abilene	67410	Dickinson	38.80610	-100.52890	250	Finishing Feedlot
Chronister, Paul	Rural Route 1	Abilene	67410	Dickinson	38.51580	-97.06970	250	Finishing Feedlot
Payne Cattle Co	113 N Myrtle	Eureka	67045	Greenwood	38.92230	-99.45510	250	Finishing Feedlot
Williams, Neal	2921 N. Woodlawn Rd.	Newton	67114	Harvey	39.12560	-99.97350	250	Finishing Feedlot
Shearer, Frank	Rr 2 - Box 132	Mankato	66956	Jewell	37.13210	-99.89700	250	Finishing Feedlot
Eilert Ranch	Route 2 Box 197	Jewell	66949	Jewell	38.58820	-96.83050	250	Finishing Feedlot
Oplinger, Clark	Rural Route	Randall	66963	Jewell	38.47000	-95.49710	250	Finishing Feedlot
D. Rosebrook & Sons	Hc 1 Box 47	Lincoln	67455	Lincoln	39.33990	-95.00310	250	Finishing Feedlot
Ringler Ranch	Route 2 - Box 173	Sylvan Grove	67481	Lincoln	39.67480	-96.02400	250	Finishing Feedlot
Boydston Farms	Route 1	Parker	66072	Linn	39.50250	-98.19900	250	Finishing Feedlot
Davis Cattle Co.	305 Road 150	Emporia	66801	Lyon	38.00760	-100.30920	250	Finishing Feedlot
Hein, Leonard	R1 Box 22	Hillsboro	67063	Marion	37.30690	-97.68550	250	Finishing Feedlot
Eberhard, Terril	Route 2 - Box 69	Peabody	66866	Marion	39.92220	-97.92210	250	Finishing Feedlot
Slocombe, Warren	Rt 2 Box 13	Peabody	66866	Marion	39.77720	-98.33460	250	Finishing Feedlot
Hett, Clifford	Rr 2 - Box 22	Peabody	66866	Marion	39.64700	-99.58050	250	Finishing Feedlot
Jantzen, Leland	Rt 1 Box 57	Peabody	66866	Marion	38.98040	-100.62140	250	Finishing Feedlot
Koop, Kim	1938 Falcon Rd	Hillsboro	67063	Marion	39.87740	-96.06140	250	Finishing Feedlot
Vogts, Richard M.	2642 Dakota Rd.	Canton	67428	McPherson	39.37200	-98.06870	250	Finishing Feedlot
Smyres, Mike G.	344 Eisenhower Rd.	Windom	67491	McPherson	37.49650	-100.95230	250	Finishing Feedlot
Trober Living Trust (Edwin & Betty)	11158 9 Road	Fowler	67844	Meade	38.48690	-100.65830	250	Finishing Feedlot
Bourquin, Maurie	26330 Sommerset Rd.	Paola	66071	Miami	38.35430	-96.56730	250	Finishing Feedlot
Spear Point Ranch	Rr 1 - Box 110	Glen Elder	67446	Mitchell	37.00090	-98.42880	250	Finishing Feedlot
Remus, Doyle L.	Route 1 - Box 111	Glen Elder	67446	Mitchell	39.73390	-99.24370	250	Finishing Feedlot
Colip, Floyd M. & Carolyn	P.O. Box 385	Norton	67654	Norton	39.93530	-95.85530	250	Finishing Feedlot
Fredrickson, Ronald & Patricia	22310 S. Carlson Road	Osage City	66523	Osage	38.18210	-99.41280	250	Cow-Calf
Hart, T. Ilene	1234 K-41	Delphos	67436	Ottawa	38.93680	-97.32610	250	Finishing Feedlot
Kats, Derek T.	837 W. Kiowa Rd.	Prairie View	67664	Phillips	39.09480	-95.06620	250	Cow-Calf
Rezac Farms, LLP	24110 Aiken Switch Rd	Onaga	66521	Pottawatomie	37.72860	-100.18700	250	Cow-Calf
Klein, Kendall and Doug	Rr 2 - Box 20	Atwood	67730	Rawlins	39.74840	-99.05660	250	Cow-Calf

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Keener, Thomas W.	Rt. 1, Box 82A	Rush Center	67575	Rush	38.49890	-95.12810	250	Cow-Calf
Tammen, RJ	Rr 2, Box 8292	Timken	67575-9091	Rush	39.48800	-98.92490	250	Cow-Calf
Erbes Farm And Livestock	Box 215	Lacrosse	67548	Rush	39.34300	-96.89610	250	Finishing Feedlot
Hill & Valley Farms Inc	2115 Wayside Lane	Hutchinson	67575	Rush	38.18210	-97.21750	250	Finishing Feedlot
Swenson, Kenner	212 W 2nd	Assaria	67416	Saline	39.58880	-97.02230	250	Cow-Calf
Schneider, Charles	2548 S Lightville Rd	Salina	67401	Saline	39.05300	-101.52860	250	Finishing Feedlot
Carls, Dean F.	5453 Se Berryton Rd	Berryton	66409	Shawnee	38.84960	-96.93730	250	Finishing Feedlot
Vaughn Feedlot	2283 County Rd #36	Rexford	67753	Thomas	37.37980	-100.15080	250	Cow-Calf
D & L Partnership	PO Box 947	Colby	67701	Thomas	38.08030	-97.08950	250	Finishing Feedlot
Larson, Floyd	215 Co. Rd. 26	Sharon Springs	67758	Wallace	38.22570	-97.25410	250	Cow-Calf
Carlgren, Robert	Route 2	Concordia	66901	Cloud	39.64580	-95.19930	240	Finishing Feedlot
Rumold Farms	1285 700 Ave.	Hope	67451-9130	Dickinson	39.93530	-95.89280	240	Finishing Feedlot
C.H. White & Sons-Droll Lots	Po Box C	Council Grove	66846	Morris	38.02220	-97.27240	240	Finishing Feedlot
Adee, Evan	1830 N. 270th Rd.	Oak Hill	67472		37.59810	-97.81800	230	Finishing Feedlot
Schroeder, Rudolf	Rt 2 Box 58	Hillsboro	67063	Marion	38.44340	-99.07560	230	Finishing Feedlot
Peterson, Michael	1135 21st Rd.	Clay Center	67432	Clay	37.64160	-96.85220	228	Cow-Calf
Close, Arlyn	325 20th Rd.	Clay Center	67432	Clay	37.50810	-95.87940	225	Finishing Feedlot
Nixon, Betty	4000 Kaw Rd.	Manhattan	66502	Riley	39.24150	-97.21250	225	Cow-Calf
KSU Purebred Beef Facility	232 Weber Hall - Ksu	Manhattan	66506-0201	Riley	39.32850	-97.56620	225	Finishing Feedlot
Chisum, Von	Hc1 - Box 470	Sharon Springs	67758	Wallace	37.47880	-95.31470	225	Finishing Feedlot
Werth, Leslie	104 South Front	Schoenchen	67667	Ellis	38.45560	-94.88830	220	Cow-Calf
Huntington Ranch	Route 3, Box 74	Eureka	67045	Greenwood	38.16760	-99.65060	220	Finishing Feedlot
Ballou, Phillip	Box 92	Delphos	67436	Ottawa	38.66060	-97.06970	220	Finishing Feedlot
Timberview Farms	1732 208th Rd	Bern	66408	Nemaha	39.40100	-96.97060	210	Cow-Calf
Poppe, Phillip	1835 Diamond Rd	Chester	68327-6006		39.14000	-97.71510	200	Cow-Calf
Hurley Supply, Inc.					39.56050	-97.41730	200	Finishing Feedlot
R.A.S., Inc.	Route 1 - Box 15	Danbury	69026		39.69040	-99.05660	200	Finishing Feedlot
Hajek, Ronnie/Mildred					37.80110	-100.55140	200	Finishing Feedlot
Perry, Homer	Rural Route 5	Fort Scott	66701	Bourbon	37.94950	-97.98590	200	Finishing Feedlot
Pfizenmaier, Phil	431 20th Road	Clay Center	67432	Clay	39.15450	-97.71510	200	Finishing Feedlot
Diamond A Ranch	P.o. Box 311 - 1554 18th Rd.	Clay Center	67432	Clay	39.16550	-96.39850	200	Finishing Feedlot
Diamond A Ranch	P.o. Box 311 - 1554 18th Rd.	Clay Center	67432	Clay	39.06750	-100.25120	200	Finishing Feedlot
James, Derek R.	1177 12th Rd	Clay Center	67432	Clay	39.03850	-98.39990	200	Finishing Feedlot
Nichols, Leo	1148 N. 280th Rd.	Longford	67458	Clay	38.21120	-97.25410	200	Finishing Feedlot
Schmutz Farm	133 Utah Rd.	Wakefield	67487	Clay	38.18210	-100.12630	200	Finishing Feedlot
Johnston, Mark	2251 Thunder Rd	Green	67447	Clay	39.67580	-98.14710	200	Finishing Feedlot
Johnston, James	1797 22nd Rd	Clay Center	67432	Clay	39.45900	-98.06870	200	Finishing Feedlot
Leidig Farms		Clay Center	67432	Clay	38.92230	-99.69580	200	Finishing Feedlot
Hofmann, Rodney & Kim	2244 19th Road	Clay Center	67432	Clay	39.31400	-97.69650	200	Finishing Feedlot
Mcadams, Max	1425 Huntress	Clay Center	67432	Clay	38.84960	-98.64050	200	Finishing Feedlot
Kadel, Ivan	Rural Route	Jamestown	66948	Cloud	39.74840	-99.84250	200	Finishing Feedlot
Sauvage & Sons, Inc.	412 W. Hall	Oberlin	67749	Decatur	38.48690	-97.29050	200	Cow-Calf
Friesen, Dennis C.	2281 400 Ave.	Herington	67449	Dickinson	37.61260	-97.50820	200	Finishing Feedlot
Stroda, Boyd	717 Highway 43	Hope	67451	Dickinson	38.65800	-94.99900	200	Finishing Feedlot
Brink, Bob	880 W. Highway 40	Lawrence	66049	Douglas	38.35660	-99.16760	200	Finishing Feedlot
Mense, Leland	Rural Route 1	Grinnell	67738	Gove	38.21120	-97.27240	200	Finishing Feedlot
Lobmeyer Farms	Route 1 - Box 98	Tribune	67879	Greeley	38.62910	-94.98050	200	Cow-Calf
Borst Farms	402 N. Mulberry	Eureka	67045-1723	Greenwood	37.77120	-96.46240	200	Finishing Feedlot
Schmidt, Jim R.	Rt 2 Box 86	Newton	67114	Harvey	37.40950	-98.34650	200	Finishing Feedlot
Dry Creek Farms	Po Box 10	Hesston	67062	Harvey	38.35660	-97.76900	200	Finishing Feedlot
Doud, Eldon	Rr 2 - Box 78	Mankato	66956	Jewell	39.54600	-98.57130	200	Finishing Feedlot
Hills Ranch	Box 246	Mankato	66956	Jewell	39.66150	-98.85080	200	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
O.K. Ranch	17965 Rosewood	Stilwell	66085	Johnson	38.98040	-97.41870	200	Finishing Feedlot
Ayres Farm	16486 S.e. 80 St.	Norwich	67118	Kingman	39.61850	-102.00140	200	Finishing Feedlot
Briggs, Carl T	2873 County Road X	Reading	66868	Lyon	38.51580	-99.16760	200	Finishing Feedlot
Hamm, James G.	Rr 2 - Box 18	Tampa	67483	Marion	37.62710	-96.90680	200	Finishing Feedlot
Hajek, Martin & John	Rr 1 - Box 56	Tampa	67483	Marion	37.59810	-99.89540	200	Finishing Feedlot
Pritz, Maurice G.	Route 1 - Box 99	Lost Springs	66859	Marion	37.29240	-98.33810	200	Finishing Feedlot
David, Frederick & Scott	210 S. Adams	Hillsboro	67063	Marion	39.93660	-98.70110	200	Finishing Feedlot
David, Frederick & Scott	210 S. Adams	Hillsboro	67063	Marion	39.99320	-95.91150	200	Finishing Feedlot
Rolling K Gelbvieh	Route 1 - Box 8	Marion	66861	Marion	39.41550	-97.15670	200	Finishing Feedlot
Washmon, Greg	Rt 3 Box 134	Hillsboro	67063	Marion	39.03850	-97.65930	200	Finishing Feedlot
Double W Farms	Rt 2 Box 116	Hillsboro	67063	Marion	38.71890	-96.73370	200	Finishing Feedlot
Sellers, Robert	Rr 1 - Box 60	Florence	66851	Marion	39.98070	-100.24550	200	Finishing Feedlot
Robinson Livestock	206 West 11th	Florence	66851	Marion	39.14000	-96.84030	200	Finishing Feedlot
Thole, Jon W.	Rr#3 Box 220 B	Marion	66861	Marion	38.09490	-97.12610	200	Finishing Feedlot
Knust, Wade	Rt 1 Box 55	Peabody	66866	Marion	37.87680	-98.82740	200	Finishing Feedlot
Funk, Kenneth	Route 2 - Box 232	Hillsboro	67063	Marion	39.60240	-95.63040	200	Finishing Feedlot
Wassenberg, Larry	1740 Eagle Road	Home	66438	Marshall	38.50130	-97.29050	200	Cow-Calf
Lundquist, Clinton E	R#2 Box 65	Lindsborg	67456	McPherson	39.84850	-95.81780	200	Finishing Feedlot
Ridge, William & Doris	Rr 2 - Box 213a	Inman	67546	McPherson	39.47350	-98.51540	200	Finishing Feedlot
Berg, Charles A. Trust	142 Dakota Rd	Windom	67491	McPherson	39.51700	-97.26840	200	Finishing Feedlot
Ekholm, Elmer	115 Eisenhower Road	Windom	67491	McPherson	38.34210	-97.29050	200	Finishing Feedlot
3-B Cattle Co. Inc., Wilson Place	Route 3, Box 10	Beloit	67420	Mitchell	39.16900	-97.23110	200	Finishing Feedlot
Smith Place	Rt 3 Box 46	Beloit	67420	Mitchell	38.71890	-97.14100	200	Finishing Feedlot
C.H. White & Sons	P.o. Box C	Council Grove	66846	Morris	37.64160	-96.94330	200	Finishing Feedlot
J Ranch	Rt 2 Box 74	Council Grove	66846	Morris	38.29860	-100.36380	200	Finishing Feedlot
RK Cattle Company	Rr 1 - Box 53	Council Grove	66846	Morris	38.26970	-100.43750	200	Finishing Feedlot
Georg Farms	Route 2, Box 90	Sabetha	66534	Nemaha	39.73270	-96.15520	200	Cow-Calf
Sargent, Laurel	Rural Route	Ransom	67572	Ness	38.58570	-95.70010	200	Finishing Feedlot
Schulze Farm	305 Sunset	Norton	67654	Norton	39.50250	-97.10080	200	Finishing Feedlot
Schulze Land & Cattle	Rr 3 - Box 122	Norton	67654	Norton	39.27050	-98.44100	200	Finishing Feedlot
Connelly Farms	528 Coronado Rd	Tescott	67484	Ottawa	38.15300	-97.14440	200	Finishing Feedlot
F & W Cattle	458 N 210th Rd	Bennington	67422	Ottawa	38.51580	-99.51730	200	Finishing Feedlot
Chester, Cecil	R.r. #1, Box 14	Glade	67639	Phillips	39.28180	-96.04500	200	Finishing Feedlot
Merklein, Paul	982 W Osage Rd	Prairie View	67664-6402	Phillips	39.70370	-95.96770	200	Finishing Feedlot
Mulligan	8735 Nadeau Rd	St Marys	66536	Pottawatomie	38.25480	-97.82120	200	Cow-Calf
Blocker, John	6118 E. Arlington Rd.	Haven	67543	Reno	39.80630	-98.47660	200	Finishing Feedlot
Farney, Robert L. (JK Farney Farms)	23816 W. 56th	Sterling	67579	Rice	38.47000	-95.73700	200	Finishing Feedlot
North Crest, Inc.	1724 South Manhattan	Manhattan	66502	Riley	38.38550	-101.65200	200	Finishing Feedlot
Stamper Kent	2085 R Road	Plainville	67663	Rooks	39.06750	-100.28820	200	Finishing Feedlot
Ochampaugh Dairy	2380 R Road	Plainville	67663	Rooks	39.24150	-97.62200	200	Finishing Feedlot
Berndt, Kenneth	3921 W. Wolff Road	Salina	67401	Saline	38.12390	-97.30900	200	Finishing Feedlot
Will Farms	3785 W Cloud	Salina	67401	Saline	37.78660	-97.50820	200	Finishing Feedlot
Sunnyside Farm	123 NE 82nd	Topeka	66617	Shawnee	39.83400	-95.94900	200	Finishing Feedlot
Hemberger Farms	163 N. Bluff Rd.	Argonia	67004	Sumner	39.16900	-100.30230	200	Finishing Feedlot
Welch Brothers	1002 Main	Haddam	66944	Washington	39.48800	-99.09240	200	Finishing Feedlot
Mueller, Frederick	P. O. Box 276	Hanover	66945	Washington	39.24150	-97.45450	200	Finishing Feedlot
Wiegers, Dean	RR 1 Box 19	Leoti	67861	Wichita	39.47350	-98.18040	200	Cow-Calf
Flying K Ranch	RR #3	Phillipsburg	67661	Phillips	38.09490	-97.45540	199	Cow-Calf
Murphy, Robb	19507 S Lackman	Spring Hill	66083	Johnson	38.26970	-99.53570	190	Cow-Calf
Vinduska, Edward P.	2523 Old Mill Road	Marion	66861-66861	Marion	38.76020	-94.86250	190	Finishing Feedlot
Parsons Livestock Market	P.O. Box 216	Edna	67342	Labette	38.03670	-97.16270	189	Finishing Feedlot
Marysville Livestock Inc.	1180 Hwy 77	Marysville	66508	Marshall	38.96580	-99.30700	185	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Buzzard Ranch	1049 N 190th Rd	Minneapolis	67467	Ottawa	38.02220	-97.12610	185	Finishing Feedlot
Flemming, Larry	Route 1 - Box 448	St Francis	67756	Cheyenne	39.29950	-96.76580	180	Finishing Feedlot
M & P Farms Inc.	2438 E. 149th St.	Carbondale	66414	Osage	39.86480	-101.29160	180	Cow-Calf
Bryan Family Trust	26468 S Hoch Road	Osage City	66523	Osage	38.38550	-99.33330	180	Finishing Feedlot
Leitner Farms	Route 1, Box 28	Atwood	67730	Rawlins	37.23410	-97.75810	180	Cow-Calf
Komarek Bros. Farm	7032 W. Cloud St.	Salina	67401	Saline	39.80690	-101.17950	180	Finishing Feedlot
Butcher, Butcher & Boertman	14 W 10 Th St. P.o. 419119	Kansas City	64141		39.83530	-99.11280	175	Cow-Calf
Sherbert, Dwight	1278 23rd Road	Clay Center	67432	Clay	39.83400	-96.39880	175	Finishing Feedlot
Slead Farms, Inc.	286 N.w. 24th Rd.	Lebo	66856	Coffey	39.86420	-97.00350	175	Finishing Feedlot
Goertzen, Steven & Reimer, Rose	Rr 2 Box 168	Newton	67114	Harvey	38.19660	-97.82120	175	Finishing Feedlot
Wildcat Cattle Co.- East	557 190th	Hillsboro	67063	Marion	39.58790	-95.64910	175	Finishing Feedlot
Wildcat Cattle Co. - West	557 190th	Hillsboro	67063	Marion	38.26750	-95.46020	175	Finishing Feedlot
Kalb Farms	1973 N. 200 Road	Wellsville	66092	Franklin	39.67480	-96.04270	170	Finishing Feedlot
Francis & Catherine Farms, Inc.	Rr 1-4637 S. 119th St. West	Clearwater	67026	Sedgwick	39.71820	-95.25550	170	Finishing Feedlot
Bahr, Rudolph	721 4th Road, Sw	Gridley	66852	Coffey	37.23470	-95.62870	168	Finishing Feedlot
Bickford, Ron	625 S. Peoria St.	Burlingame	66413	Osage	39.83520	-97.90340	160	Finishing Feedlot
Brown, Bill	688 Oxbow Rd	Minneapolis	67467	Ottawa	39.94980	-96.34260	160	Finishing Feedlot
Walking K Ranch	14075 Fremont Rd	Wheaton	66521	Pottawatomie	39.64700	-98.81340	160	Cow-Calf
Timmons Brothers Farms, Inc.	504 N. Washington	Smith Center	66967	Smith	39.93670	-98.18460	160	Cow-Calf
Finley Farms	16240 Sunflower Road	Gardner	66030	Johnson	39.54600	-98.32930	152	Finishing Feedlot
Russell Livestock Commission Co.	S Hwy 281	Russell	67665	Russell	38.63160	-100.47430	151	Finishing Feedlot
D & S Feedlot	Harold Demmer	Traer	67760		38.67510	-96.88570	150	Finishing Feedlot
Lange Jr., Charles	5861 Hwy 59	Cummings	66016	Atchison	39.84970	-100.16060	150	Finishing Feedlot
Yaussi, Don	15668 Jackrabbit Rd	Hiawatha	66434	Brown	39.40100	-97.28700	150	Finishing Feedlot
Mosiman, Bret	15398 Nw 30th	Benton	67017	Butler	38.95130	-97.25210	150	Finishing Feedlot
Fagan Living Trust	Rr 1 - 15413 Nw 30th St.	Benton	67017	Butler	38.52790	-96.41970	150	Finishing Feedlot
Wiebe/Harms Farms	13806 County Line Road	Whitewater	67154	Butler	38.00760	-97.01630	150	Finishing Feedlot
Flemming, Larry	Route 1 - Box 448	St Francis	67756	Cheyenne	37.14670	-98.03000	150	Finishing Feedlot
Crimmins, Daniel T.	735 Court Street	Clay Center	67432	Clay	38.53030	-96.83050	150	Finishing Feedlot
Downing, Joe E.	717 Court Street	Clay Center	67432	Clay	38.90570	-95.89970	150	Finishing Feedlot
Forsyth, John W.	1224 1st Rd.	Wakefield	67487	Clay	39.35450	-95.63570	150	Finishing Feedlot
Affolter, David B.	2243 Hackberry Road	Morganville	67468	Clay	39.63300	-100.56310	150	Finishing Feedlot
Yarrow, Jimmie L	1614 8th Road	Wakefield	67487	Clay	39.35750	-101.75410	150	Finishing Feedlot
James, Veryl	1050 Kiowa Rd.	Clay Center	67432	Clay	39.32850	-98.40380	150	Finishing Feedlot
Elsasser, Harold	26 Arrowhead	Clyde	66938	Cloud	39.25600	-97.10080	150	Finishing Feedlot
Elsasser, Harold	26 Arrowhead Road	Clyde	66938	Cloud	38.73340	-97.21500	150	Finishing Feedlot
Gilbert, Richard D.	691 Trefoil Rd. Se	Leroy	66857	Coffey	38.70200	-95.32550	150	Finishing Feedlot
Curtis, James	1640 Hawk Rd.	Abilene	67410	Dickinson	38.22570	-97.58340	150	Finishing Feedlot
Neibling, Charles	2025 Buffalo Rd	Highland	66035	Doniphan	37.93490	-97.43710	150	Finishing Feedlot
Pfannenstiel, A. J. - Site #1	840 150 Ave	Hays	67601	Ellis	38.77470	-94.76990	150	Cow-Calf
Teneyck Angus Farm	7603 Se 24th St.	Newton	67114-9621	Harvey	39.40100	-97.06360	150	Finishing Feedlot
Entz, Oscar & Alan	4221 E 1st St	Newton	67114	Harvey	39.92090	-96.34260	150	Finishing Feedlot
Doyle, Lee & Scott	13361 - 238th Rd	Holton	66436	Jackson	39.19450	-96.32410	150	Finishing Feedlot
Jensen, Arthur	18435 S 169 Highway	Olathe	66062	Johnson	38.96580	-97.25210	150	Finishing Feedlot
Shields, Carroll Shields Farm	2524 300th St	Lincolnville	66858	Marion	37.78660	-96.76110	150	Cow-Calf
Beltz, Mike	Route 1 - Box 81	Ramona	67475	Marion	38.16760	-98.26030	150	Finishing Feedlot
Kaufman, Tim	Rr 1 Box 48	Durham	67438	Marion	38.18210	-100.98610	150	Finishing Feedlot
Tajchman, Joe T.	Rr 1 - Box 118	Lincolnville	66858	Marion	39.06750	-96.71520	150	Finishing Feedlot
Oborny, David J.	Route 3 - Box 137	Marion	66861	Marion	37.74310	-98.00020	150	Finishing Feedlot
Vogel, Randal B.	Rr 3 - Box 135	Marion	66861	Marion	39.74840	-98.71980	150	Finishing Feedlot
Nellans, Dale	Rr 2 Box 47	Peabody	66866	Marion	39.34300	-96.82160	150	Finishing Feedlot
Behrens, Glenn	1188 12th Road	Marysville	66508	Marshall	39.12560	-97.34460	150	Cow-Calf

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Norberg Feedlot	9792 South Burma Rd	Lindsborg	67456	McPherson	39.15450	-96.65410	150	Finishing Feedlot
Johnson, Marvin	2057 16th Ave	Mcpherson	67460	McPherson	39.74720	-96.41760	150	Finishing Feedlot
Duerksen, Clayton	2758 Cheyenne Rd	Canton	67428	McPherson	38.47000	-95.36800	150	Finishing Feedlot
Fagan, Dan	14542 Nw 30th	Benton	67107	McPherson	39.58880	-97.34100	150	Finishing Feedlot
Shields, Dennis	Rt 2 Box 70	Lindsborg	67456	McPherson	39.67480	-96.45500	150	Finishing Feedlot
Heller, Terry J	Hc61 Box 33	Hunter	67452	Mitchell	39.80690	-100.54440	150	Finishing Feedlot
A & N Farms, Inc.	Rr 2 - Box 19	Norton	67654	Norton	37.36520	-98.28370	150	Finishing Feedlot
M & S Farms, Inc.	950 Justice Road	Minneapolis	67467	Ottawa	38.74800	-96.84480	150	Cow-Calf
Schlickau Herefords	11701 East K96 Hwy	Haven	67543	Reno	38.61460	-95.88460	150	Finishing Feedlot
Hadachek, Larry - Hadachek Joint Venture	2994 Us Hwy 36	Cuba	66940-8078	Republic	39.51700	-98.98080	150	Finishing Feedlot
A J Land & Cattle, Inc.	Route 1 - Box 26	Mccracken	67556	Rush	39.90640	-95.68660	150	Cow-Calf
Pechanec, Steve	Rt 2, Box 8251	Timken	67575	Rush	39.25600	-97.71510	150	Cow-Calf
North Farms	Route 1 - Box 23	Mccracken	67556	Rush	38.28420	-97.40100	150	Cow-Calf
Jecha, Craig	Rr 2, Box 8276	Timken	67575-9075	Rush	39.66030	-95.78030	150	Cow-Calf
Brack, Brian Jay	Po Box 137	Otis	67565	Rush	39.89190	-96.54880	150	Finishing Feedlot
J & M Georg	Route 1 - Box 29	Rush Center	67575-9412	Rush	38.21120	-97.38220	150	Finishing Feedlot
Burr, Sheldon E.	624 Uppermill Heights Dr	Salina	67401	Saline	38.32760	-97.12490	150	Cow-Calf
Cox, Fred, Jr.	Hopkins Rd	Assaria	67416	Saline	39.97880	-96.04270	150	Cow-Calf
Tillberg Bros.	1216 S. Hohneck Rd	Salina	67401	Saline	39.92090	-95.70530	150	Finishing Feedlot
Casley & Son	1048 Se 160 Ave	Cheney	67025	Sedgwick	38.10940	-97.38220	150	Finishing Feedlot
Broken Ladder Cattle Co. Inc.	Hc1 - Box 455	Sharon Springs	67758	Wallace	39.84970	-98.68240	150	Cow-Calf
Jones, David	Hc1 - Box 425	Sharon Springs	67758	Wallace	37.84770	-99.24820	150	Finishing Feedlot
Stigge, Alan	1455 18th Rd	Washington	66968	Washington	38.00760	-97.19920	150	Finishing Feedlot
Edwards, Donald	Rr 4, Box 113	Yates Center	66783	Woodson	39.28180	-96.34270	150	Finishing Feedlot
Moo Valley Ranch	13461 142nd	Bonner Springs	66012	Wyandotte	39.68930	-95.94900	150	Cow-Calf
Litch Farms	621 S.w. Emporia	Melvern	66910		39.92280	-101.83330	147	Finishing Feedlot
Anschutz Farm	23800 S California Road	Lyndon	66451	Osage	39.86480	-100.91800	145	Finishing Feedlot
Konarik, Robert	2537 Pawnee Road	Marion	66861	Marion	39.67480	-95.44290	140	Finishing Feedlot
Elvin, Clifford O	R 1 Box 9	Marquette	67464	McPherson	39.74890	-100.73120	140	Finishing Feedlot
Quaney, J. Martin	9405 W. 157th St.	Burlingame	66413	Osage	37.92040	-98.88230	140	Cow-Calf
Stout, Sam	2475 11th Rd.	Sterling	67579	Rice	39.69040	-99.58050	140	Finishing Feedlot
Armour, Jack	Rr 1 - 18801 W. 55th So.	Viola	67149	Sedgwick	39.64750	-100.22680	132	Finishing Feedlot
Wiebe, Marvin & Dalen	12813 Nw 130th St.	Whitewater	67154	Butler	37.92040	-99.52260	130	Cow-Calf
Lee, William & Harold	552 18th Road	Clay Center	67432	Clay	39.44450	-98.16180	130	Finishing Feedlot
Fowles, Wallace V.	721 Washington St.	Clay Center	67432	Clay	39.36900	-96.28690	130	Finishing Feedlot
Stoss, Dale	1175 Nw 90 Ave	Olmitz	67564	Barton	39.89320	-98.24080	125	Cow-Calf
Dougherty Farms	14361 Sw 190th St.	Rose Hill	67133-8578	Butler	39.03850	-97.02990	125	Finishing Feedlot
Owens, Clifford & Ruth	R4 - 2448 Prairie Road	Clay Center	67432	Clay	39.05300	-98.15920	125	Finishing Feedlot
Yarrow, Dwight	Rr 2 - 975 Navajo Rd.	Clay Center	67432	Clay	39.02390	-97.45570	125	Finishing Feedlot
Adams, Jerry D	Rural Route 4	Beloit	67480	Dickinson	39.35750	-100.60010	125	Finishing Feedlot
Schumacher, Melvin/Schumacher Trust Charolais & Red Angus	1855B 250th Ave	Hays	67601	Ellis	38.99490	-100.15860	125	Cow-Calf
Phillips Hereford Farms, c/o Cecil & Jim Phillips	10636 N. 16 HWY	Valley Falls	66088	Jefferson	37.93490	-99.28480	125	Cow-Calf
Kline Farms	14309 Indian Hills Rd.	Scranton	66537	Osage	39.02390	-97.88150	125	Finishing Feedlot
Kline Farms	Route 2	Scranton	66537	Osage	38.98040	-97.84450	125	Finishing Feedlot
Ducharm, Alfred L.	1604 East 1100 Road	Agra	67621	Phillips	39.38650	-100.20920	125	Finishing Feedlot
McClellan, Robert	807 Main Box 248	Palco	67657	Rooks	39.40100	-96.98920	125	Cow-Calf
Hovorka, Leroy & Wilma	1541 S. Ryan Rd.	Caldwell	67022	Sumner	39.22700	-100.73040	125	Finishing Feedlot
Kuhlman Farms	Hc #1, Box 165	Sharon Springs	67758	Wallace	38.41450	-97.21690	125	Cow-Calf
Chestnut Farms, Inc.	1092 14th Road	Clay Center	67432	Clay	39.80630	-98.81340	120	Cow-Calf
Wiggins Ranch	Rural Route 2, Box 49	Eureka	67045	Greenwood	38.58820	-96.81210	120	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Bevanjogene Dairy	Rt #2 Box 68	Peabody	66866	Marion	38.73340	-97.25210	120	Finishing Feedlot
Bartel, James	Box 26, Rr 3	Hillsboro	67063	Marion	38.74800	-97.67780	120	Finishing Feedlot
Glahn, Steve (S M Farms)	1751 Nighthawk Road	Marion	66861	Marion	38.70440	-97.02990	120	Finishing Feedlot
Unruh, Jerald D.	Rr 2 - Box 145	Hillsboro	67063	Marion	38.61460	-96.53040	120	Finishing Feedlot
Vering Farm	1278 Pony Express Hwy.	Marysville	66508	Marshall	38.99490	-100.25120	120	Finishing Feedlot
Dakin, John	37017 Mission Belleview Rd.	Louisburg	66053	Miami	38.87870	-97.08540	120	Finishing Feedlot
Badger, David & Keith	1932 E 149th St	Carbondale	66414	Osage	38.67510	-97.21690	120	Finishing Feedlot
Stevens, Edward D.	Route 1 - Box 94	Belvue	66407	Pottawatomie	38.95130	-97.17800	120	Finishing Feedlot
Bacon, Keith	8577 W Magnolia Rd	Salina	67401	Saline	38.71650	-95.84410	120	Finishing Feedlot
Metzen, Donald	6045 S 183 W	Viola	67149	Sedgwick	38.74800	-97.54830	120	Finishing Feedlot
Turney Farms	755 N Seneca Rd	Belle Plaine	67013	Sumner	39.32540	-96.30550	120	Cow-Calf
Carls, Dale	9035 Sw Morrill	Wakarusa	66546	Shawnee	38.25480	-97.19920	110	Finishing Feedlot
Shellito, Milo	RR 3 - Box 27	Smith Center	66967	Smith	37.46750	-99.47630	110	Cow-Calf
Farmers Livestock Comm. Co. In	711 D St	Washington	66968	Washington	38.35660	-96.97770	110	Finishing Feedlot
Clarke, J. Don	711 Patton Road	Great Bend	67530	Barton	37.83320	-97.76640	104	Finishing Feedlot
Gasaway Farms	292 Navajo Road	Ada	67414		37.55460	-98.25530	100	Finishing Feedlot
Roe, Bill	Route 1	Hardy	68943		38.76250	-97.21500	100	Finishing Feedlot
Setter Farms	2391 Hawaii Road	Humboldt	66748	Allen	39.37200	-96.95190	100	Cow-Calf
Brown, Clarence	Rr 3 - Box 98	Great Bend	67530	Barton	38.24020	-100.21780	100	Finishing Feedlot
Schartz, Gilbert	Rr 3 - Box 98	Great Bend	67530	Barton	37.11750	-97.54050	100	Finishing Feedlot
Schartz, Gilbert	Rr 3 - Box 98	Great Bend	67530	Barton	38.06580	-99.50430	100	Finishing Feedlot
Meyer, Shirley A.	1066 180th Street	Hiawatha	66434	Brown	37.35070	-97.14170	100	Finishing Feedlot
Jackson Farm (Larry)	3440 SW 120th St.	Augusta	67010-7727	Butler	39.18350	-97.60340	100	Finishing Feedlot
Flemming, Larry	Route 1 - Box 448	St Francis	67756	Cheyenne	37.74310	-97.92730	100	Finishing Feedlot
VanScoyoc, Don	875 4th Road	Longford	67458	Clay	39.00940	-96.67810	100	Cow-Calf
Geer, Raymond	2012 Kiowa Rd	Clay Center	67432	Clay	37.24870	-97.35930	100	Finishing Feedlot
Sutter, Don	592 9th Road	Oak Hill	67432	Clay	37.19040	-97.35930	100	Finishing Feedlot
Wendelken, Richard	1309 8th Rd.	Clay Center	67432	Clay	37.13350	-95.71940	100	Finishing Feedlot
Brown, Phillip	429 Crawford St	Clay Center	67432	Clay	39.76340	-102.02010	100	Finishing Feedlot
Schmutz Farm	133 Utah Rd.	Wakefield	67487	Clay	39.40100	-98.47820	100	Finishing Feedlot
Brown, Phillip	429 Crawford St	Clay Center	67432	Clay	37.65610	-97.87270	100	Finishing Feedlot
Nichols, Lonny	1234 260th Road	Longford	67458	Clay	37.42400	-97.30770	100	Finishing Feedlot
Thurlow, Robert Dean	238 Valleyview Road	Wakefield	67487	Clay	37.30690	-96.74290	100	Finishing Feedlot
Grass Valley Farms (Norm Fuller)	2113 Windmill Rd	Miltonvale	67466	Cloud	39.39810	-96.15660	100	Cow-Calf
Mcbride, Jack	1480 Hwy 75	Burlington	66839	Coffey	37.89130	-97.78470	100	Finishing Feedlot
Thomas, Roger	2325 Emmer Rd Nw	Lebo	66856	Coffey	39.16900	-97.64060	100	Finishing Feedlot
Klein's Farm	Box 39 Rr#3	Udall	67146	Cowley	38.84960	-96.91880	100	Finishing Feedlot
Schueneman, Paul	Box 20, R 2	Udall	67146	Cowley	38.80610	-97.78890	100	Finishing Feedlot
Sandow, Rex A.	1104 Hawk Rd.	Abilene	67410	Dickinson	38.63160	-101.17360	100	Cow-Calf
Rumold Farms	1285 700 Ave.	Hope	67451-9130	Dickinson	38.66060	-97.76900	100	Finishing Feedlot
Mann, Louis & Sons	Route 2 - Box 221	Eureka	67045-9347	Greenwood	39.28500	-97.02640	100	Finishing Feedlot
Smith, W W	Box 171	Walton	67151	Harvey	39.66030	-95.81780	100	Finishing Feedlot
Williams, Neal	2921 N. Woodlawn Rd.	Newton	67114	Harvey	39.40100	-98.01290	100	Finishing Feedlot
Unruh, Joseph L.	9023 Nw 36th St.	Halstead	67056	Harvey	39.28500	-98.53400	100	Finishing Feedlot
Mosiman, James & Michelle	1015 N Rock Rd	Newton	67114	Harvey	39.21250	-97.26840	100	Finishing Feedlot
Nellor Farms	21195 S. Gardner Rd	Gardner	66030	Johnson	37.29240	-98.48310	100	Cow-Calf
Pretz, Charles	26911 W. 151st	Olathe	66061	Johnson	38.55680	-95.33110	100	Cow-Calf
Jacobs, James W.	17740 Sw 120 Ave.	Zenda	67159	Kingman	39.03850	-97.23350	100	Finishing Feedlot
Rahmeier, Kent	Route 2 - Box 163	Sylvan Grove	67481	Lincoln	38.82060	-99.39960	100	Cow-Calf
Mccosh, Rodney	Hc1 Box 41	Beverly	67423	Lincoln	39.09660	-97.75190	100	Finishing Feedlot
D. Rosebrook & Sons	Rr 2 Box 25	Lincoln	67455	Lincoln	39.08030	-95.30700	100	Finishing Feedlot
Meyer Land & Cattle Company	Po Box 305	Sylvan Grove	67481	Lincoln	38.99490	-97.82600	100	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Harms Plainview Ranch (Mark)	Rr #1 Box 62	Lincolnville	66858	Marion	37.69960	-96.90680	100	Cow-Calf
Shields, Fred	2828 300 St	Lincolnville	66858	Marion	39.21250	-100.35810	100	Cow-Calf
Shields, Fred	2828 300 St	Lincolnville	66858	Marion	39.43000	-97.15670	100	Cow-Calf
Walnut Grove Angus	R 3, Box 95	Marion	66861	Marion	39.77720	-97.84710	100	Finishing Feedlot
Jost, Victor L.	Route 2 - Box 172	Hillsboro	67063	Marion	39.74720	-95.31170	100	Finishing Feedlot
D/J Farms	2951 13th Avenue	Lindsborg	67456	McPherson	38.58820	-101.22880	100	Finishing Feedlot
Bornholdt, Tim	126 Chisholm	Inman	67546	McPherson	38.08990	-95.28980	100	Finishing Feedlot
Duerksen, Marvin	Rr 1 Box 89	Canton	67428	McPherson	39.83530	-99.93610	100	Finishing Feedlot
Larson, Robert A	1852 9th Ave	Mcpherson	67460-0838	McPherson	38.00760	-97.82120	100	Finishing Feedlot
Allen, Geo. W.	35560 Mission Belleview Rd.	Louisburg	66053	Miami	38.29860	-98.57880	100	Finishing Feedlot
Shurts Farms	Route 4 Box 33	Beloit	67420	Mitchell	38.47240	-96.90410	100	Cow-Calf
Cordel, Edward A.	Route 3 - Box 52	Beloit	67420	Mitchell	39.48800	-96.91470	100	Cow-Calf
Greif, Ron	Rr 1 Box 47	Tipton	67485	Mitchell	37.26320	-97.12360	100	Finishing Feedlot
Pruitt, Dan	721 North Highland	Beloit	67420	Mitchell	39.66130	-98.01590	100	Finishing Feedlot
Moeller, John	4304 E. 121st	Carbondale	66414	Osage	39.99320	-95.70530	100	Finishing Feedlot
Zimmerman, Terry	1778 Sunset Rd	Delphos	67436	Ottawa	39.76340	-100.65650	100	Finishing Feedlot
Kindall, Charles	1390 Limestone Rd	Minneapolis	67467	Ottawa	39.35750	-98.29210	100	Finishing Feedlot
T & A Livestock	Po Box 644	Lyons	67554	Rice	38.22000	-96.31530	100	Finishing Feedlot
Sinn, Carl	8640 N. 52nd St.	Manhattan	66503	Riley	38.24020	-97.32730	100	Finishing Feedlot
Kershner, Bruce	Rr #1, Box 31	Rush Center	67575	Rush	39.64680	-97.22850	100	Cow-Calf
Miller, Sam A.	Rr 1 Box 30	Lacrosse	67548	Rush	38.55920	-97.75060	100	Finishing Feedlot
Martin, Michael J.	214 S. Whitmore	Salina	67401	Saline	38.89320	-97.49270	100	Finishing Feedlot
Simon, Jim	8021 West 79th	Clearwater	67026	Sedgwick	39.09660	-97.12250	100	Finishing Feedlot
La Pasture	8301 E. 47th South	Derby	67037	Sedgwick	39.28500	-97.97570	100	Finishing Feedlot
Kramer, Richard J.	3810 S. 183rd West	Goddard	67052	Sedgwick	39.25600	-98.31070	100	Finishing Feedlot
Cole, Bradley R.	Rr 1 - Box 15	Gaylord	67638	Smith	37.37980	-96.90610	100	Finishing Feedlot
Compton, James L.	325 N Stowe Po Box 184	Sharon Springs	67758	Wallace	38.98040	-98.01110	100	Finishing Feedlot
Tate, Thad S.	Route 1	Linn	66953	Washington	39.71940	-99.87990	100	Finishing Feedlot
Gary Streit Farms	140 West Hwy 181	Tipton	67485-9311	Mitchell	39.92090	-95.79900	97	Cow-Calf
Bartholomew, John & Tessie	Rt 1, Box 31	Mankato	66956	Jewell	39.98010	-99.54310	90	Cow-Calf
Suderman, Joel	Rr 1 Box 191	Marion	66861	Marion	38.86420	-97.27060	90	Finishing Feedlot
Burhoop, Enno	Aa Ave And 2800 Rd	Burdick	66838	Morris	38.64610	-99.55410	90	Cow-Calf
Thome, Ronald F	15924 W 39th St S	Goddard	67052	Sedgwick	39.96570	-97.60340	90	Finishing Feedlot
Welch, Edwin	387 20th Road	Haddam	66944	Washington	39.18000	-96.45430	88	Cow-Calf
Neis Brothers Farms	2215 N 1100 Road	Eudora	66025	Douglas	37.07380	-99.48010	85	Cow-Calf
Harrison, James	2550 Road 29	Wallace	67761	Wallace	39.73440	-101.92670	85	Cow-Calf
Ekholm, Richard	165 Cimarron Rd.	Inman	67546	McPherson	38.48690	-97.25370	83	Cow-Calf
Bodenhausen Farms	8593 Bourbon Road	Muscotah	66058	Atchison	38.64360	-95.49710	80	Finishing Feedlot
Sherbert, Mike D.	1061 21st Road	Clay Center	67432	Clay	38.54480	-101.96490	80	Finishing Feedlot
Sherbert, Dwight	1278 23rd Rd	Clay Center	67432	Clay	39.90640	-95.83650	80	Finishing Feedlot
Dodd, Franklin	2222 Navajo Rd.	Clay Center	67432	Clay	38.95130	-98.43690	80	Finishing Feedlot
Miller, Joe L.	1580 2100 Ave.	Enterprise	67441	Dickinson	38.79150	-97.30760	80	Finishing Feedlot
Schoen, Richard E.		Sylvan Grove	67481	Lincoln	38.71890	-101.60260	80	Cow-Calf
Hein, Edward	Rt 2 Box 98	Hillsboro	67063	Marion	38.74800	-97.28910	80	Finishing Feedlot
Patrick, Gary W.	1806 Sioux Rd	Lindsborg	67456	McPherson	39.92280	-101.32890	80	Cow-Calf
Hook, Donald / Bell, Arlo	25323 S. Morril	Lyndon	66451	Osage	39.44170	-96.13800	80	Finishing Feedlot
Hook, Donald	25323 S. Morril	Lyndon	66451	Osage	38.99490	-98.43690	80	Finishing Feedlot
Urban, Barry	Rr 1, Box 118	Bison	67520	Rush	38.64360	-95.51560	80	Cow-Calf
Martin, Greg	214 S Whitmore Rd	Salina	67401	Saline	39.74840	-99.22500	80	Finishing Feedlot
LaCrosse Livestock Market, Inc.	Box 657	Lacrosse	67548	Rush	38.10940	-97.12610	79	Finishing Feedlot
Praeger, Brian	Rr, Box 155	Claflin	67525	Barton	38.41450	-97.03290	75	Cow-Calf
Weaver Farms Inc	309 Minnetare Ln	Hiawatha	66434	Brown	39.35750	-97.19390	75	Cow-Calf

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Yarrow, Marvin	1457 10th Road	Clay Center	67432	Clay	39.60400	-102.02010	75	Cow-Calf
Huber, Edward T	Route 2, Box 650	Madison	66860	Greenwood	37.36520	-98.82750	75	Cow-Calf
Wedel, Henry	303 30th Ave. (rr 2 - Box 75)	Newton	67114	Harvey	39.74720	-95.94900	75	Finishing Feedlot
Cedar Hill Farms, Inc.	14905 West 199th	Spring Hill	66083	Johnson	38.54230	-96.41970	75	Finishing Feedlot
Groening, Jerry	Rr 3 Box 119	Marion	66861	Marion	38.73110	-94.91800	75	Finishing Feedlot
Huxman, Rodney R	2419 Arrowhead Rd	Moundridge	67107-7470	McPherson	38.28420	-97.41940	75	Finishing Feedlot
File, Duane E.	Route 2	Beloit	67420	Mitchell	38.15300	-98.77250	75	Cow-Calf
Mans, Richard		Osborne	67473	Osborne	39.22360	-94.85420	75	Finishing Feedlot
Franke Cattle Feeders	Route 1, Box B14	Herndon	67739	Rawlins	38.45560	-95.42330	75	Cow-Calf
Sellers, Alan	563 S. Bluff	Milan	67105	Sumner	38.40000	-97.06970	75	Cow-Calf
Zech, Burton	Route 1	Wellington	67152	Sumner	38.93480	-96.43680	75	Finishing Feedlot
Morrison Dairy Farm	16340 W 207th	Spring Hill	66083	Johnson	38.18210	-98.22370	72	Cow-Calf
Poppe, Norman (Phil) & Lavila	1801 Birch Rd	Chester	68327		38.15300	-98.29690	70	Cow-Calf
Carlson, Ronald	1735 Quail Rd	Clay Center	67432	Clay	39.47080	-96.45430	70	Finishing Feedlot
Terrapin Lake Farm	1763 Old Hwy 40	Chapman	67431	Dickinson	38.47000	-95.64480	70	Finishing Feedlot
Regier Farms	Rr 3 - Box 50	Newton	67114	Harvey	39.48530	-95.69150	70	Finishing Feedlot
Evans, Gary	Route 3 - Box 165	Marion	66861	Marion	38.50130	-97.01450	70	Finishing Feedlot
3-B Cattle Co. Inc. Fransmatthews Place	Rt 3 Box 10	Beloit	67420	Mitchell	39.37200	-100.48840	70	Cow-Calf
Sand Creek Feeders	7305 W. Morgan	Hutchinson	67501	Reno	38.44340	-96.92250	70	Finishing Feedlot
Tomacek, Edward	RR 2, Box 8252	Bison	67575	Rush	39.80690	-100.52570	70	Cow-Calf
Buller Farms	1828 N. Rock Road	Newton	67114	Harvey	39.86300	-96.30510	65	Finishing Feedlot
Pagel Feedlot	11355 U 4 Road	Hoyt	66440	Jackson	38.80380	-95.80710	65	Finishing Feedlot
Bretton, Jerry	727 Quartz Rd.	Minneapolis	67467	Ottawa	39.25600	-97.75230	62	Cow-Calf
Marston, Bill					37.97860	-98.13220	60	Cow-Calf
Worrell, David	686 Bramerton Ct. B	Andover	67002	Butler	38.09490	-97.14440	60	Finishing Feedlot
Sanneman, George & Robert	203 Vincent	Idana	67432	Clay	38.53030	-96.94090	60	Cow-Calf
Larson, Dale	1231 25th Rd.	Clay Center	67432	Clay	38.51580	-96.92250	60	Cow-Calf
Mall, Duane	1442 Valleyview Rd	Clay Center	67432	Clay	38.15300	-99.65060	60	Cow-Calf
Sherbert, Mike D.	1061 21st Road	Clay Center	67432	Clay	39.31400	-98.55270	60	Finishing Feedlot
Naffziger & Ediger Farms	Rr 1 Box 36	Harper	67058	Harper	38.65800	-95.33110	60	Finishing Feedlot
Schroeder, Arlie	Route 2 - Box 179	Newton	67114	Harvey	38.83290	-95.64040	60	Cow-Calf
Boeckner, Gary	85 29th Avenue	Hesston	67062	Harvey	38.03670	-96.90650	60	Cow-Calf
Pruitt Farms, Inc.	Route 1 - Box 104	Barnard	67418	Lincoln	39.29950	-98.55270	60	Finishing Feedlot
Regier Farms	Rr 2 - Box 199	Hillsboro	67063	Marion	38.08030	-96.96140	60	Finishing Feedlot
Duerksen, Milton	Route 1 - Box 88	Canton	67428	McPherson	39.61690	-95.49920	60	Finishing Feedlot
Heller, Harold J.	Hcr 61 - Box 7	Hunter	67452	Mitchell	38.77470	-94.75130	60	Finishing Feedlot
Tucker, Edward S.	11482 S. Stubbs Rd.	Overbrook	66524-9282	Osage	38.62910	-94.74070	60	Finishing Feedlot
Mickelson Farm	517 W 277th St	Lyndon	66451	Osage	38.77470	-95.89970	60	Finishing Feedlot
Miller, Wallace Or Patricia	4946 E. 245th St.	Lyndon	66451	Osage	38.26970	-97.30890	60	Finishing Feedlot
Carswell, Jay	2628 W. 40th Dr.	Alton	67623	Osborne	39.60330	-97.60340	60	Finishing Feedlot
Reed, Dale	772 Coronado Road	Culver	67484	Ottawa	39.81950	-96.56750	60	Finishing Feedlot
Hammerlund Angus Farms	6995 Highway 63	St Marys	66536	Pottawatomie	38.38550	-97.41940	60	Finishing Feedlot
Jim Dixson Farm	Route 1 Box 38	Atwood	67730	Rawlins	39.02390	-99.08480	60	Cow-Calf
Poe, Kenneth L.	260 Co. Rd. 26	Sharon Springs	67758	Wallace	39.90640	-96.13640	60	Cow-Calf
Hurd Family Farm	2489 Ferguson Road	Perry	66073	Jefferson	38.24020	-98.18710	55	Cow-Calf
Cole, Wesley	RR 1 - Box 57	Kensington	66951	Smith	38.29860	-98.92840	55	Cow-Calf
Zumbrunn, Steve	2127 N. Dietrich Rd.	Junction City	66441	Geary	39.03850	-97.71490	52	Cow-Calf
Elder, Jim	Water Mill Rd				39.48530	-95.57980	50	Cow-Calf
Demel, Steve & Randy	Rr#1, Box 30	Claflin	67525	Barton	37.59810	-97.72690	50	Cow-Calf
Johnson, Steven R.	192 Se 60th	Leon	67074	Butler	37.84410	-96.33360	50	Finishing Feedlot
Flemming, Larry	Route 1 - Box 448	St Francis	67756	Cheyenne	39.81950	-96.17390	50	Finishing Feedlot
Flemming, Larry	Route 1 - Box 448	St Francis	67756	Cheyenne	38.74560	-94.91800	50	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Luthi, Theodore	531 Quail Road	Wakefield	67487	Clay	39.86300	-96.26760	50	Cow-Calf
Urban, Michael J.	745 23rd Rd.	Morganville	67468	Clay	39.70370	-95.96770	50	Finishing Feedlot
Fengel, Michael L.	561 - 8th Road	Oak Hill	67432	Clay	37.83320	-97.78470	50	Finishing Feedlot
Hartner, Harold F.	405 Liberty	Clay Center	67432	Clay	39.87870	-99.28120	50	Finishing Feedlot
Coulson, Jeffrey	967 First Road	Longford	67458	Clay	38.26750	-95.97690	50	Finishing Feedlot
Sherbert, Mike D.	1061 21st Road	Clay Center	67432	Clay	38.79150	-97.23350	50	Finishing Feedlot
Dillon, Gregory A.	502 Key Road	Hope	67451	Dickinson	39.66030	-95.96770	50	Cow-Calf
Forsyth, Roger	3627 Hawk Rd.	Abilene	67410	Dickinson	38.00760	-98.07740	50	Finishing Feedlot
Schaub, Bud	2978 Hamilton Rd.	Princeton	66078	Franklin	39.87740	-95.29300	50	Finishing Feedlot
Goering, Larry E.	7122 N. Anderson Rd.	Newton	67114	Harvey	39.38360	-96.26830	50	Finishing Feedlot
O'Keefe, Melvin	1413 S. Anderson	Newton	67114	Harvey	39.35750	-98.45960	50	Finishing Feedlot
Hiebert, Rudolf, Jr.	Box 163a	Walton	67151	Harvey	38.90570	-95.69590	50	Finishing Feedlot
Goertz, John & Ruth	918 N. Rock Rd-rt 4-bx 23a	Newton	67114	Harvey	38.00760	-97.07120	50	Finishing Feedlot
Underwood, Delbert	Rr 1 Box 129	Burr Oak	66936	Jewell	39.51700	-97.52890	50	Finishing Feedlot
Heim, Eugene	18126 Mt. Olivet Rd.	Leavenworth	66048	Leavenworth	38.92230	-97.23350	50	Finishing Feedlot
Lohmann, Vernon	Rr 1 Box 171	Lincoln	67455	Lincoln	38.77700	-97.58530	50	Cow-Calf
Greene, Joseph	Route 1	Beverly	67423	Lincoln	39.77610	-95.87400	50	Finishing Feedlot
Winter, Norman W.	Route 3 - Box 160a	Hillsboro	67063	Marion	39.70490	-99.07530	50	Finishing Feedlot
Dalinghaus, Jim	Box 130	Baileyville	66404	Nemaha	37.68350	-96.31660	50	Cow-Calf
Goddard & Sons	HC 63, P.O. Box 18	Lenora	67645	Norton	38.73340	-98.27030	50	Finishing Feedlot
Spring Valley Farms	878 E. Santa Fe Road	Agra	67621	Phillips	38.92020	-95.67740	50	Cow-Calf
B & M Mongeau Farms LLC (site #2)	PO Box 513	Stockton	67669	Rooks	39.96560	-98.43920	50	Cow-Calf
Mc Cormick Farms	2551 S. Geissler Rd.	Salina	67401	Saline	37.14220	-94.71330	50	Cow-Calf
Schauf, Thomas M.	Po Box 133	Garden Plain	67050	Sedgwick	38.61720	-97.62180	50	Cow-Calf
Dugan, John	15810 W. 47th Street South	Clearwater	67026	Sedgwick	39.43000	-99.35300	50	Cow-Calf
Baalman, Valeria	4631 Victoria	Wichita	67216	Sedgwick	38.84960	-96.60410	50	Finishing Feedlot
Martin, Michael	2756 S. Donmyer Rd.	Gypsum	67448	Saline	37.13210	-100.62210	45	Finishing Feedlot
Funk, Lavern	983 Indigo Road	Peabody	66866	Marion	39.34300	-97.11950	43	Finishing Feedlot
Axman, Jerome	1457 Nw 90 Ave	Olmitz	67564	Barton	37.59810	-97.47170	40	Finishing Feedlot
Terrapin Lake Farm Inc	6763 Old Hwy 40	Chapman	67431	Dickinson	37.27780	-97.25050	40	Finishing Feedlot
Van Horn, Dale B.	3712 Texas Rd.	Ottawa	66067	Franklin	38.73110	-96.10340	40	Cow-Calf
Wedel, Tim	1031 Chisolm Trail	Newton	67114	Harvey	38.31090	-95.51560	40	Finishing Feedlot
Peck, Edward J.	19370 S. Clare Road	Spring Hill	66083	Johnson	37.11310	-95.58560	40	Finishing Feedlot
Unruh, Warren	527 340th Rd	Tampa	67483	Marion	38.18210	-97.12610	40	Cow-Calf
Wiebe, Kenneth	Rr 1 - Box 16	Durham	67438	Marion	37.94950	-97.14440	40	Finishing Feedlot
Ruud, Karl	Rr 1 - Box 34	Lindsborg	67456	McPherson	39.05300	-96.91880	40	Finishing Feedlot
Bonjour Land & Cattle	Rt 1, Box 169	Centralia	66415	Nemaha	37.80110	-97.59930	40	Cow-Calf
Renyer, Jim	Rt 2, Box 76	Sabetha	66534	Nemaha	39.99320	-96.09890	40	Cow-Calf
J & M Georg, Inc .	Rr #1, Box 29	Rush Center	67575	Rush	37.59810	-97.58110	40	Finishing Feedlot
Gisick, Ralph	Box 314	Bison	67520	Rush	39.41260	-94.98440	40	Finishing Feedlot
O'Neill, Thomas	Rr 1 Box 153	Alma	66401	Wabaunsee	37.58360	-97.56290	40	Finishing Feedlot
Van Horn, Gene	3662 Texas Road	Wellsville	66092	Franklin	39.95120	-97.92210	35	Cow-Calf
Greenlee, John	548 14th Road	Clay Center	67432	Clay	37.72740	-94.91390	30	Cow-Calf
Riley, Earlene	2735 Tready Rd.	Oak Hill	67432	Clay	39.29950	-97.21250	30	Finishing Feedlot
Duskie, Edwin A	Rr 2 Box 120	Jewell	66949	Jewell	39.60330	-97.56590	30	Cow-Calf
Banman, Richard Or Evelyn	Rr #2 Box 66	Hillsboro	67063	Marion	39.12560	-98.32580	30	Finishing Feedlot
Hiebert, Ronald	Rr 2 Box 97	Peabody	66866	Marion	38.10440	-96.15050	30	Finishing Feedlot
Rogers, Kenneth W.	Rr 2 - Box 78	Peabody	66866	Marion	39.99470	-96.77860	30	Finishing Feedlot
Schroeder, Gilbert	6915 E. 108th Ave.	Inman	67546	McPherson	38.48690	-97.38260	30	Finishing Feedlot
Spooner, Archie	712 E Kansas St	Glen Elder	67446	Mitchell	39.15450	-98.32930	30	Finishing Feedlot
Shamrock Farms	Route 3	Manhattan	66502	Riley	38.37100	-96.95930	30	Finishing Feedlot
Martin & Son Farms	4001 Kitten Creek	Manhattan	66503	Riley	37.39110	-95.87940	30	Finishing Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Miller, Glenn	Rr 1, Box 6	Great Bend	67530	Barton	38.79150	-97.08540	27	Finishing Feedlot
Flemming, Larry	Route 1 - Box 448	St Francis	67756	Cheyenne	39.77610	-95.74280	25	Finishing Feedlot
Harmon, James & Bernice	6344 Hodges Drive	Prairie Village	66208	Johnson	39.77720	-97.09730	25	Cow-Calf
Huston, Tom	25040 W. 71st	Shawnee Mission	66227	Johnson	38.68960	-96.94090	25	Finishing Feedlot
Penner, Reno	R 2 Box 77	Hillsboro	67063	Marion	38.99490	-97.21500	25	Finishing Feedlot
Teetzen, Kenneth E.	Route 1 - Box 61	Ramona	67475	Marion	38.54480	-97.58500	25	Finishing Feedlot
Teetzen, Kenneth E.	Route 1 - Box 61	Ramona	67475	Marion	38.80380	-95.62190	25	Finishing Feedlot
Leis, John A	28719 West Harry Box 120	Garden Plain	67050	Sedgwick	38.52790	-95.46020	25	Finishing Feedlot
Ptacek, Kenneth F.	985 County Rd 20	Colby	67701	Thomas	38.48690	-96.86730	25	Cow-Calf
River Bend Farm	Rr 1 - Box 138	Marquette	67464	McPherson	38.47000	-95.68170	23	Finishing Feedlot
Kirmer, Gary L.	PO Box 536	Claflin	67525	Barton	39.89190	-96.06140	20	Finishing Feedlot
Unruh, John D	Rt 2 Box 151	Newton	67114	Harvey	39.18000	-96.52870	20	Finishing Feedlot
Fraser Farm	8215 N West Road	Hesston	67062	Harvey	37.37980	-101.63720	20	Finishing Feedlot
3 S Feeders	11281 V4 Rd	Hoyt	66440	Jackson	39.02390	-100.19560	20	Finishing Feedlot
Scheunemann, Ulrich E.	22080 W. 199 St.	Spring Hill	66083-8752	Johnson	37.61040	-95.38760	20	Finishing Feedlot
Mills, Marvin L. (farm #3183)	407 Evergreen Court	Mcpherson	67460	McPherson	39.26720	-95.56120	20	Finishing Feedlot
Baalmann, Joseph	4300 S 311 W	Cheney	67025	Sedgwick	38.16760	-96.79680	20	Finishing Feedlot
Lorenz, W Dean	33413 W 15th S	Garden Plain	67050	Sedgwick	37.97860	-98.00420	20	Finishing Feedlot
Baetz, Kevin	RR 2, Box 111A	Smith Center	66967	Smith	39.29950	-98.53400	20	Cow-Calf
Higgins, Gary	24985 W. 199th	Spring Hill	66083	Johnson	39.00940	-97.25210	15	Finishing Feedlot
Boucek, Richard	Navajo Road	Ada	67467	Ottawa	39.45630	-96.54730	15	Cow-Calf
Pattimore, John C.	19770 S. Lone Elm	Spring Hill	66083	Johnson	38.52790	-95.14660	12	Finishing Feedlot
Geer, Margaret	306 15th St	Clay Center	67432	Clay	38.76250	-97.27060	10	Finishing Feedlot
Regier, Howard & Otto	15725 Nw Prairie Creek Rd.	Newton	67114-8014	Harvey	38.51340	-94.72220	10	Finishing Feedlot
Harris, George & Gary	301 N. Center	Williamsburg	66095	Franklin	38.78930	-95.01060	7	Cow-Calf
Traffas Veterinary Services P.A.	Route 1, Box 29	Smith Center	66967	Smith	38.36880	-94.85140	5	Misc
Sramek, Mike					39.92090	-95.83650	0	Starter Feedlot
Mongeau, Ronnie	2330 10 Road	Zurich	67676		38.20560	-96.05900	0	Starter Feedlot
Doubletree Feeders, L.L.C.	1355 400 Ave	Gorham	67670		38.15300	-98.27860	0	Starter Feedlot
Walker, Russell	Hwy 43, North Of Hope	Hope			38.32760	-97.43780	0	Starter Feedlot
Walker Ranch					38.67510	-97.06970	0	Misc
Flying Diamond Ranch					38.83290	-95.38110	0	Misc
Triple A Cattle	Box 384	Welda	66091	Anderson	39.57350	-96.17390	0	Starter Feedlot
Bedwell Feeders	5502 NW Reutlinger	Medicine Lodge	67104	Barber	38.68960	-101.59680	0	Starter Feedlot
Ricke Cattle Co.	6326 Ne Blackmore	Medicine Lodge	67104	Barber	39.76160	-95.29300	0	Starter Feedlot
Nittler, Jody	405 Eldorado Ave	Medicine Lodge	67104	Barber	39.61780	-97.26600	0	Starter Feedlot
MYC Cattle Company	P.O. Box 7	Kiowa	67070	Barber	39.64700	-98.85080	0	Starter Feedlot
C & D Cattle	3867 Se Rattle Snake Tr	Kiowa	67070	Barber	38.38550	-99.18610	0	Starter Feedlot
Brady Farms, Inc.	RR #1, Box 65A	Albert	67511	Barton	39.92090	-95.96770	0	Starter Feedlot
Scheufler, Kenneth	294 Se 120th Ave	Ellinwood	67526	Barton	38.68960	-97.36420	0	Starter Feedlot
Schlessiger, Jack F.	1266 NE 120 Rd.	Claflin	67525	Barton	39.90640	-95.68660	0	Starter Feedlot
G-Three	774 Poplar Road	Uniontown	66779	Bourbon	39.15450	-97.21250	0	Starter Feedlot
Stucky, Elwyn	14488 Ne Price Rd.	Cassoday	66842	Butler	38.78930	-95.04770	0	Starter Feedlot
Spinden, Mike	Route 1 Box 135	Cottonwood Falls	66845	Chase	38.25480	-97.52850	0	Starter Feedlot
Buck Creek Ranch	Rr#1 Box 23	Cottonwood Falls	66845	Chase	39.60240	-95.72410	0	Starter Feedlot
Peterson, Gary	Box 110d	Cottonwood Falls	66845	Chase	39.22360	-96.30550	0	Starter Feedlot
Swift, Donnie R.	Rr 1 - Box 50	Matfield Green	66862	Chase	39.83400	-95.44290	0	Starter Feedlot
Rogers Farm	Route 2 - Box 119	St Francis	67756	Cheyenne	39.05300	-98.88120	0	Starter Feedlot
Betschart Livestock, Inc.	Route 1 Box 306	Ashland	67831	Clark	39.68930	-95.31170	0	Starter Feedlot
Weddle Farms, Inc.	11642 Yucca	Minneola	67865	Clark	39.92280	-101.72120	0	Starter Feedlot
Leis, John	12548 108 Road	Minneola	67865	Clark	39.68930	-95.66780	0	Starter Feedlot
Newell, Marc	285 Prairie Rd.	Wakefield	67487	Clay	38.42890	-97.21690	0	Starter Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Perry, Lyle	1509 N. 270 Road	Longford	67458	Clay	38.45790	-97.12490	0	Starter Feedlot
Nichols, Loran J	2699 Kiowa Road	Longford	67458	Clay	39.86420	-99.48700	0	Starter Feedlot
Kopfer Farms	630 Cherokee Rd.	Oak Hill	67432	Clay	38.24020	-97.58340	0	Starter Feedlot
Yarrow, Dwight	Rr 2 - 975 Navajo Rd.	Clay Center	67432	Clay	38.77700	-97.19650	0	Starter Feedlot
Chaffee, Rick	1079 Valleyview Rd	Clay Center	67432	Clay	39.77790	-101.62780	0	Starter Feedlot
Vesterberg Farms	1928 North 240th	Miltonvale	67466	Cloud	39.93530	-96.49250	0	Starter Feedlot
Slead Farms, Inc.	286 N.W. 24th Rd.	Lebo	66856	Coffey	38.47240	-99.20450	0	Starter Feedlot
Wernli, Kenneth	Route 1, Box 36	Gridley	66852	Coffey	39.66030	-95.76160	0	Starter Feedlot
Gilbert, Roger	1871 10th Road SE	Burlington	66839	Coffey	38.95130	-99.32550	0	Starter Feedlot
Gilbert, Richard	691 Trefoil Road SE	Leroy	66857	Coffey	39.60330	-96.83480	0	Starter Feedlot
Pugh, Donna	1980 10th Road SE	Leroy	66857	Coffey	37.72740	-94.91390	0	Starter Feedlot
Baker And Son Partnership	Rural Route 1, Box 78	Protection	67127	Comanche	39.76160	-95.78030	0	Starter Feedlot
O'Brien Cattle Co. Inc.	979 N. 90th	Hepler	66746	Crawford	39.14000	-100.26510	0	Starter Feedlot
Circle W Ranch	125 Hwy 3	Hepler	66746	Crawford	37.69810	-95.35110	0	Starter Feedlot
Miller Farms & Feedlot G.P.	P.O. Box 27	Norcatur	67653	Decatur	38.22570	-99.99820	0	Starter Feedlot
Holle, Kevin K.	Rr 2, Box 79	Oberlin	67749	Decatur	37.37980	-100.96650	0	Starter Feedlot
Bainter Construction Co.	Rt. 1	Dresden	67635	Decatur	39.15450	-99.70670	0	Starter Feedlot
Peterson, Arden	2218 Daisy Road	Solomon	67480	Dickinson	39.96430	-95.59290	0	Starter Feedlot
Reynolds, Justin	2321 Eden Rd	Abilene	67410	Dickinson	37.54000	-99.64030	0	Starter Feedlot
Anderson, Jim	763 HWY 43	Hope	67451	Dickinson	38.25480	-97.52850	0	Starter Feedlot
Goracke, Robert	469 Oat Rd	Hope	67451	Dickinson	38.48690	-98.06350	0	Starter Feedlot
Johnson, William	1930 Nail Rd	Enterprise	67441	Dickinson	39.93660	-98.45790	0	Starter Feedlot
Aker, Dan	1821 Fair Road	Abilene	67410	Dickinson	39.69090	-101.98270	0	Starter Feedlot
Mayden Feedlot - West	1400 Ave and Deer Rd	Abilene	67410	Dickinson	38.45790	-98.39470	0	Starter Feedlot
Rock, Lynn	1669 1300 Ave.	Hope	67451	Dickinson	39.73390	-99.01920	0	Starter Feedlot
Davis, Jerry L.	209 S. 12th	Herington	67449	Dickinson	38.70200	-94.65870	0	Starter Feedlot
Kuntz Land & Cattle	1268 Hwy 18 - Box 224	Abilene	67410	Dickinson	37.07380	-96.85170	0	Starter Feedlot
Bethe, Don & Mark	712 Hawk Road	Hope	67451	Dickinson	38.77700	-97.27060	0	Starter Feedlot
Eskeldson Farms	112 Paint Road	Ramona	67449	Dickinson	39.90640	-95.78030	0	Starter Feedlot
Dillon, Ralph E.	502 Key Road	Hope	67451	Dickinson	39.89190	-96.11770	0	Starter Feedlot
Kauffman, Lynn	1545 Key Road	Enterprise	67441	Dickinson	39.82070	-98.35330	0	Starter Feedlot
Meuli, Dwight L.	1142 Jeep Road	Abilene	67410	Dickinson	39.74720	-96.11770	0	Starter Feedlot
Stroda, Clarence	1749 1300 Ave	Hope	67451	Dickinson	37.72860	-97.87270	0	Starter Feedlot
Riedy Farms, Inc. (Charles Riedy)	508 Oat Road	Hope	67451	Dickinson	37.69810	-95.35110	0	Starter Feedlot
Polok, John	1531 400 Avenue	Hope	67451	Dickinson	39.76160	-95.96770	0	Starter Feedlot
Johnson, Steve & Sherry	1536 Nail Rd.	Enterprise	67441	Dickinson	37.78660	-97.92730	0	Starter Feedlot
Bielefeld, Raymond	329 Key Road	Hope	67451-9111	Dickinson	39.06750	-97.51120	0	Starter Feedlot
Wilson, Mrs. Charles	1045 2100 Ave.	Abilene	67410	Dickinson	39.77610	-96.09890	0	Starter Feedlot
Ja-Sal Farms	1228 3400 Ave	Abilene	67410	Dickinson	37.43500	-95.04140	0	Starter Feedlot
Neibling Farms	1870 Blackjack Rd	Highland	66035	Doniphan	38.77700	-97.43720	0	Starter Feedlot
Oliphant, Rodney	Rt 1 Box 87	Offerle	67563	Edwards	39.95110	-99.58050	0	Starter Feedlot
McClaren Farms	RR 2, Box 58	Lewis	67552	Edwards	38.45560	-96.49350	0	Starter Feedlot
Hornbaker Farms	Route 2 Box 65A	Lewis	67552	Edwards	38.48690	-96.94090	0	Starter Feedlot
Davis, Vernon	Rt. 1, Box 101	Kinsley	67547	Edwards	38.06580	-97.12610	0	Starter Feedlot
Burr Brothers	Route 1 - Box 54b	Kinsley	67547	Edwards	39.31400	-96.89610	0	Starter Feedlot
Werth, Leland & Janice	RR 2 Box 104	Ellis	67637	Ellis	39.79170	-97.28470	0	Starter Feedlot
Marcotte Farms	3119 Thunderbird Circle	Hays	67601	Ellis	39.34300	-98.44100	0	Starter Feedlot
Kubick, Lester	376 20th Rd	Ellsworth	67439	Ellsworth	39.61690	-96.32380	0	Starter Feedlot
Koster, Duane #2-Tates	P. O. Box 897	Garden City	67846	Finney	39.60330	-97.32220	0	Starter Feedlot
Sunbelt Farms	P.o. Box 897	Garden City	67846	Finney	37.83320	-99.52260	0	Starter Feedlot
Frontier Feeders	8385 East Plymell Rd	Garden City	67846	Finney	39.31400	-101.64240	0	Starter Feedlot
Goetz Farms Inc.	10950 101 Road	Dodge City	67801	Ford	38.57370	-101.06320	0	Starter Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Temaat, Dan	Route 2, Box 93	Spearville	67876	Ford	39.27050	-96.72860	0	Starter Feedlot
Burkdoll Feedlot	4146	Rantoul	66079	Franklin	37.32140	-95.86440	0	Starter Feedlot
Burkdoll, Trent	4191 John Brown Rd	Rantoul	66079	Franklin	38.02220	-97.27240	0	Starter Feedlot
D & D Ranching Enterprises Inc.	2270 County Road 48	Grainfield	67737-6017	Gove	38.97840	-95.21440	0	Starter Feedlot
Dohm, Dennis		Grinnell	67738	Gove	39.87870	-97.15350	0	Starter Feedlot
BLOC, LLC	801 Co. Rd. 42	Gove	67736	Gove	38.32760	-98.54190	0	Starter Feedlot
Lewis, Patrick	1736 County Road 34	Grinnell	67738	Gove	39.92220	-98.73850	0	Starter Feedlot
Mendenhall, David		Gove	67736	Gove	38.08030	-96.76020	0	Starter Feedlot
Tustin, Wayde	5081 County Rd. M	Gove	67736	Gove	37.68510	-96.96150	0	Starter Feedlot
Briggs, Bill	810 County Road 50	Gove	67736	Gove	39.38360	-95.07750	0	Starter Feedlot
Riedel Cattle Company	1542 160th Ave.	Morland	67650	Graham	38.44340	-98.15550	0	Starter Feedlot
Money Cattle Company	2564 180th Ave.	Penokee	67659	Graham	37.49650	-97.03440	0	Starter Feedlot
D/T Cattle Co.	Rr #1, Box 169	Penokee	67659	Graham	39.24150	-100.43260	0	Starter Feedlot
Gano Farms Partnership	1433 230th Ave.	Hill City	67642-2822	Graham	38.50130	-99.09400	0	Starter Feedlot
Long, Michael T.	916 N. McCall	Ulysses	67880	Grant	39.96570	-97.17230	0	Starter Feedlot
R & P Cattle Company	14902 19th Road	Cimarron	67835	Gray	38.32760	-98.24750	0	Starter Feedlot
Chaparral Feeders	18745 16 Road	Cimarron	67835	Gray	38.60270	-100.49270	0	Starter Feedlot
Tim Dewey Farm	3680 North Dewey Road	Cimarron	67835	Gray	37.56910	-98.21890	0	Starter Feedlot
Ponca Cattle Co.	PO Box 668	Cimarron	67835	Gray	38.87870	-101.76920	0	Starter Feedlot
Dumler, Roger & Jacob	7500 North Evans Rd	Kalvesta	67835	Gray	37.47880	-95.58790	0	Starter Feedlot
Mangan Cattle Company	P. O. Box 631	Tribune	67879	Greeley	38.47240	-101.78090	0	Starter Feedlot
Otter Creek Ranch, LLC	Route 3, Box 104	Eureka	67045	Greenwood	38.31310	-99.97740	0	Starter Feedlot
Matador Cattle Co.- Spring Creek Ranch	448 Reece Rd	Eureka	67045	Greenwood	39.35750	-99.98590	0	Starter Feedlot
Marshall Farms	Rt 1 Box 73	Eureka	67045	Greenwood	38.24890	-95.45460	0	Starter Feedlot
High Plains Calf Ranch	PO Box 775	Syracuse	67878	Hamilton	38.19660	-98.35180	0	Starter Feedlot
111 Ranch	Route 2 - Box 206	Anthony	67003	Harper	37.94950	-97.96760	0	Starter Feedlot
Bergman Farms	Rr 1 Box 67	Harper	67058	Harper	39.95120	-96.72230	0	Starter Feedlot
Cox Farms, Inc.	725 N. Anthony	Anthony	67003	Harper	39.86420	-96.87230	0	Starter Feedlot
Mueller, Josh	820 N. Halstead Rd.	Halstead	67056	Harvey	38.76250	-97.43720	0	Starter Feedlot
Janzen Family Farms Inc.	1492 10th	Newton	67114	Harvey	38.90770	-96.97440	0	Starter Feedlot
J & C Farms	4300 Se 24th	Newton	67114-8837	Harvey	37.45300	-97.30770	0	Starter Feedlot
Brown, Inc.	RR 1 Box 109A	Satanta	67870	Haskell	37.99310	-97.03460	0	Starter Feedlot
Doris Cattle Company	Rr 1 Box 118	Satanta	67870	Haskell	37.32150	-100.33210	0	Starter Feedlot
Bradford Feedyard	R.R.1, Box 31A	Jetmore	67854	Hodgeman	37.72860	-97.39890	0	Starter Feedlot
Bradford Farm	Rr 1 Box 20	Jetmore	67854	Hodgeman	38.98040	-99.86240	0	Starter Feedlot
Wilson Yard - Cary Wilson	R.R.1, Box 52	Jetmore	67854	Hodgeman	38.92020	-95.47370	0	Starter Feedlot
Bohling, Marvin	Route 1, Box 94	Jetmore	67854-9746	Hodgeman	39.32540	-96.41710	0	Starter Feedlot
Burkhart Farms	Route 1 Box 31	Hanston	67849	Hodgeman	37.80110	-100.53320	0	Starter Feedlot
Hahn's Inc. - Wilson Yard	Rt 1 Box 34A	Hanston	67849	Hodgeman	38.62910	-95.88460	0	Starter Feedlot
Doyle, Lee & Scott	14884 Rd 238	Holton	66436	Jackson	38.98040	-98.43690	0	Starter Feedlot
Burdiek, Roger	25300 L4 Rd	Circleville	66416	Jackson	39.60240	-95.23680	0	Starter Feedlot
Area, Robert	17221 R4 Rd	Mayetta	66509	Jackson	39.12560	-100.30670	0	Starter Feedlot
Bailey, Leland	11449 110th Rd.	Mayetta	66509	Jackson	38.61460	-95.47870	0	Starter Feedlot
J-Bar Ranch	Route 1 - Box 291	Perry	66073	Jefferson	38.73110	-94.75130	0	Starter Feedlot
Hemme Ranch (west)	8284 - 22nd Rd	Perry	66073	Jefferson	38.23450	-95.45460	0	Starter Feedlot
K4 Cattle Co.	Route 1 - Box 183	Valley Falls	66088	Jefferson	39.64680	-97.99710	0	Starter Feedlot
Traxler, Richard	11880 US 24 HWY	Perry	66073	Jefferson	38.96580	-97.19650	0	Starter Feedlot
Hemme Ranch (east)	Route 1 - Box 100	Perry	66073	Jefferson	39.25270	-94.89140	0	Starter Feedlot
Barrett, Don R.	Rr 1 - Box 61	Randall	66963-9703	Jewell	39.44450	-97.19390	0	Starter Feedlot
Duskie, Leonard	Rr 2 Box 181	Jewell	66949	Jewell	37.84410	-94.72210	0	Starter Feedlot
Kohn, Bradley L.	RR 2 - Box 175	Jewell	66949	Jewell	38.70440	-97.04840	0	Starter Feedlot
Warner, Tim	Rr 1 Box 25a	Burr Oak	66936	Jewell	39.64580	-95.96770	0	Starter Feedlot

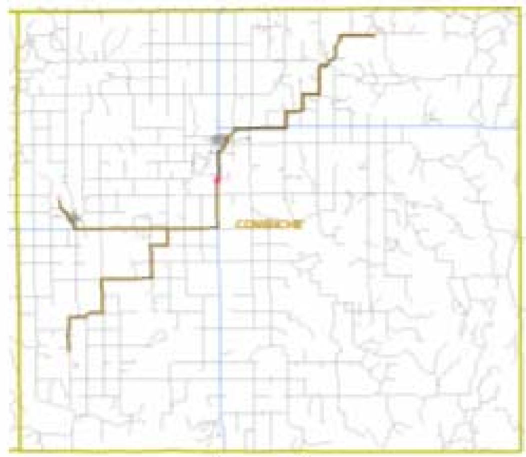
FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
B & J Farms	Route 2 - Box 124	Mankato	66956	Jewell	37.83320	-97.51020	0	Starter Feedlot
Fuller, Bradley	Route 1 - Box 35	Lakin	67860	Kearny	37.94950	-98.00420	0	Starter Feedlot
Tiesmeyer Farms	7246 Sw 70th St.	Kingman	67068	Kingman	39.37200	-97.15670	0	Starter Feedlot
Simons Bros.	501 South Main	Kingman	67068	Kingman	39.79060	-95.98650	0	Starter Feedlot
Hart, Bruce E	16506 W Hwy 42	Nashville	67112	Kingman	37.89130	-97.21750	0	Starter Feedlot
Sowers, Leon	13103 Se 40 St	Murdock	67111	Kingman	38.96580	-98.01110	0	Starter Feedlot
Taylor Land & Cattle (Michael Taylor)	Rt 1 Box 121 A	Greensburg	67054	Kiowa	38.58820	-100.63990	0	Starter Feedlot
Roberts, Carl M.	296 N. Mustang	Dighton	67839	Lane	37.39500	-100.24160	0	Starter Feedlot
Schwartz, Darrel - dba Schwartz Feeders	154 North Gage Road	Dighton	67839	Lane	38.64360	-95.25730	0	Starter Feedlot
Lazy J-4 Cattle Company	251 N Karl Road	Shields	67839	Lane	39.47080	-95.71010	0	Starter Feedlot
Bell Farms	Rt 2 Box 69a	Lincoln	67455	Lincoln	38.21120	-99.52260	0	Starter Feedlot
Meyer Land & Cattle Company	Po Box 305	Sylvan Grove	67481	Lincoln	37.94950	-98.09560	0	Starter Feedlot
Draper Cattle	2815 County Rd 400	Oakley	67748	Logan	38.32760	-97.34570	0	Starter Feedlot
Wheat Ranch	Po Box 38	Allen	66833	Lyon	39.82070	-97.07850	0	Starter Feedlot
Delong, David	1285 Road 210	Emporia	66801	Lyon	37.02590	-94.71330	0	Starter Feedlot
Williams, Will	455 Road D	Olpe	66865	Lyon	39.14000	-97.34280	0	Starter Feedlot
Darbyshire Grow Yard	805 Road X5	Hartford	66854	Lyon	39.29950	-98.23620	0	Starter Feedlot
Davies, Clint & Sons (west)	10961 W 309	Reading	66868	Lyon	37.94950	-101.00440	0	Starter Feedlot
Reed Ranch	3730 Road U	Allen	66833	Lyon	39.35750	-100.02310	0	Starter Feedlot
Davies, Clint & Sons (east)	Route 2 Box 37	Reading	66868	Lyon	38.26970	-97.16170	0	Starter Feedlot
Krispense, Steven Todd	2280 Pawnee Rd.	Marion	66861	Marion	37.20030	-94.98590	0	Starter Feedlot
Carlson, Marcus	2881 290th Rd	Lincolnville	66858	Marion	38.89320	-97.54830	0	Starter Feedlot
Donahue Hayhook Ranch, Timothy Donahue	2461 Clover Rd	Lincolnville	66858	Marion	39.35750	-100.74900	0	Starter Feedlot
Bina, Robert J. & Sons	2725 280th St	Lincolnville	66858	Marion	39.41550	-96.97060	0	Starter Feedlot
Entz, Alden	1673 E 20th St	Peabody	66866	Marion	39.93670	-96.92850	0	Starter Feedlot
Williams Farm	1434 150th Rd	Marion	66861	Marion	39.50250	-97.17530	0	Starter Feedlot
Meathook Ranch, Inc.	1612 60th St.	Peabody	66866	Marion	39.20910	-96.13800	0	Starter Feedlot
Donahue Hayhook Ranch, Dudley Donahue	784 310th Rd	Durham	67438	Marion	39.57430	-97.60340	0	Starter Feedlot
Donahue Hayhook Ranch	Rr 1 - Box 9	Durham	67438	Marion	39.28500	-96.74720	0	Starter Feedlot
Kaiser, Duane	628 310th	Durham	67438	Marion	39.06750	-97.65930	0	Starter Feedlot
Donahue Hayhook Ranch	Rr 1 - Box 9	Durham	67438	Marion	38.64610	-97.76900	0	Starter Feedlot
Nellans, Martin	Rr 2 Box 50	Peabody	66866	Marion	39.80630	-98.88820	0	Starter Feedlot
Spiller Te Ce Quarter Horses Inc	1121 Overland Rd.	Mcpherson	67460	McPherson	37.84770	-97.08950	0	Starter Feedlot
Thompson, Darrell	1636 North Main	Mcpherson	67460	McPherson	39.58950	-101.73990	0	Starter Feedlot
Foote Cattle Co. (Hamiltons)	231st & Pflumm	Bucyrus	66013	Miami	37.51100	-100.66080	0	Starter Feedlot
Fletchall, Martin	Rural Route 3 Box 78	Beloit	67420	Mitchell	37.94950	-97.12610	0	Starter Feedlot
Remus, C.W.	Rural Route 1, Box 17	Cawker City	67430	Mitchell	39.31400	-97.19390	0	Starter Feedlot
Becker, Robert	1275 110 Road	Cawker City	67430	Mitchell	38.84750	-96.08490	0	Starter Feedlot
Gasper Farms	RR 1 - Box 14	Tipton	67485	Mitchell	39.16900	-97.23110	0	Starter Feedlot
Gasper, Kenneth N.	1751 S. 10th Ave.	Tipton	67485	Mitchell	38.98040	-98.08510	0	Starter Feedlot
Pahls, Edwin	Rr 2 Box 15	Cawker City	67430	Mitchell	38.45560	-95.46020	0	Starter Feedlot
Timbers, Roy	Route 1 - Box 158	Glen Elder	67446	Mitchell	37.65610	-96.94330	0	Starter Feedlot
Bar M Bar Veterinary Clinic	Route 2 Box 188	Cherryvale	67335	Montgomery	39.14000	-100.15340	0	Starter Feedlot
Bacon, Dan	418 DD Avenue	Council Grove	66846	Morris	37.23410	-97.75810	0	Starter Feedlot
Casey, Malcolm	117 Road 380	Council Grove	66846	Morris	39.58950	-101.36630	0	Starter Feedlot
2 B Ranch	433 Dd Ave	Council Grove	66846	Morris	37.32150	-96.92420	0	Starter Feedlot
Burhoop, Enno	Aa Ave And 2800 Rd	Burdick	66838	Morris	39.32850	-98.25490	0	Starter Feedlot
Seth Farms	1685 Parkerville Rd.	Council Grove	66846	Morris	39.94980	-96.06140	0	Starter Feedlot
Holthaus Feedlot	Route 1 - Box 10	Centralia	66415	Nemaha	38.00760	-96.97970	0	Starter Feedlot
Dalinghaus, Eugene	Rt 1	Baileyville	66404	Nemaha	38.26970	-97.60340	0	Starter Feedlot
Sumner, Ward	907 Westridge	Norton	67654	Norton	37.92040	-97.76640	0	Starter Feedlot

FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
KWWS Feeders	RR 3, Box 54	Norton	67654	Norton	38.14770	-96.53510	0	Starter Feedlot
Persinger Farms, Inc.	RR 3 Box 44	Norton	67654	Norton	37.63970	-94.95030	0	Starter Feedlot
Hilltop Farms	HC 63 Box 22	Lenora	67645	Norton	37.23410	-100.62210	0	Starter Feedlot
Schulze Land & Cattle	Rr 3 - Box 122	Norton	67654	Norton	38.50130	-101.04480	0	Starter Feedlot
C & M Starters	Route 3 - Box 54	Norton	67654	Norton	39.35750	-98.47820	0	Starter Feedlot
Lang, Michael	Route 2 - Box 3	Norton	67654	Norton	39.22700	-97.45450	0	Starter Feedlot
Sturdy Farms	1108 W 6th St.	Lyndon	66451	Osage	39.37200	-97.13810	0	Starter Feedlot
Lacey Farms, Inc.	32782 Highway K-31	Melvern	66510	Osage	39.32850	-100.45120	0	Starter Feedlot
Wiley Farm	25853 S Hwy 75	Lyndon	66451	Osage	37.62710	-97.69040	0	Starter Feedlot
Thornton, Lynn	1188 C 671 Ave	Osborne	67473	Osborne	39.02390	-98.45540	0	Starter Feedlot
Krier, Dan	328 Co. 388 Drive	Downs	67437	Osborne	39.00940	-100.21410	0	Starter Feedlot
Sigle, Scott S.	120 N. 1st	Osborne	67473	Osborne	38.61720	-97.06970	0	Starter Feedlot
Wolf, Greg	Po Box 307	Bennington	67422	Ottawa	37.19130	-95.90060	0	Starter Feedlot
Bollier Farm	Frontier and 140th	Minneapolis	67467	Ottawa	37.72860	-100.46030	0	Starter Feedlot
Crosson Farms Inc.	1537 Nugget Road	Minneapolis	67467	Ottawa	39.11110	-98.34430	0	Starter Feedlot
Mchenry, Jeff	90th Rd.	Delphos	67467	Ottawa	38.31310	-98.59720	0	Starter Feedlot
Tibbits, John & Riley	207 E. 9th	Minneapolis	67467	Ottawa	38.67250	-96.14290	0	Starter Feedlot
Boucek, Richard	1468 N 20th Road	Ada	67467	Ottawa	38.74800	-101.91730	0	Starter Feedlot
Miller, Steven L.	Rr 2 - B0x 37	Burdett	67523	Pawnee	39.61800	-98.47660	0	Starter Feedlot
K & K Cattle #2	Rt 1 Box 17	Rozel	67574	Pawnee	39.81950	-95.94900	0	Starter Feedlot
Ingram Farms Feedyard	Rr 1, Box 4	Long Island	67647	Phillips	37.68510	-97.67220	0	Starter Feedlot
Losey, Roger & Mark	1752 E. 1100 Road	Agra	67621	Phillips	39.95180	-101.08610	0	Starter Feedlot
VanAllen, Michael D.	1795 East 300 Road	Phillipsburg	67661	Phillips	37.96400	-97.54680	0	Starter Feedlot
Stockman, Bruce	PO Box 412	Kirwin	67644	Phillips	39.71820	-96.15520	0	Starter Feedlot
Van Loenen Farms, LLC	PO Box 365	Prairie View	67664	Phillips	39.58790	-95.87400	0	Starter Feedlot
Miller, Steven D. Farms	1222 East Plains Road	Agra	67621	Phillips	38.32760	-97.58500	0	Starter Feedlot
Morgan Farms	119 W Hwy 9	Glade	67639	Phillips	39.37200	-100.48840	0	Starter Feedlot
Erickson Farms	1197 West Iron	Prairie View	67664	Phillips	38.47000	-96.14290	0	Starter Feedlot
Oak Springs Ranch	17055 Day Rd	Onaga	66521	Pottawatomie	38.10940	-97.05290	0	Starter Feedlot
Lemon And Barbee	P O Box 987	Pratt	67124	Pratt	38.51340	-96.32740	0	Starter Feedlot
Lenkner & Son Inc.	11039 NW Larkspur Rd	Coats	67028	Pratt	39.40100	-96.78440	0	Starter Feedlot
Frisbie Wheat & Hereford Farms	Hc2 - Box 61	Mcdonald	67745	Rawlins	38.84960	-100.26970	0	Starter Feedlot
Klein, Doug	Rr 2 - Box 20	Atwood	67730	Rawlins	37.62710	-97.69040	0	Starter Feedlot
R & S Cattle Co.	21918 S. Salt Marsh Rd.	Turon	67583	Reno	39.93670	-97.05980	0	Starter Feedlot
Showalter, CB	8803 East Arlington Rd	Haven	67543	Reno	38.03670	-97.29070	0	Starter Feedlot
H & S Cattle Co. Of Partridge (aka) Doug Harner	6802 S. Salem Road	Partridge	67566	Reno	39.53150	-97.28700	0	Starter Feedlot
Headings #2	4201 W Mills Ave.	Hutchinson	67501	Reno	38.57370	-101.37600	0	Starter Feedlot
Gibson Farms	4013 E Illinois Ave	Hutchinson	67501	Reno	38.61720	-99.64610	0	Starter Feedlot
Stroberg Land & Cattle	5016 N Hendricks	Hutchinson	67502-9676	Reno	38.13850	-97.25410	0	Starter Feedlot
Headings, Mervin	Route 1, Box 239	Hutchinson	67501	Reno	38.83510	-97.71490	0	Starter Feedlot
Larson, Kevin	1215 Rock Road	Scandia	66966	Republic	37.77120	-95.69730	0	Starter Feedlot
McVay Farm (JK Farney Farms)	23816 W. 56th	Sterling	67579	Rice	37.33590	-95.77370	0	Starter Feedlot
Mizell Farms Inc.	10306 N. Salem Road	Sterling	67579	Rice	38.71890	-97.30760	0	Starter Feedlot
Schweizer, Tom	25310 W. 82nd	Sterling	67579	Rice	39.94980	-95.91150	0	Starter Feedlot
Clarke, Courtney	620 State Road 14	Lyons	67554	Rice	38.25480	-97.10780	0	Starter Feedlot
Cobb, Helen M	18408 West 17th Ave	Sterling	67579	Rice	39.71820	-95.48040	0	Starter Feedlot
Mongeau AB Trust	512 South 4th	Stockton	67669	Rooks	38.44340	-100.93430	0	Starter Feedlot
Strutt, Vernon	2825 F Road	Woodston	67675	Rooks	39.19450	-96.26830	0	Starter Feedlot
Carsten, Bernard, Carsten Farms	1240 20 Road	Stockton	67669	Rooks	37.24870	-98.39250	0	Starter Feedlot
Stamper, Larry	2120 R R0ad	Plainville	67663	Rooks	37.65610	-98.34650	0	Starter Feedlot
Holopirek Cattle Co.	RR 2 Box 8262	Timken	67575	Rush	38.26970	-98.72600	0	Starter Feedlot

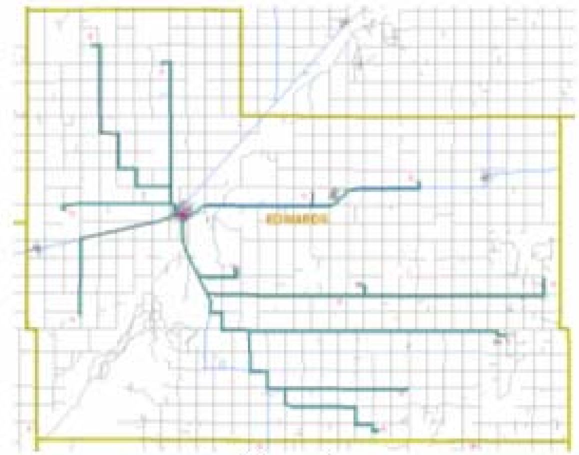
FACILITIY NAME	LOCATION ADDRESS	LOC CITY	LOC ZIP	COUNTY	LATITUDE	LONGITUDE	BEEF-ADULT	OPERATION TYPE
Lohrey, John	R.r. 1, Box 71	Bison	67520	Rush	38.44110	-96.16140	0	Starter Feedlot
Brack, Alan and/or Scott Brack	Route 1 Box 16	Bison	67520	Rush	39.22700	-100.35810	0	Starter Feedlot
Baus, Mark L.	P.O. Box 93	Alexander	67513	Rush	39.19450	-95.11470	0	Starter Feedlot
Georg, Winston F.	1101 Madison	Lacrosse	67548	Rush	39.35750	-101.75410	0	Starter Feedlot
Lohrey, John	RR 1, Box 71	Bison	67520	Rush	37.72740	-95.55150	0	Starter Feedlot
Thielenhaus Brothers	Rr 1, Box 139	Bison	67520	Rush	38.68700	-95.71860	0	Starter Feedlot
Barnes, Gary & Bruce	Rr 1	Mccracken	67556	Rush	37.99310	-97.78470	0	Starter Feedlot
Barnes, Gerald	Rr 1 - Box 8	Mccracken	67556	Rush	38.44340	-97.71380	0	Starter Feedlot
Bohnen Cattle Company	19623 Grant Rd.	Dorrance	67634	Russell	38.10940	-98.29690	0	Starter Feedlot
Kent Palmer Farm	5697 202nd St.	Lucas	67648	Russell	39.64580	-96.15520	0	Starter Feedlot
Brungardt Ranch	2652 Emmeram Road	Gorham	67640	Russell	38.26970	-97.71380	0	Starter Feedlot
Came Farms, Inc.	3472 W. Shipton Rd.	Salina	67401	Saline	39.66130	-98.25960	0	Starter Feedlot
Isaacson, Vaughn	2238 Wesley	Salina	67401	Saline	39.79180	-100.17930	0	Starter Feedlot
Johnson, Clayton N.	11948 S. Lamer Rd.	Assaria	67416	Saline	37.07380	-96.96050	0	Starter Feedlot
Armstrong, Joe	224 South Main	Hedville	67401	Saline	38.62910	-96.56730	0	Starter Feedlot
Griffith Ranch	503 E. 11th	Scott City	67871	Scott	39.92090	-95.76160	0	Starter Feedlot
Bolinger, Richard	Rr 2 - Box 121	Cheney	67025	Sedgwick	39.79060	-96.04270	0	Starter Feedlot
Hillman Farms	33115 W. 47th St. S.	Cheney	67025	Sedgwick	37.32150	-96.90610	0	Starter Feedlot
Powers, Roger	4080 County Road S	Grainfield	67037	Sedgwick	38.66060	-101.39440	0	Starter Feedlot
Hatcher, Charlotte S. Revocable Trust	651 Lilac	Liberal	67901	Seward	39.34300	-100.52560	0	Starter Feedlot
Parr, Howard	Box 416	Rossville	66533	Shawnee	39.95120	-98.12830	0	Starter Feedlot
Chisham, Brian	3742 SW 93rd St	Wakarusa	66546	Shawnee	38.10940	-97.14440	0	Starter Feedlot
Tenbrink, Bill	1827 93rd St	Wakarusa	66546	Shawnee	39.44450	-98.23620	0	Starter Feedlot
Crystalline 7 Feeders	RR 2 Box 131	Selden	67757	Sheridan	39.79060	-95.93020	0	Starter Feedlot
Wigginton Farm Trust	RR 2, Box 16	Hoxie	67740	Sheridan	39.40100	-97.17530	0	Starter Feedlot
Taylor, Charles B.	RR 1 - 99D	Hoxie	67740	Sheridan	39.21250	-100.74900	0	Starter Feedlot
Wickwar, Gary & Charlene	6510 Rd 18	Goodland	67735	Sherman	38.21120	-100.83980	0	Starter Feedlot
Nichols, Kendall L.	Rt 2 Box 211	Smith Center	66967	Smith	37.42400	-100.98880	0	Starter Feedlot
Levin Farms, Inc.	P.O. Box 325	Kensington	66951-0325	Smith	38.00760	-97.12610	0	Starter Feedlot
Johnson, Mark	1109 Hwy #9	Gaylord	67638	Smith	38.87870	-99.34400	0	Starter Feedlot
Seibert, Gary	Rt 1 Box 37	Macksville	67557	Stafford	37.97860	-98.86400	0	Starter Feedlot
Wilson, Doyle	Rr 1 Box 11	Macksville	67557	Stafford	37.99310	-99.85190	0	Starter Feedlot
Fisher Farms, Inc.	Route 1 - Box 44	St John	67576	Stafford	38.06580	-96.97970	0	Starter Feedlot
Grunder,Fred	Route 1, Box 55	St John	67576	Stafford	37.68350	-95.20540	0	Starter Feedlot
Fisher, Craig	Rr 1 - Box 44	St John	67576	Stafford	38.16760	-98.13220	0	Starter Feedlot
Pro Am Feedyard	BB Road & 12 Road	Hugoton	67951	Stevens	38.45790	-100.78710	0	Starter Feedlot
Wagon Bed Feeders, LLC	P.O. Box 521	Hugoton	67951	Stevens	39.28500	-102.03330	0	Starter Feedlot
Neises, Jimmie	409 N. Rock Rd.	Belle Plaine	67013-8274	Sumner	38.13850	-97.36390	0	Starter Feedlot
4-Mile Feeders, Inc.	1647 County Rd 15	Colby	67701	Thomas	38.82060	-102.00990	0	Starter Feedlot
Baird, Steve	2022 County Road 11	Levant	67743	Thomas	37.33610	-97.46800	0	Starter Feedlot
Geyer, Galen	721 N Main	Wakeeney	67672	Trego	39.83400	-95.31170	0	Starter Feedlot
Walsh Ranch	RR Box 2	Collyer	67631	Trego	37.42400	-96.87040	0	Starter Feedlot
Hase & Hase Cattle Company	Rr 1 Box 137	Eskridge	66423	Wabaunsee	39.87740	-96.17390	0	Starter Feedlot
GEM Land & Cattle	P.O. Box 338	Leoti	67861	Wichita	39.67600	-99.09410	0	Starter Feedlot
Baker Boys Haying	Route 1 - Box 64	Marienthal	67863	Wichita	39.34300	-99.81830	0	Starter Feedlot
Rossillon, Eric	2135 Indian Road	Yates Center	66783	Woodson	37.92040	-97.12610	0	Starter Feedlot

APPENDIX V - SHORTEST PATHS FROM COUNTY CENTROIDS TO FEED YARDS IN THE RESPECTIVE COUNTY

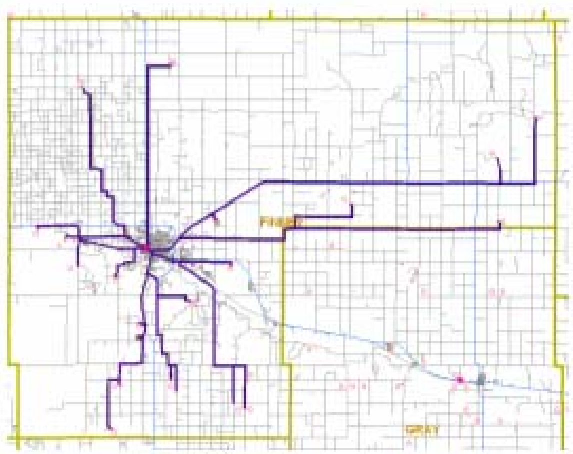
Clark



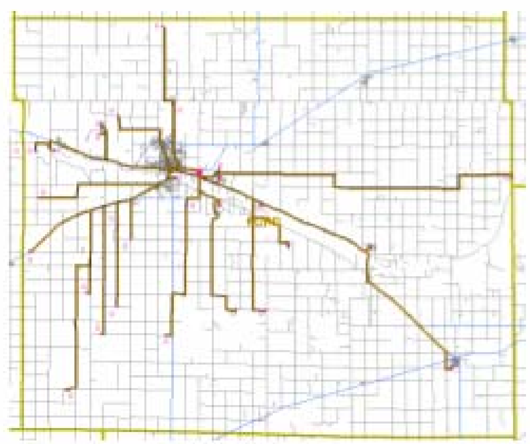
Comanche



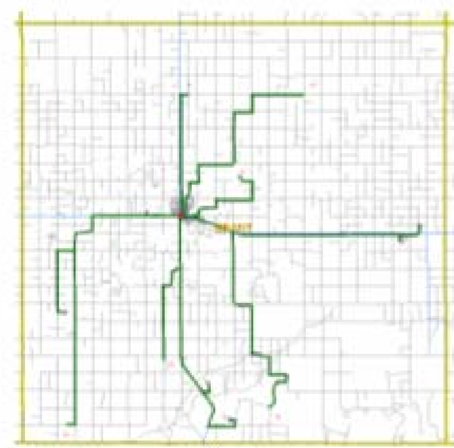
Edwards



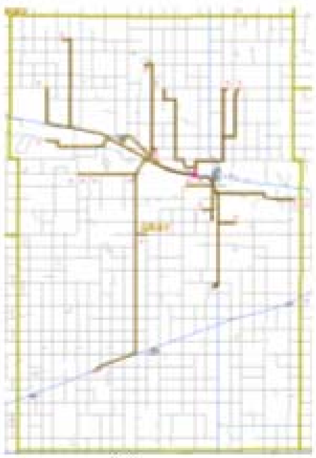
Finney



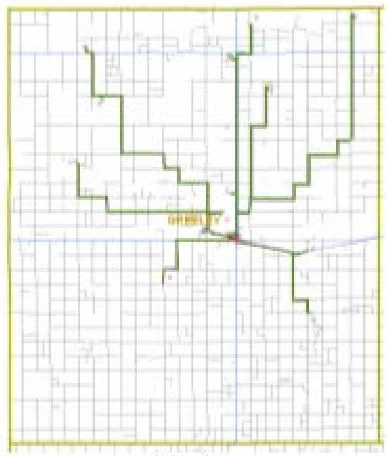
Ford



Grant

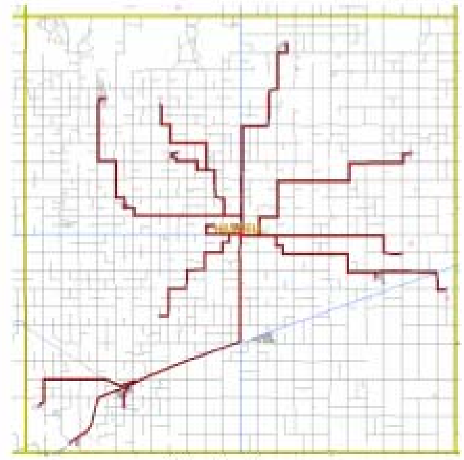


Gray

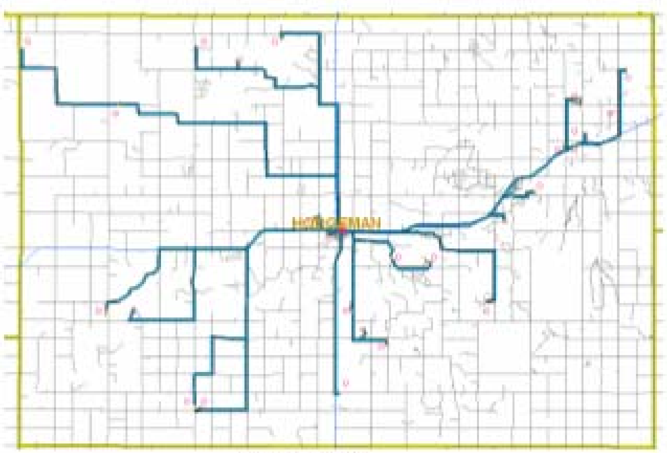


Greeley

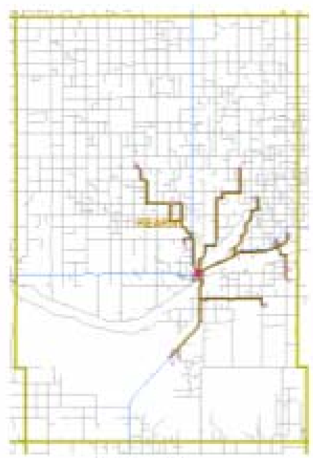
Hamilton



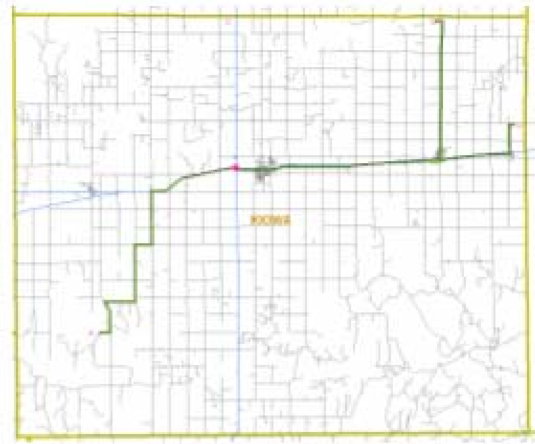
Haskell



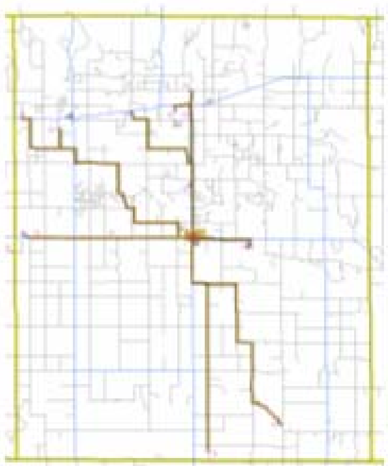
Hodgeman



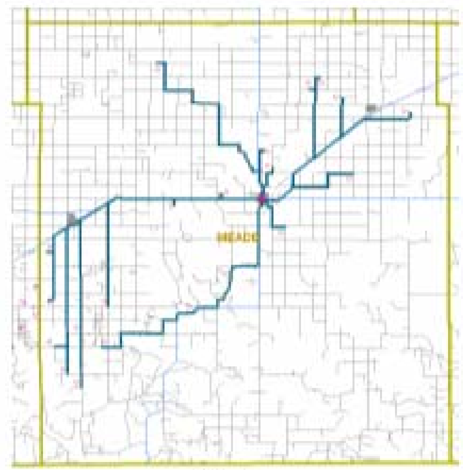
Kearny



Kiowa

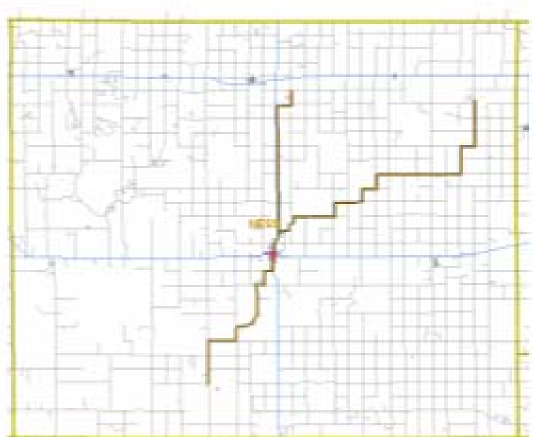


Lane

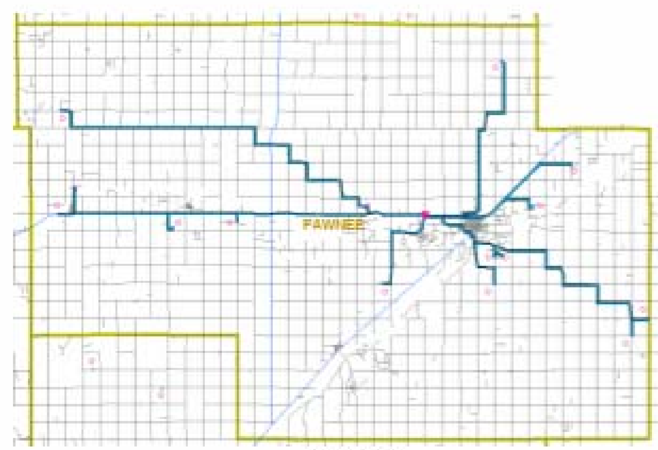


Meade

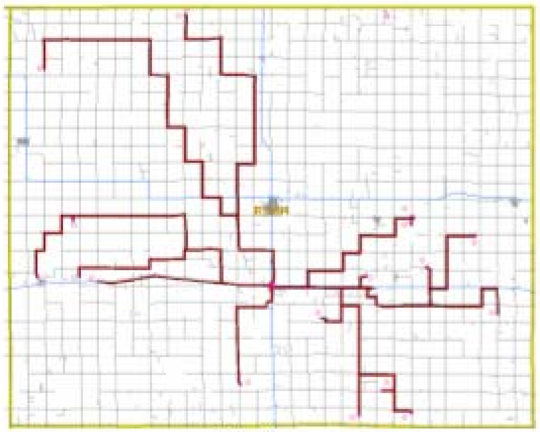
Morton

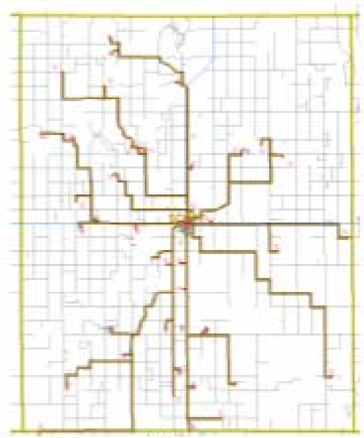


Ness

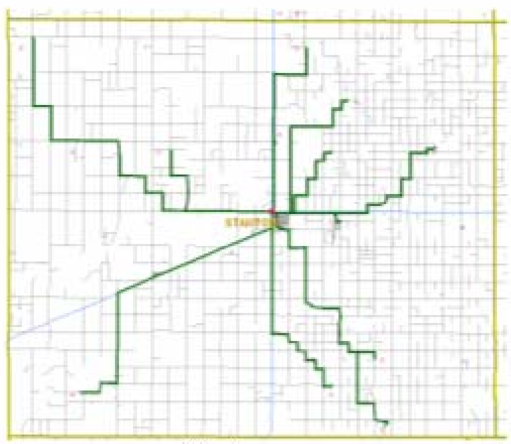


Pawnee

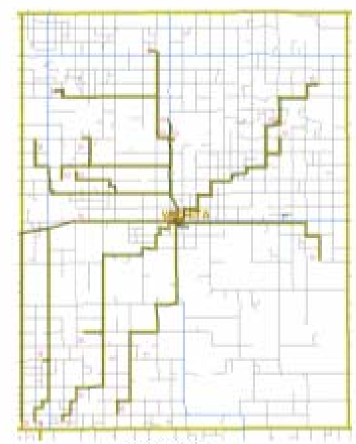

Rush


Scott


Seward


Stanton


Stevens


Wichita

APPENDIX VI - SHORTEST PATHS FROM ENTRY POINTS IN THE BOUNDARY TO COUNTY CENTROIDS

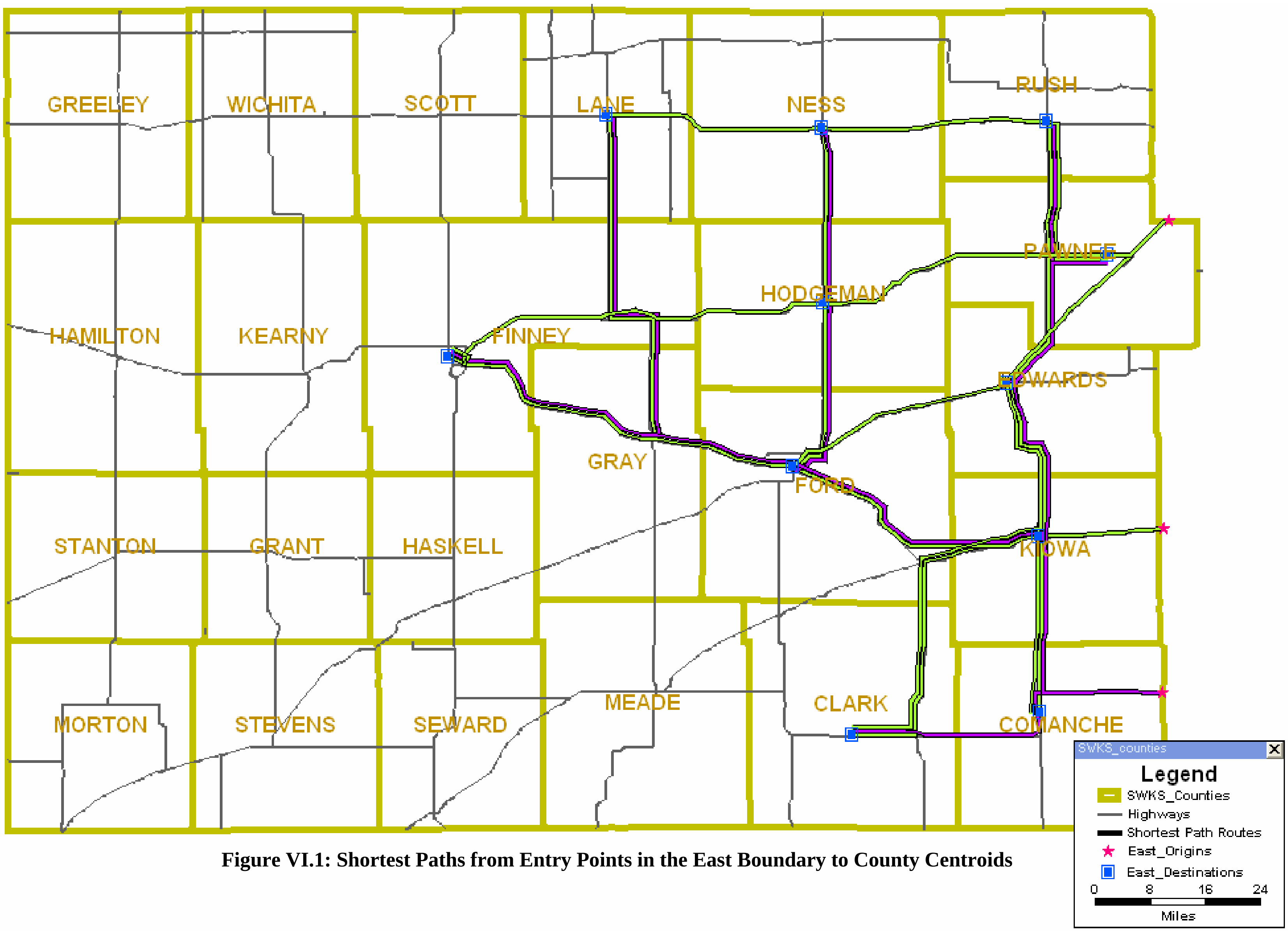


Figure VI.1: Shortest Paths from Entry Points in the East Boundary to County Centroids

Table VI.1: Highway Mileages from Entry Points in the East Boundary to County Centroids

No.	Origin	Destination	Southwest Kansas Highway Mileage (Miles)																	Other Roads (Miles)	Total Length (Miles)
			East/West Highway										South/North Highway						Total		
			K 4	K 34	US 50	K 51	US 54	US 56	K 96	K 156	US 160	US 400	K 23	K 25	K 27	US 83	US 183	US 283			
1	E160	Clark									48.46								48.46	2.67	51.13
2	E160	Comanche									18.93								18.93	1.29	20.22
3	E160	Edwards						0.31			17.98						47.54		65.83	0.89	66.72
4	E160	Finney			46.21		7.47				17.98	25.38				0.10	22.61		119.75	17.78	137.53
5	E160	Ford					7.47				17.98	24.52				22.61			72.58	9.77	82.35
6	E160	Hodgeman			3.18		7.47				17.98	24.52					22.61	20.73	96.49	12.26	108.75
7	E160	Kiowa									17.98						23.21		41.19	0.01	41.20
8	E160	Lane			15.46		17.98				17.98	25.38	51.51			17.98			146.29	9.35	155.64
9	E160	Ness			3.18		7.47				17.98	24.52					22.61	45.05	120.81	13.40	134.21
10	E160	Pawnee						25.26		1.96	17.98						47.54		92.74	2.59	95.33
11	E160	Rush						7.85			17.98						79.32		105.15	0.91	106.06
12	E54	Clark		24.06			34.36				7.91								66.33	4.18	70.51
13	E54	Comanche					16.50				0.95						22.61		40.06	2.55	42.61
14	E54	Edwards					16.50	0.31									24.93		41.74	2.16	43.90
15	E54	Finney			46.21		23.97					25.38				0.10			95.66	19.04	114.70
16	E54	Ford					23.97					24.52							48.49	11.03	59.52
17	E54	Hodgeman			3.18		23.97					25.38						20.73	73.26	12.67	85.93
18	E54	Kiowa					16.50										0.61		17.11	1.27	18.38
19	E54	Lane			15.46		23.97					25.38	51.51						116.32	16.50	132.82
20	E54	Ness			3.18		23.97					24.52						45.05	96.72	14.67	111.39
21	E54	Pawnee					16.50	25.26		1.96							24.93		68.65	3.86	72.51
22	E54	Rush					16.50	7.85									56.71		81.06	2.18	83.24
23	E56	Clark		24.06			17.85	32.64			7.91						24.93		107.39	3.96	111.35
24	E56	Comanche						32.54			0.95						47.54		81.03	2.42	83.45
25	E56	Edwards						33.01											33.01	0.22	33.23
26	E56	Finney			1.26			7.29		70.43			5.98			0.10			85.06	27.65	112.71
27	E56	Ford			31.05			33.86											64.91	2.73	67.64
28	E56	Hodgeman						7.29		44.56								0.15	52.00	2.01	54.01
29	E56	Kiowa						32.54									24.32		56.86	1.14	58.00
30	E56	Lane						7.29	61.46	11.19							19.17		99.11	3.89	103.00
31	E56	Ness						7.29	31.39	11.19							19.17		69.04	2.97	72.01
32	E56	Pawnee						7.29		1.96									9.25	1.46	10.71
33	E56	Rush						7.29		11.96							19.53		38.78	0.69	39.47
Subtotal			0.00	48.12	168.37	0.00	302.42	275.17	92.85	155.21	246.93	249.50	109.00	0.00	0.00	40.89	549.89	131.71	2370.06	210.17	2580.23

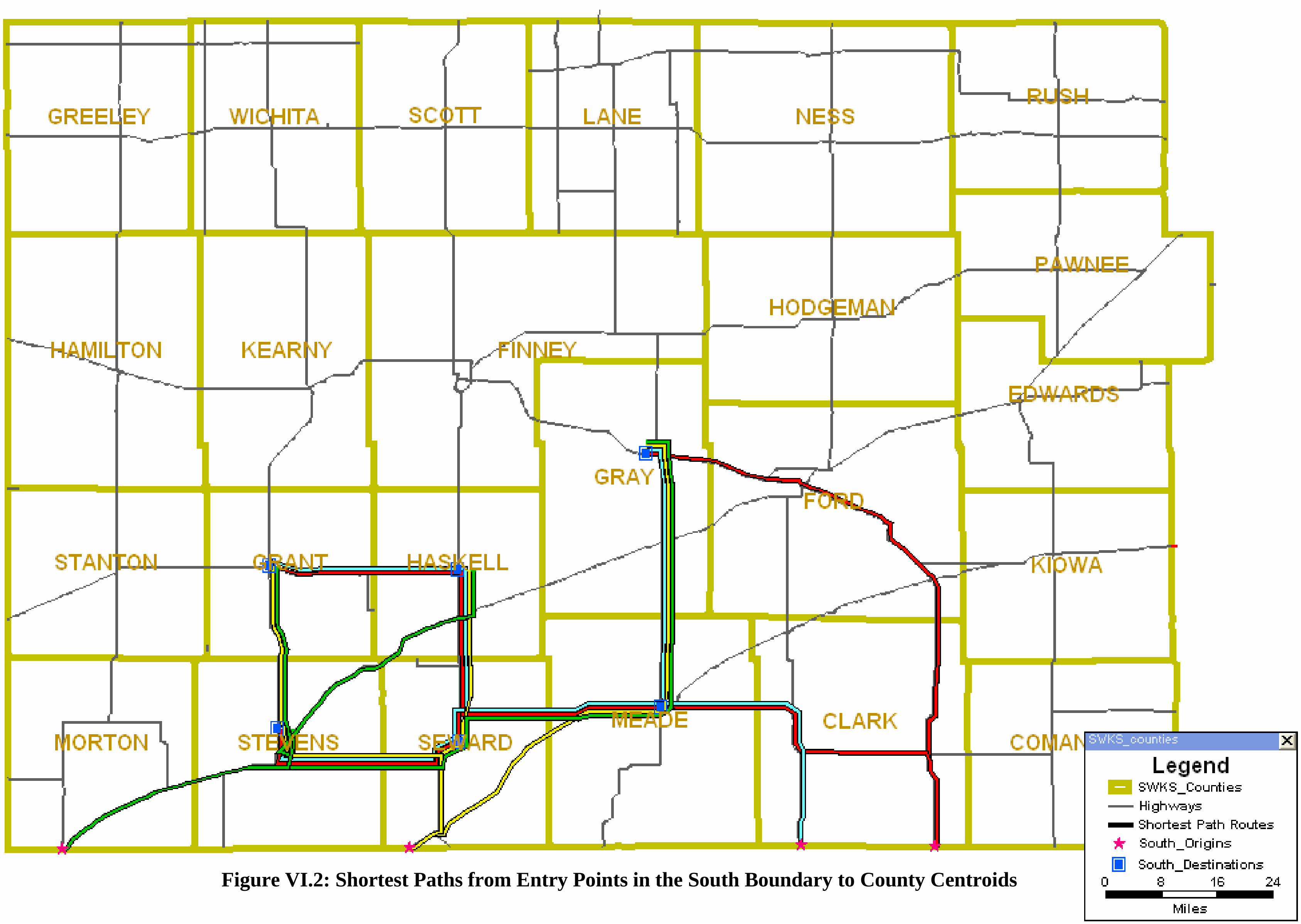


Figure VI.2: Shortest Paths from Entry Points in the South Boundary to County Centroids

Table VI.2: Highway Mileages from Entry Points in the South Boundary to County Centroids

No.	Origin	Destination	Southwest Kansas Highway Mileage (Miles)																	Other Roads (Miles)	Total Length (Miles)
			East/West Highway										South/North Highway						Total		
			K 4	K 34	US 50	K 51	US 54	US 56	K 96	K 156	US 160	US 400	K 23	K 25	K 27	US 83	US 183	US 283			
1	S183	Grant					12.00				66.66					20.05	13.56		112.27	21.94	134.21
2	S183	Gray		29.23	16.58		0.11					20.39					13.56		79.87	6.76	86.63
3	S183	Haskell					12.00				41.33					20.05	13.56		86.94	19.59	106.53
4	S183	Meade									28.46						13.56		42.02	15.33	57.35
5	S183	Seward					12.00				41.33					3.55	13.56		70.44	19.59	90.03
6	S183	Stevens				17.81	12.00	0.89			41.33			2.99		8.84	13.56		97.42	27.52	124.94
7	S283	Grant					12.00				58.00					20.05		12.29	102.34	13.70	116.04
8	S283	Gray			1.12						11.64		23.27					12.29	48.32	28.41	76.73
9	S283	Haskell					12.00				24.51					20.05		12.29	68.85	19.51	88.36
10	S283	Meade									11.64							12.29	23.93	15.26	39.19
11	S283	Seward					12.00				24.51					3.55		12.29	52.35	19.52	71.87
12	S283	Stevens				17.87	12.00	0.89			24.51			2.99		8.84		12.29	79.39	27.38	106.77
13	S54	Grant				17.87	3.72	0.89						22.72		6.85			52.05	15.07	67.12
14	S54	Gray			1.12		41.49						23.27						65.88	15.89	81.77
15	S54	Haskell					3.72									35.73			39.45	3.75	43.20
16	S54	Meade					41.49												41.49	2.73	44.22
17	S54	Seward					3.72										12.04		15.76	3.75	19.51
18	S54	Stevens				17.87	3.72	0.89						2.99		6.85			32.32	11.61	43.93
19	S56	Grant						35.20						22.72					57.92	5.04	62.96
20	S56	Gray			1.12	17.87	12.00	32.50			12.87		23.27			8.84			108.47	24.75	133.22
21	S56	Haskell						65.43								6.02			71.45	3.91	75.36
22	S56	Meade				17.87	12.00	32.50								8.84			71.21	24.46	95.67
23	S56	Seward				17.87		32.50								5.29			55.66	6.72	62.38
24	S56	Stevens						32.50						2.99					35.49	4.28	39.77
Subtotal			0.00	29.23	19.94	125.03	217.97	234.19	0.00	0.00	386.79	20.39	69.81	57.40	0.00	183.40	93.40	73.74	1511.29	356.47	1867.76

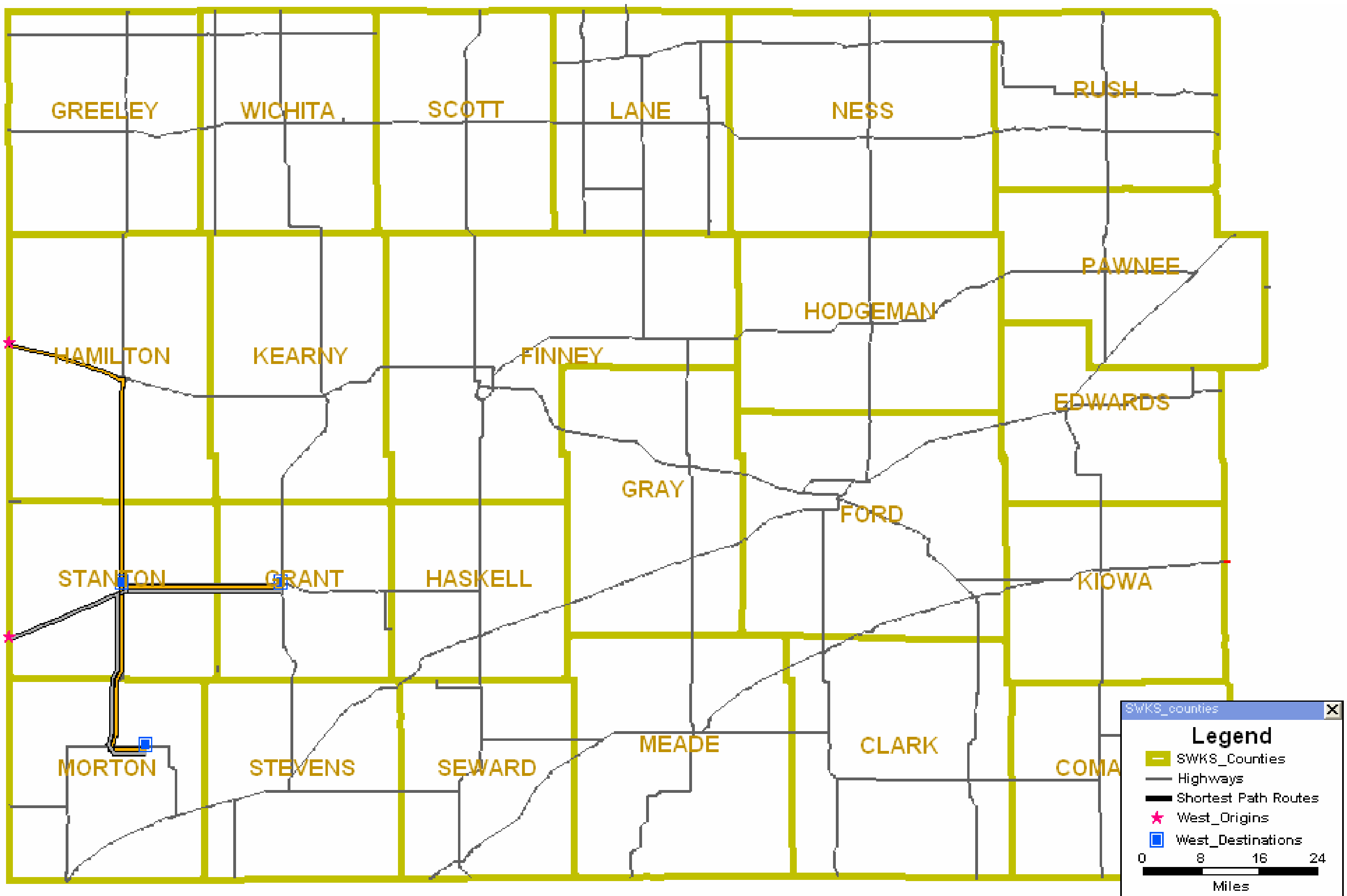


Figure VI.3: Shortest Paths from Entry Points in the West Boundary to County Centroids

Table VI.3: Highway Mileages from Entry Points in the West Boundary to County Centroids

No.	Origin	Destination	Southwest Kansas Highway Mileage (Miles)																	Other Roads (Miles)	Total Length (Miles)
			East/West Highway										South/North Highway						Total		
			K 4	K 34	US 50	K 51	US 54	US 56	K 96	K 156	US 160	US 400	K 23	K 25	K 27	US 83	US 183	US 283			
1	W160	Grant									25.24								25.24	14.53	39.77
2	W160	Morton				4.02					16.09				20.73				40.84	1.84	42.68
3	W160	Stanton									17.09								17.09	0.59	17.68
4	W50/400	Grant			15.08						8.16				27.28				50.52	16.12	66.64
5	W50/400	Morton			15.08	4.02									48.01				67.11	4.44	71.55
6	W50/400	Stanton			15.08										27.28				42.36	2.19	44.55
Subtotal			0.00	0.00	45.24	8.04	0.00	0.00	0.00	0.00	66.58	0.00	0.00	0.00	123.30	0.00	0.00	0.00	243.16	39.71	282.87

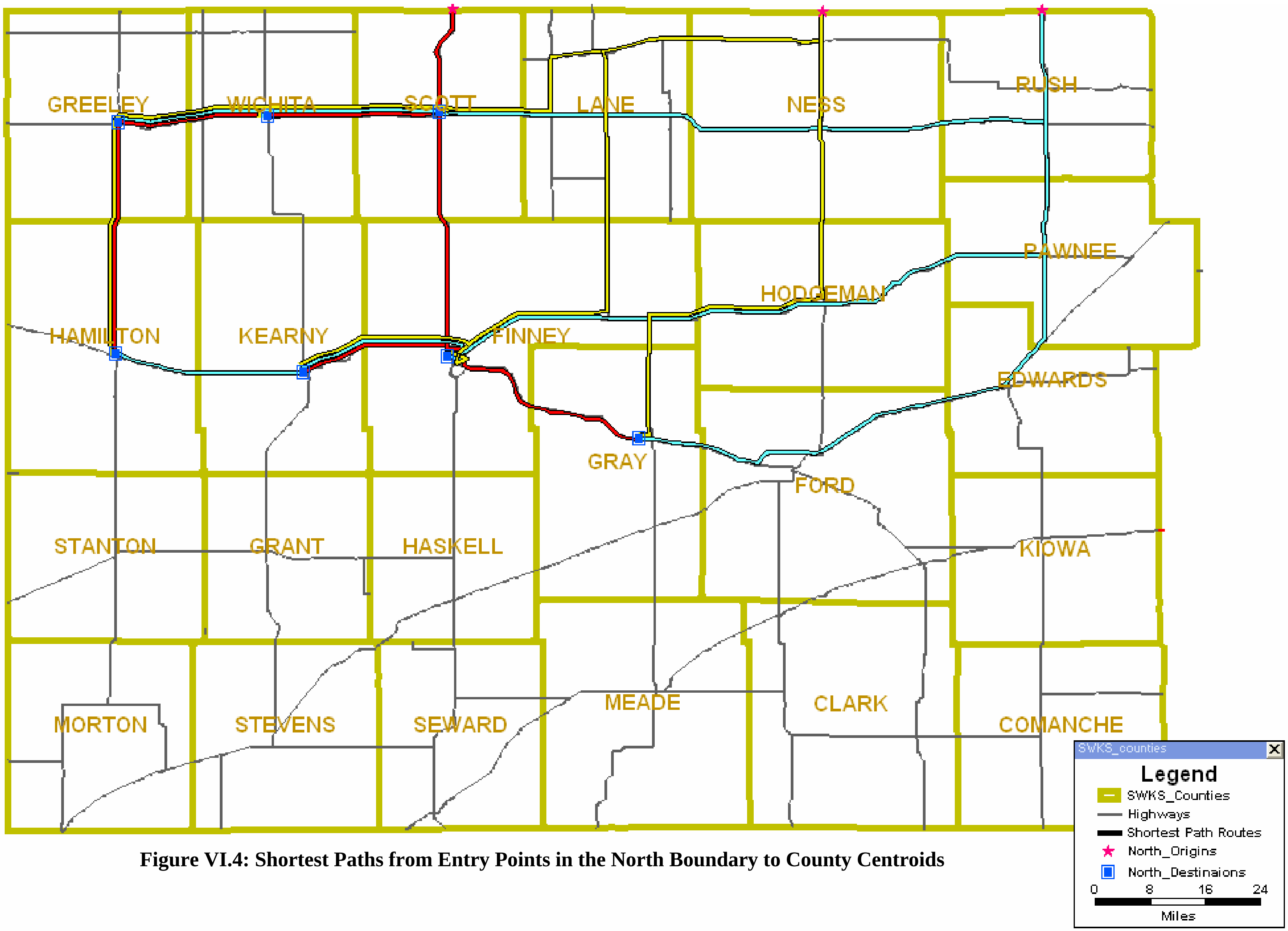


Figure VI.4: Shortest Paths from Entry Points in the North Boundary to County Centroids

Table VI.4: Highway Mileages from Entry Points in the North Boundary to County Centroids

No.	Origin	Destination	Southwest Kansas Highway Mileage (Miles)																	Other Roads (Miles)	Total Length (Miles)
			East/West Highway										South/North Highway						Total		
			K 4	K 34	US 50	K 51	US 54	US 56	K 96	K 156	US 160	US 400	K 23	K 25	K 27	US 83	US 183	US 283			
1	N183	Finney			1.26					59.24			5.98			0.46	30.81		97.75	30.65	128.40
2	N183	Gray			52.16			9.17									43.06		104.39	7.86	112.25
3	N183	Greeley							127.79								11.63		139.42	20.67	160.09
4	N183	Hamilton			42.29					59.24			5.98				30.81		138.32	38.22	176.54
5	N183	Kearny			14.72					59.24			5.98	0.10			30.81		110.85	38.23	149.08
6	N183	Scott							84.08								11.63		95.71	8.27	103.98
7	N183	Wichita							107.17								11.63		118.80	9.61	128.41
8	N283	Finney	31.24		1.26								37.82			0.46		4.20	74.98	26.03	101.01
9	N283	Gray			1.12					25.76			16.84					40.69	84.41	2.88	87.29
10	N283	Greeley	38.68						58.91									4.20	101.79	12.03	113.82
11	N283	Hamilton	38.68						58.91						33.31			4.20	135.10	12.35	147.45
12	N283	Kearny	31.24		14.72								37.33	0.10				4.20	87.59	34.09	121.68
13	N283	Scott	38.68						15.20									4.20	58.08	9.63	67.71
14	N283	Wichita	38.68						38.29									4.20	81.17	10.97	92.14
15	N83	Finney														48.82			48.82	1.87	50.69
16	N83	Gray			31.99											47.27			79.26	4.68	83.94
17	N83	Greeley							43.71							14.99			58.70	3.33	62.03
18	N83	Hamilton							43.71						33.31	14.99			92.01	3.64	95.65
19	N83	Kearny			10.92									0.10		47.27			58.29	12.91	71.20
20	N83	Scott														14.99			14.99	0.54	15.53
21	N83	Wichita							23.09							14.99			38.08	2.26	40.34
Subtotal			217.20	0.00	170.44	0.00	0.00	9.17	600.86	203.48	0.00	0.00	109.93	0.30	66.62	204.24	170.38	65.89	1818.51	290.72	2109.23

Table VI.5: Summary of Highway Mileages from Entry Points in Boundary to County Centroids

	Southwest Kansas Highway Mileage (Miles)																	Other Roads (Miles)	Total Length (Miles)
	East/West Highway										South/North Highway						Total		
	K 4	K 34	US 50	K 51	US 54	US 56	K 96	K 156	US 160	US 400	K 23	K 25	K 27	US 83	US 183	US 283			
Total	217.20	77.35	403.99	133.07	520.39	518.53	693.71	358.69	700.30	269.89	288.74	57.70	189.92	428.53	813.67	271.34	5943.02	897.07	6840.09

APPENDIX VII - SHORTEST PATHS FROM COUNTY CENTROIDS TO FOUR MEAT PROCESSING PLANTS IN SOUTHWEST KANSAS

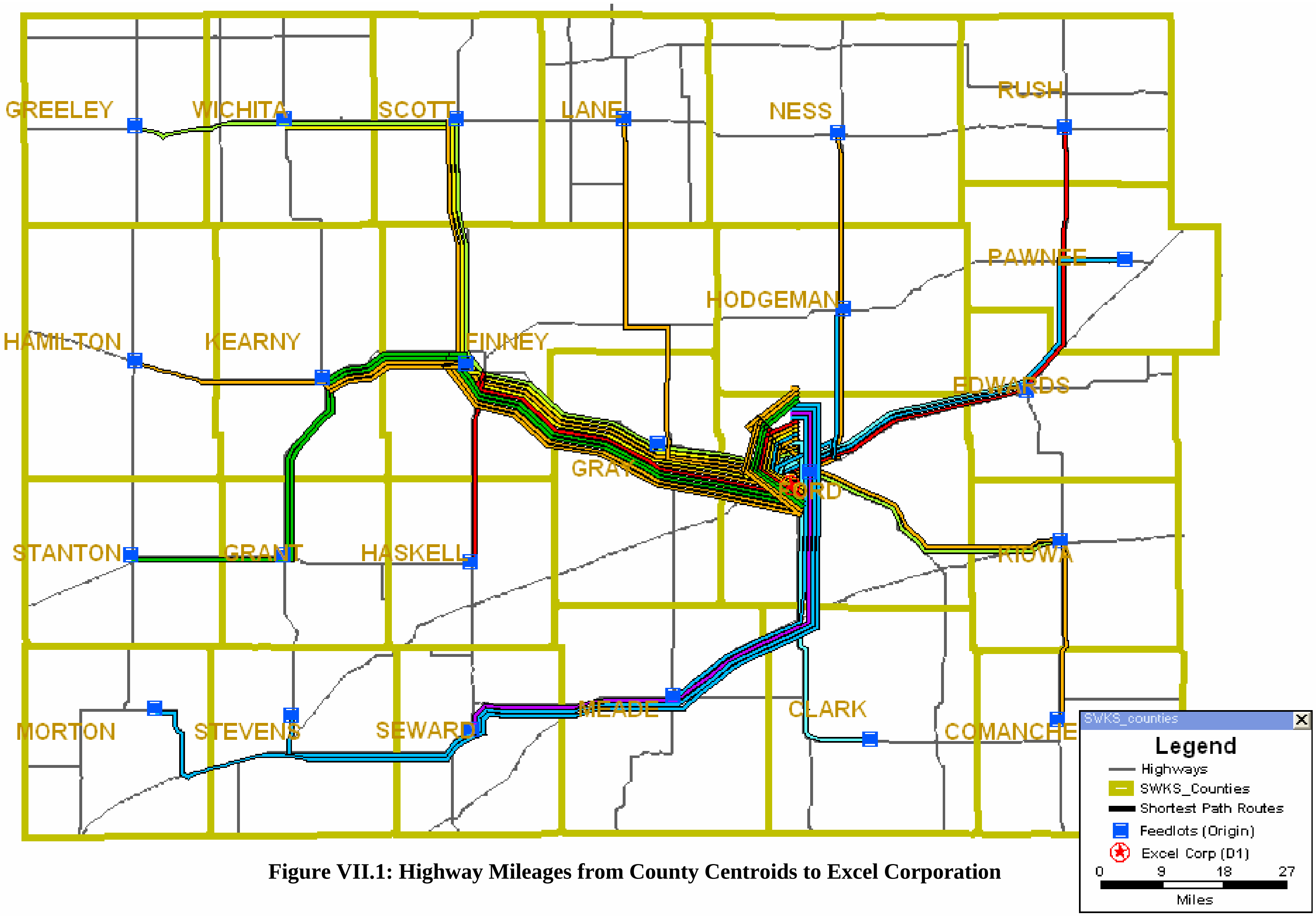


Figure VII.1: Highway Mileages from County Centroids to Excel Corporation

Table VII.1: Highway Mileages from County Centroids to Excel Corporation

No.	Origin County	Destination	Southwest Kansas Highway Mileage (Miles)															Other Roads (Miles)	Total Length (Miles)
			East/West Highway								South/North Highway						Total		
			US 50	K 51	US 54	US 56	K 96	K 156	US 160	US 400	K 23	K 25	K 27	US 83	US 183	US 283			
1	Clark	Excel Corp.				1.00			15.49							30.04	46.53	0.65	47.18
2	Comanche	Excel Corp.			7.47	2.98				24.52					22.61		57.58	13.69	71.27
3	Edwards	Excel Corp.	31.05			3.53											34.58	4.80	39.38
4	Finney	Excel Corp.	46.21			2.98				0.86							50.05	10.40	60.45
5	Ford	Excel Corp.				2.98											2.98	1.88	4.86
6	Grant	Excel Corp.	62.01			1.98				0.86		26.17					91.02	21.14	112.16
7	Gray	Excel Corp.	16.58			2.98				0.86							20.42	7.13	27.55
8	Greeley	Excel Corp.	48.55			2.98	43.71			0.86				32.28			128.38	13.58	141.96
9	Hamilton	Excel Corp.	85.24			2.98				0.86							89.08	22.48	111.56
10	Haskell	Excel Corp.	46.21			2.98				0.86				27.86			77.91	7.51	85.42
11	Hodgeman	Excel Corp.	3.18			2.98		0.11								20.53	26.80	4.89	31.69
12	Kearny	Excel Corp.	62.01			2.98				0.86							65.85	18.39	84.24
13	Kiowa	Excel Corp.			7.47	2.98				24.52							34.97	10.59	45.56
14	Lane	Excel Corp.				2.98				0.86	51.51						55.35	23.24	78.59
15	Meade	Excel Corp.			19.86	1.00										18.93	39.79	2.09	41.88
16	Morton	Excel Corp.		30.70	31.86	16.28								8.84		18.93	106.61	25.73	132.34
17	Ness	Excel Corp.	3.18			2.98										45.05	51.21	5.72	56.93
18	Pawnee	Excel Corp.	31.05			12.15		8.97							12.25		64.42	4.27	68.69
19	Rush	Excel Corp.	31.05			12.15									31.43		74.63	4.27	78.90
20	Scott	Excel Corp.	48.55			2.98				0.86				32.28			84.67	11.09	95.76
21	Seward	Excel Corp.			31.86	1.00								4.02		18.93	55.81	19.53	75.34
22	Stanton	Excel Corp.	62.01			2.98			8.16	0.86		26.17					100.18	33.85	134.03
23	Stevens	Excel Corp.		9.87	31.86	1.89			12.87			2.05		8.84		18.93	86.31	22.51	108.82
24	Wichita	Excel Corp.	48.55			2.98	23.09			0.86				32.28			107.76	12.47	120.23
Subtotal			625.43	40.57	130.38	95.68	66.80	9.08	36.52	58.50	51.51	54.39	0.00	146.40	66.29	171.34	1552.89	301.89	1854.78

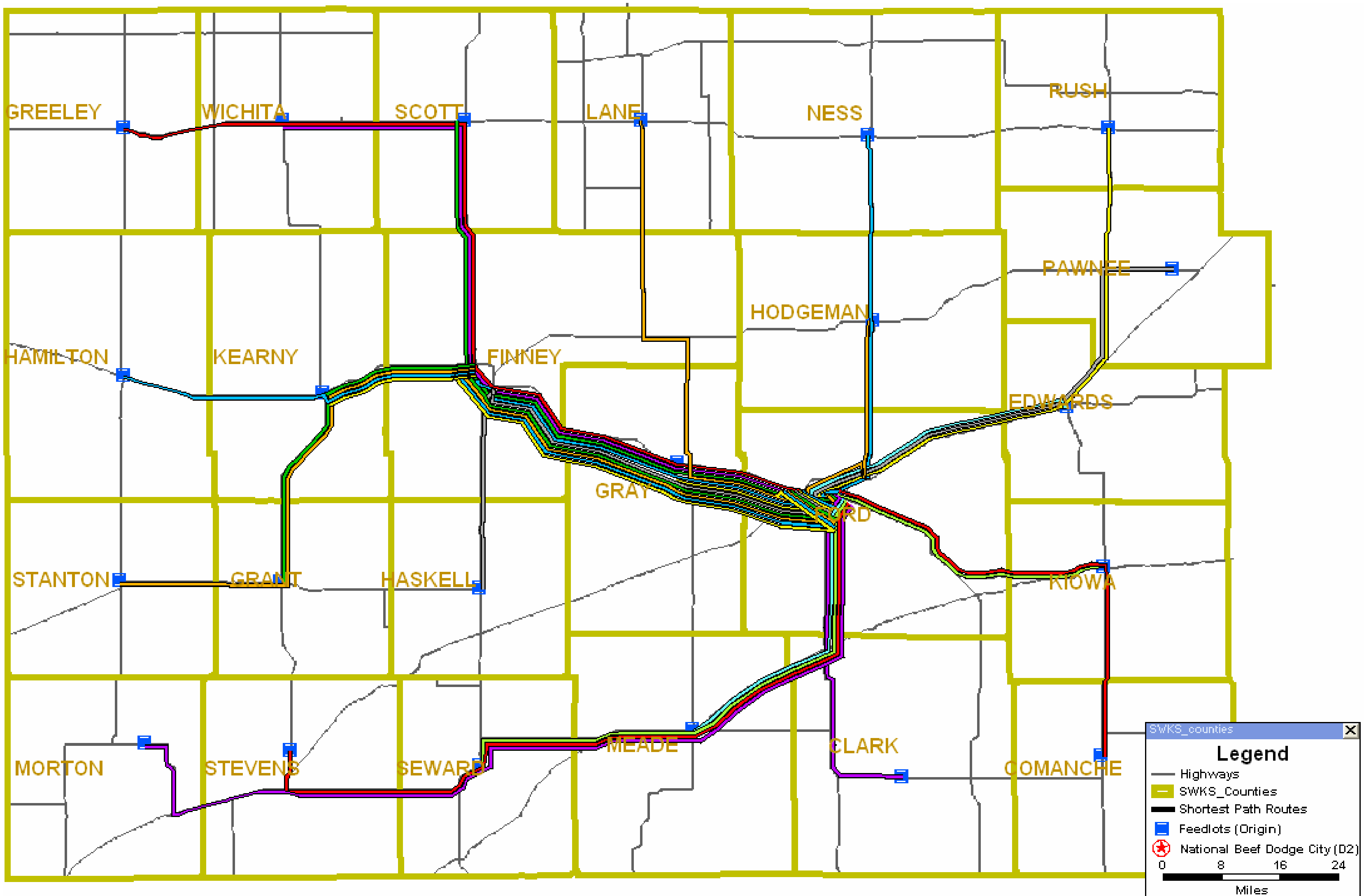


Figure VII.2: Highway Mileages from County Centroids to National Beef in Dodge City

Table VII.2: Highway Mileages from County Centroids to National Beef in Dodge City

No.	Origin County	Destination	Southwest Kansas Highway Mileage (Miles)															Other Roads (Miles)	Total Length (Miles)
			East/West Highway								South/North Highway						Total		
			US 50	K 51	US 54	US 56	K 96	K 156	US 160	US 400	K 23	K 25	K 27	US 83	US 183	US 283			
1	Clark	NB Dodge City				1.98			15.49							30.04	47.51	2.28	49.79
2	Comanche	NB Dodge City			7.47				1.82	24.52					22.61		56.42	10.29	66.71
3	Edwards	NB Dodge City	31.05			0.55											31.60	3.17	34.77
4	Finney	NB Dodge City	46.21							0.86							47.07	8.77	55.84
5	Ford	NB Dodge City															0.00	0.25	0.25
6	Grant	NB Dodge City	51.09							0.86		26.17					78.12	29.43	107.55
7	Gray	NB Dodge City	16.58							0.86							17.44	5.50	22.94
8	Greeley	NB Dodge City	51.09				43.71			0.86				32.28			127.94	9.41	137.35
9	Hamilton	NB Dodge City	88.78							0.86							89.64	17.31	106.95
10	Haskell	NB Dodge City	46.21							0.86				27.86			74.93	5.88	80.81
11	Hodgeman	NB Dodge City	3.18					0.11								20.53	23.82	3.26	27.08
12	Kearny	NB Dodge City	51.09							0.86							51.95	27.68	79.63
13	Kiowa	NB Dodge City			7.47					24.52							31.99	9.00	40.99
14	Lane	NB Dodge City								0.86	51.51						52.37	21.61	73.98
15	Meade	NB Dodge City			19.86	1.98										18.93	40.77	3.72	44.49
16	Morton	NB Dodge City		30.70	31.86	17.26			12.87					8.84		18.93	120.46	14.49	134.95
17	Ness	NB Dodge City	3.18													45.05	48.23	4.09	52.32
18	Pawnee	NB Dodge City	31.05			9.17		8.97							12.25		61.44	2.64	64.08
19	Rush	NB Dodge City	31.05			9.17									31.43		71.65	2.64	74.29
20	Scott	NB Dodge City	51.09							0.86				32.28			84.23	6.92	91.15
21	Seward	NB Dodge City			31.86	1.98			12.87					4.02		18.93	69.66	8.29	77.95
22	Stanton	NB Dodge City	59.47						8.16	0.86		26.17					94.66	34.76	129.42
23	Stevens	NB Dodge City		17.87	31.86	2.87			12.87			2.05		8.84		18.93	95.29	16.14	111.43
24	Wichita	NB Dodge City	51.09				23.09			0.86				32.28			107.32	8.30	115.62
Subtotal			612.21	48.57	130.38	44.96	66.80	9.08	64.08	58.50	51.51	54.39	0.00	146.40	66.29	171.34	1524.51	255.83	1780.34

Note: NB: National Beef Packing Co. LLC

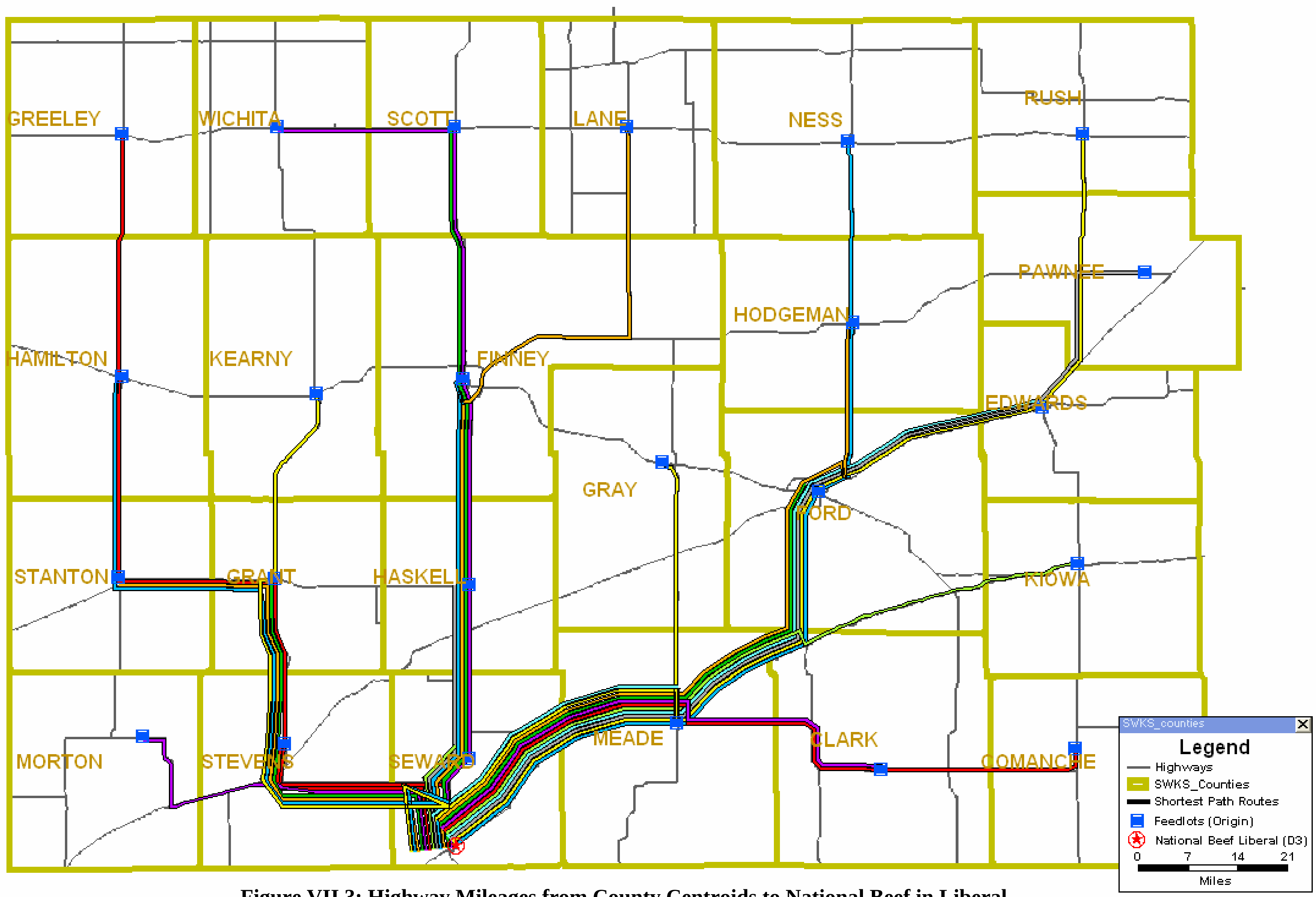


Figure VII.3: Highway Mileages from County Centroids to National Beef in Liberal

Table VII.3: Highway Mileages from County Centroids to National Beef in Liberal

No.	Origin County	Destination	Southwest Kansas Highway Mileage (Miles)															Other Roads (Miles)	Total Length (Miles)
			East/West Highway								South/North Highway						Total		
			US 50	K 51	US 54	US 56	K 96	K 156	US 160	US 400	K 23	K 25	K 27	US 83	US 183	US 283			
1	Clark	NB Liberal			37.37				20.56								57.93	14.15	72.08
2	Comanche	NB Liberal			37.37				49.21								86.58	15.54	102.12
3	Edwards	NB Liberal	31.05		57.23	2.53										18.93	109.74	7.39	117.13
4	Finney	NB Liberal			0.40									63.37			63.77	5.53	69.30
5	Ford	NB Liberal			57.23	1.98										18.93	78.14	4.47	82.61
6	Grant	NB Liberal		17.87	0.40	0.89						22.72		6.85			48.73	14.38	63.11
7	Gray	NB Liberal	1.12		37.37						34.21						72.70	3.02	75.72
8	Greeley	NB Liberal		17.87	0.40	0.89			8.16			22.72	60.59	6.85			117.48	29.58	147.06
9	Hamilton	NB Liberal		17.87	0.40	0.89			8.16			22.72	27.28	6.85			84.17	28.74	112.91
10	Haskell	NB Liberal			0.40									35.73			36.13	3.51	39.64
11	Hodgeman	NB Liberal			57.23			0.11								39.46	96.80	12.64	109.44
12	Kearny	NB Liberal		17.87	0.40	0.89						48.89		6.85			74.90	16.14	91.04
13	Kiowa	NB Liberal			97.19												97.19	2.65	99.84
14	Lane	NB Liberal	1.49		0.40						28.69			63.59			94.17	26.62	120.79
15	Meade	NB Liberal			37.37												37.37	0.50	37.87
16	Morton	NB Liberal		22.61	0.40	15.28								6.85			45.14	17.80	62.94
17	Ness	NB Liberal	3.18		57.23	1.98										45.05	107.44	27.25	134.69
18	Pawnee	NB Liberal	31.05		57.23	11.15		8.97							12.25	18.93	139.58	6.86	146.44
19	Rush	NB Liberal	31.05		57.23	11.15									31.34	18.93	149.70	6.95	156.65
20	Scott	NB Liberal			0.40									97.65			98.05	6.67	104.72
21	Seward	NB Liberal			0.40									11.67			12.07	3.50	15.57
22	Stanton	NB Liberal		17.87	0.40	0.89			8.16			22.72		6.85			56.89	28.10	84.99
23	Stevens	NB Liberal		17.87	0.40	0.89						2.05		6.85			28.06	11.36	39.42
24	Wichita	NB Liberal			0.40		23.09							97.65			121.14	8.05	129.19
Subtotal			98.94	129.83	595.25	49.41	23.09	9.08	94.25	0.00	62.90	141.82	87.87	417.61	43.59	160.23	1913.87	301.41	2215.28

Note: NB: National Beef Packing Co. LLC

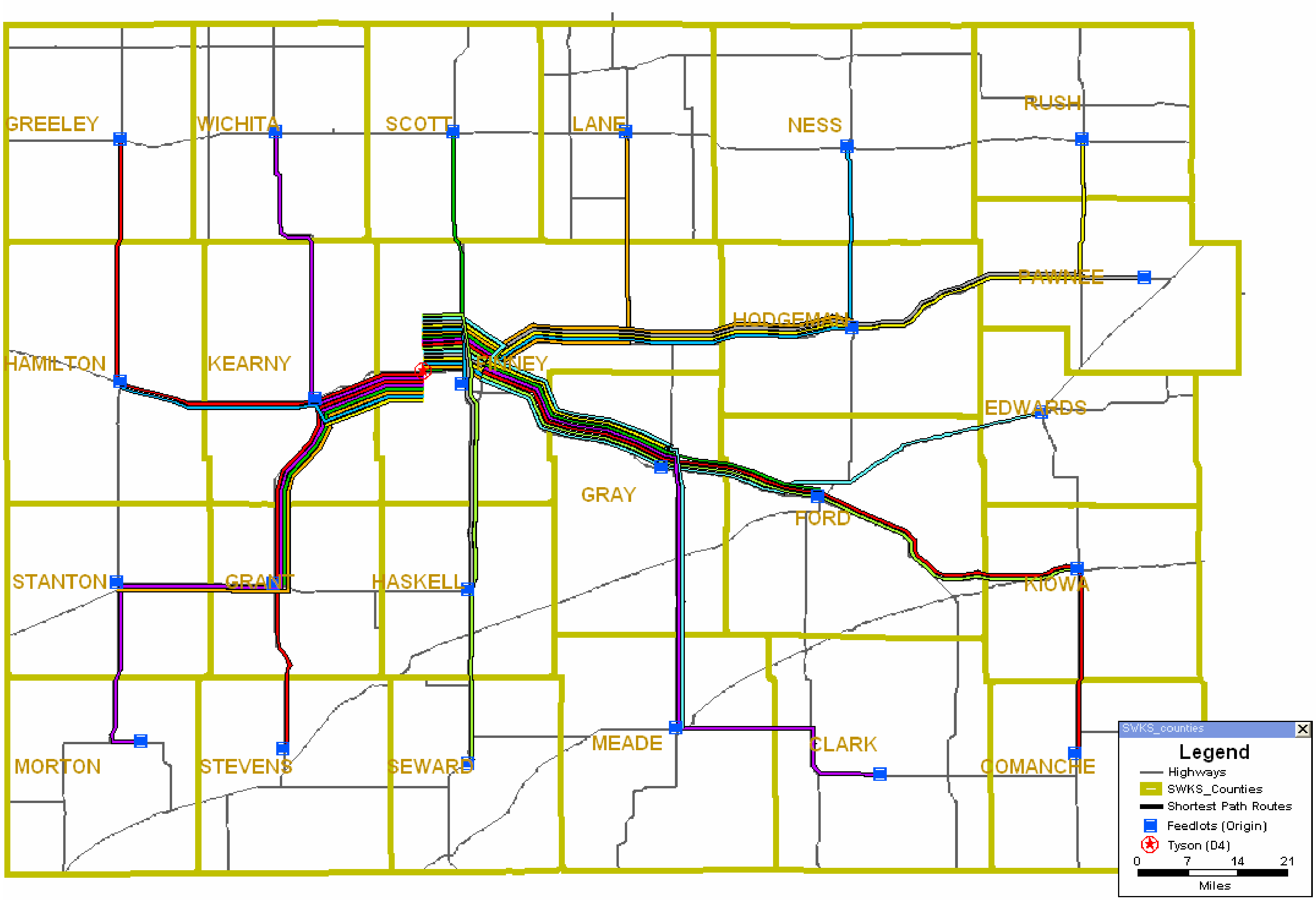


Figure VII.4: Highway Mileages from County Centroids to Tyson

Table VII.4: Highway Mileages from County Centroids to Tyson and Summary

No.	Origin County	Destination	Southwest Kansas Highway Mileage (Miles)															Other Roads (Miles)	Total Length (Miles)
			East/West Highway								South/North Highway						Total		
			US 50	K 51	US 54	US 56	K 96	K 156	US 160	US 400	K 23	K 25	K 27	US 83	US 183	US 283			
1	Clark	Tyson	36.63						20.56		23.27						80.46	31.93	112.39
2	Comanche	Tyson	49.55		7.47				1.82	25.38					22.61		106.83	23.14	129.97
3	Edwards	Tyson	87.88			0.55											88.43	8.52	96.95
4	Finney	Tyson	1.00											2.00			3.00	4.53	7.53
5	Ford	Tyson	52.09							0.86							52.95	10.07	63.02
6	Grant	Tyson	9.92									26.17					36.09	8.19	44.28
7	Gray	Tyson	35.51														35.51	4.82	40.33
8	Greeley	Tyson	36.69										33.31				70.00	7.84	77.84
9	Hamilton	Tyson	36.69														36.69	6.99	43.68
10	Haskell	Tyson	1.00											29.64			30.64	6.55	37.19
11	Hodgeman	Tyson	4.80					25.96			5.98						36.74	26.76	63.50
12	Kearny	Tyson	9.92														9.92	6.44	16.36
13	Kiowa	Tyson	49.55		7.47					25.38							82.40	21.86	104.26
14	Lane	Tyson	4.80								28.69						33.49	27.26	60.75
15	Meade	Tyson	36.63								23.27						59.90	18.28	78.18
16	Morton	Tyson	9.91	4.02					9.16			26.17	20.73				69.99	23.17	93.16
17	Ness	Tyson	4.80					25.76			5.98					24.42	60.96	27.70	88.66
18	Pawnee	Tyson	4.80					68.21			5.98						78.99	27.26	106.25
19	Rush	Tyson	4.80					59.24			5.98				18.17		88.19	28.26	116.45
20	Scott	Tyson	1.00											32.28			33.28	5.68	38.96
21	Seward	Tyson	1.00											53.71			54.71	6.55	61.26
22	Stanton	Tyson	9.92						8.16			26.17					44.25	21.91	66.16
23	Stevens	Tyson	9.92									46.74					56.66	11.32	67.98
24	Wichita	Tyson	9.92									40.71					50.63	6.99	57.62
Subtotal			508.73	4.02	14.94	0.55	0.00	179.17	39.70	51.62	99.15	165.96	54.04	117.63	40.78	24.42	1300.71	372.04	1672.75
Total			**1845.31**	**222.99**	**870.95**	**190.60**	**156.69**	**206.41**	**234.55**	**168.62**	**265.07**	**416.56**	**141.91**	**828.04**	**216.95**	**527.33**	**6291.98**	**1231.17**	**7523.15**

APPENDIX VIII - SHORTEST PATHS FROM ENTRY POINTS TO FOUR MEAT PROCESSING PLANTS IN SOUTHWEST KANSAS

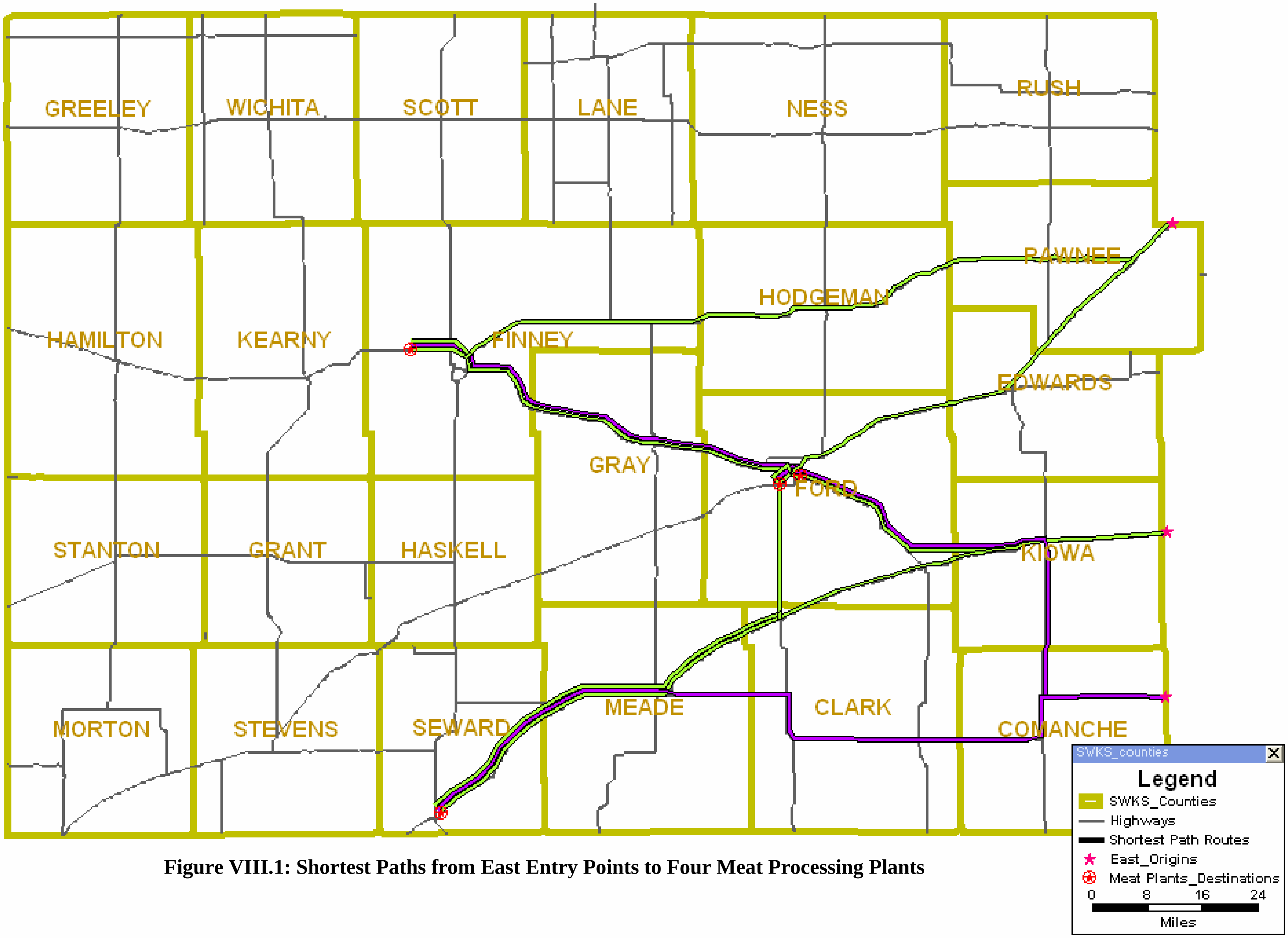


Figure VIII.1: Shortest Paths from East Entry Points to Four Meat Processing Plants

Table VIII.1: Highway Mileages from East Entry Points to Four Meat Processing Plants

No.	Origin	Destination	Southwest Kansas Highway Mileage (Miles)																Other Roads (Miles)	Total Length (Miles)
			East/West Highway									South/North Highway								
			K 4	K 34	US 50	K 51	US 54	US 56	K 156	US 160	US 400	K 23	K 25	K 27	US 83	US 183	US 283	Total		
1	E54	Excel					23.97	1.98			24.52							50.47	11.85	62.32
2		NB Dodge City					23.97				24.29							48.26	9.46	57.72
3		NB Liberal					113.70											113.70	3.91	117.61
4		Tyson			52.09		23.97				24.29							100.35	21.67	122.02
5	E160	Excel					7.47			17.98	24.29					22.61		72.35	12.80	85.15
6		NB Dodge City					7.47			17.98	24.29					22.61		72.35	8.19	80.54
7		NB Liberal					37.37			69.01								106.38	16.83	123.21
8		Tyson			52.09		7.47			17.98	24.52					22.61		124.67	20.18	144.85
9	E56	Excel			31.05			35.84										66.89	4.50	71.39
10		NB Dodge City			31.05			35.84			0.23							67.12	1.70	68.82
11		NB Liberal			31.05		57.23	35.84									18.93	143.05	7.09	150.14
12		Tyson			4.80			7.29	70.43			5.98						88.50	28.72	117.22
Subtotal			0.00	0.00	202.13	0.00	302.62	116.79	70.43	122.95	146.43	5.98	0.00	0.00	0.00	67.83	18.93	1054.09	146.90	1200.99

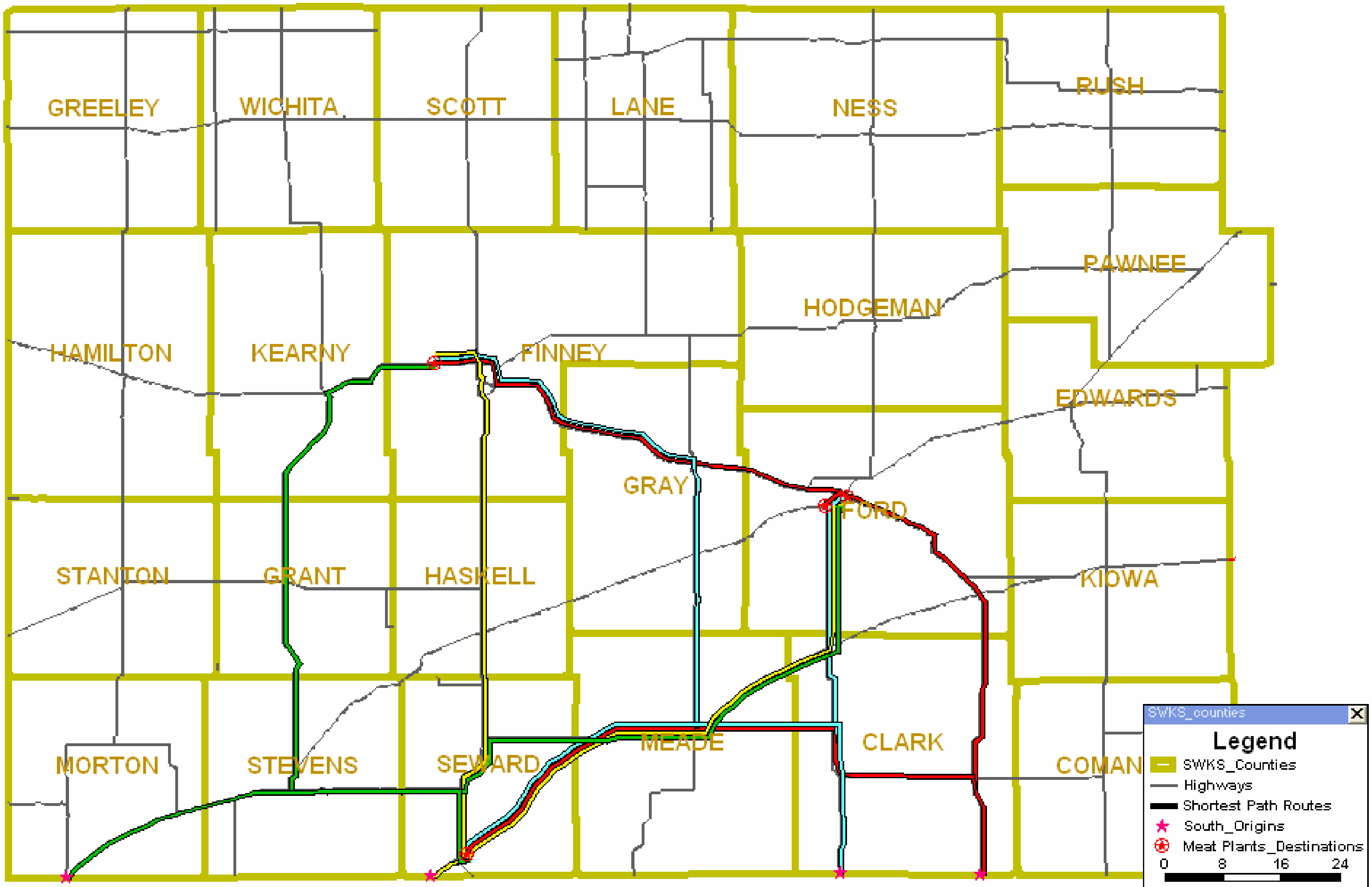


Figure VIII.2: Shortest Paths from South Entry Points to Four Meat Processing Plants

Table VIII.2: Highway Mileages from South Entry Points to Four Meat Processing Plants

No.	Origin	Destination	Southwest Kansas Highway Mileage (Miles)																Other Roads (Miles)	Total Length (Miles)
			East/West Highway									South/North Highway						Total		
			K 4	K 34	US 50	K 51	US 54	US 56	K 156	US 160	US 400	K 23	K 25	K 27	US 83	US 183	US 283			
1	S54	Excel					61.35										18.93	80.28	4.52	84.80
2		NB Dodge City					61.35	1.98			0.23						18.93	82.49	6.91	89.40
3		NB Liberal					4.12											4.12	1.93	6.05
4		Tyson			1.00		3.72								65.37			70.09	10.31	80.40
5	S283	Excel								6.58							42.33	48.91	1.94	50.85
6		NB Dodge City								6.58	0.23						42.33	49.14	6.32	55.46
7		NB Liberal					37.37			11.64							12.29	61.30	15.45	76.75
8		Tyson			36.63					11.64		23.27					12.29	83.83	33.23	117.06
9	S56	Excel				17.87	31.86	33.50		12.87					8.84		18.93	123.87	12.38	136.25
10		NB Dodge City				17.87	31.86	34.48		12.87	0.23				8.84		18.93	125.08	15.77	140.85
11		NB Liberal				17.87	0.40	32.50							6.85			57.62	10.23	67.85
12		Tyson			9.92			33.50					48.89					92.31	14.49	106.80
13	S183	Excel		27.62			0.11				19.30					13.56		60.59	6.67	67.26
14		NB Dodge City		27.62			0.11				19.30					13.56		60.59	2.06	62.65
15		NB Liberal					37.37			28.46						13.56		79.39	15.53	94.92
16		Tyson		27.62	52.09						19.30					13.56		112.57	14.39	126.96
Subtotal			0.00	82.86	99.64	53.61	269.62	135.96	0.00	90.64	58.59	23.27	48.89	0.00	89.90	54.24	184.96	1192.18	172.13	1364.31

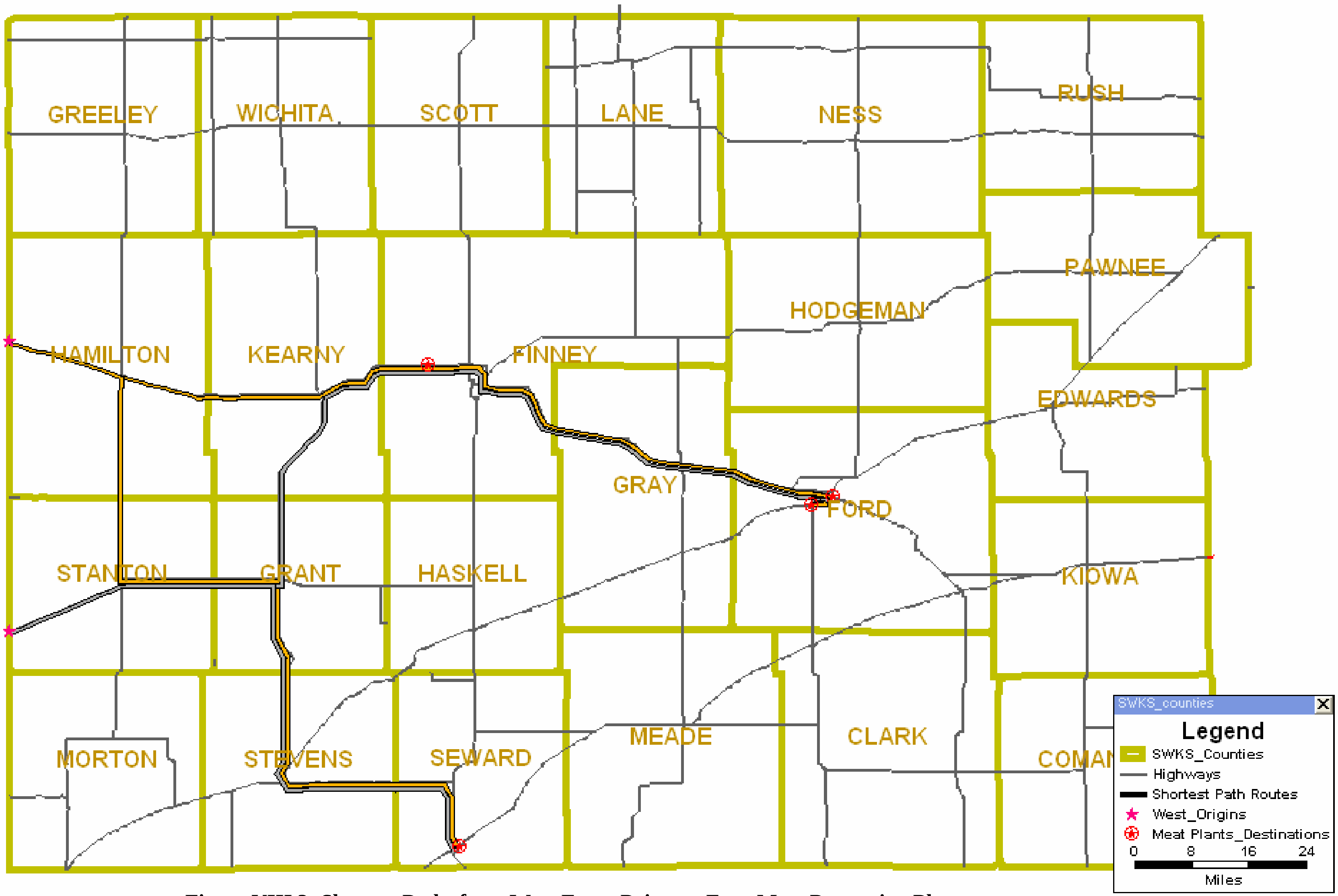


Figure VIII.3: Shortest Paths from West Entry Points to Four Meat Processing Plants

Table VIII.3: Highway Mileages from West Entry Points to Four Meat Processing Plants

No.	Origin	Destination	Southwest Kansas Highway Mileage (Miles)																Other Roads (Miles)	Total Length (Miles)
			East/West Highway									South/North Highway						Total		
			K 4	K 34	US 50	K 51	US 54	US 56	K 156	US 160	US 400	K 23	K 25	K 27	US 83	US 183	US 283			
1	W160	Excel			61.01			1.98		25.24	0.86		26.17					115.26	35.45	150.71
2		NB Dodge City			61.01					25.24	1.09		26.17					113.51	34.63	148.14
3		NB Liberal				17.87	0.40	0.89		25.24			22.72		6.85			73.97	28.70	102.67
4		Tyson			9.92					25.24			26.17					61.33	22.51	83.84
5	W50	Excel			103.86						0.86							104.72	22.47	127.19
6		NB Dodge City			98.80						1.09							99.89	24.73	124.62
7		NB Liberal			15.08	17.87	0.40	0.89		8.16			22.72	27.28	6.58			98.98	30.56	129.54
8		Tyson			51.77													51.77	8.55	60.32
Subtotal			0.00	0.00	401.45	35.74	0.80	3.76	0.00	109.12	3.90	0.00	123.95	27.28	13.43	0.00	0.00	719.43	207.60	927.03

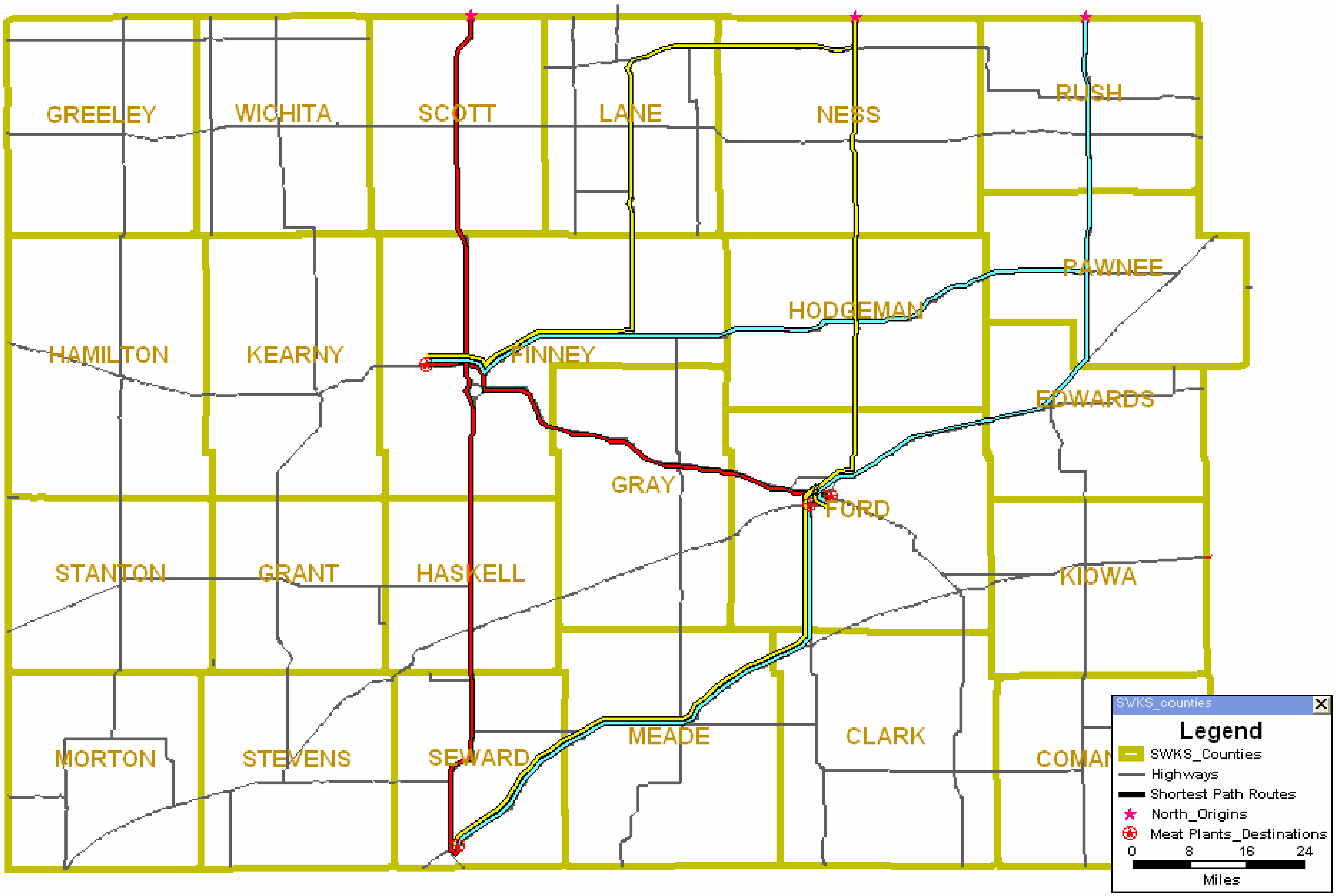


Figure VIII.4: Shortest Paths from North Entry Points to Four Meat Processing Plants

Table VIII.4: Highway Mileages from North Entry Points to Four Meat Processing Plants and Summary

No.	Origin	Destination	Southwest Kansas Highway Mileage (Miles)																Other Roads (Miles)	Total Length (Miles)
			East/West Highway									South/North Highway						Total		
			K 4	K 34	US 50	K 51	US 54	US 56	K 156	US 160	US 400	K 23	K 25	K 27	US 83	US 183	US 283			
1	N183	Excel			31.05			11.15								43.06		85.26	8.74	94.00
2		NB Dodge City			31.05			9.17			0.23					43.06		83.51	7.92	91.43
3		NB Liberal			31.05		57.23	11.15								43.06	18.93	161.42	11.33	172.75
4		Tyson			4.80				59.24			5.98				30.81		100.83	31.73	132.56
5	N283	Excel			3.18			1.98									61.32	66.48	6.35	72.83
6		NB Dodge City			3.18						0.23						61.32	64.73	5.53	70.26
7		NB Liberal			3.18		57.23	1.98									61.32	123.71	27.87	151.58
8		Tyson	30.74		4.80							37.33					4.20	77.07	28.09	105.16
9	N83	Excel			48.57			1.98			0.86				47.27			98.68	11.81	110.49
10		NB Dodge City			48.57						1.09				47.27			96.93	10.99	107.92
11		NB Liberal					0.40								112.64			113.04	7.41	120.45
12		Tyson			1.00										47.27			48.27	6.41	54.68
Total			**30.74**	**82.86**	**913.65**	**89.35**	**687.90**	**293.92**	**129.67**	**322.71**	**211.33**	**72.56**	**172.84**	**27.28**	**357.78**	**282.06**	**410.98**	**4085.63**	**690.81**	**4776.44**

APPENDIX IX - SHORTEST PATHS FROM FOUR MEAT PROCESSING PLANTS TO SIX US CITIES

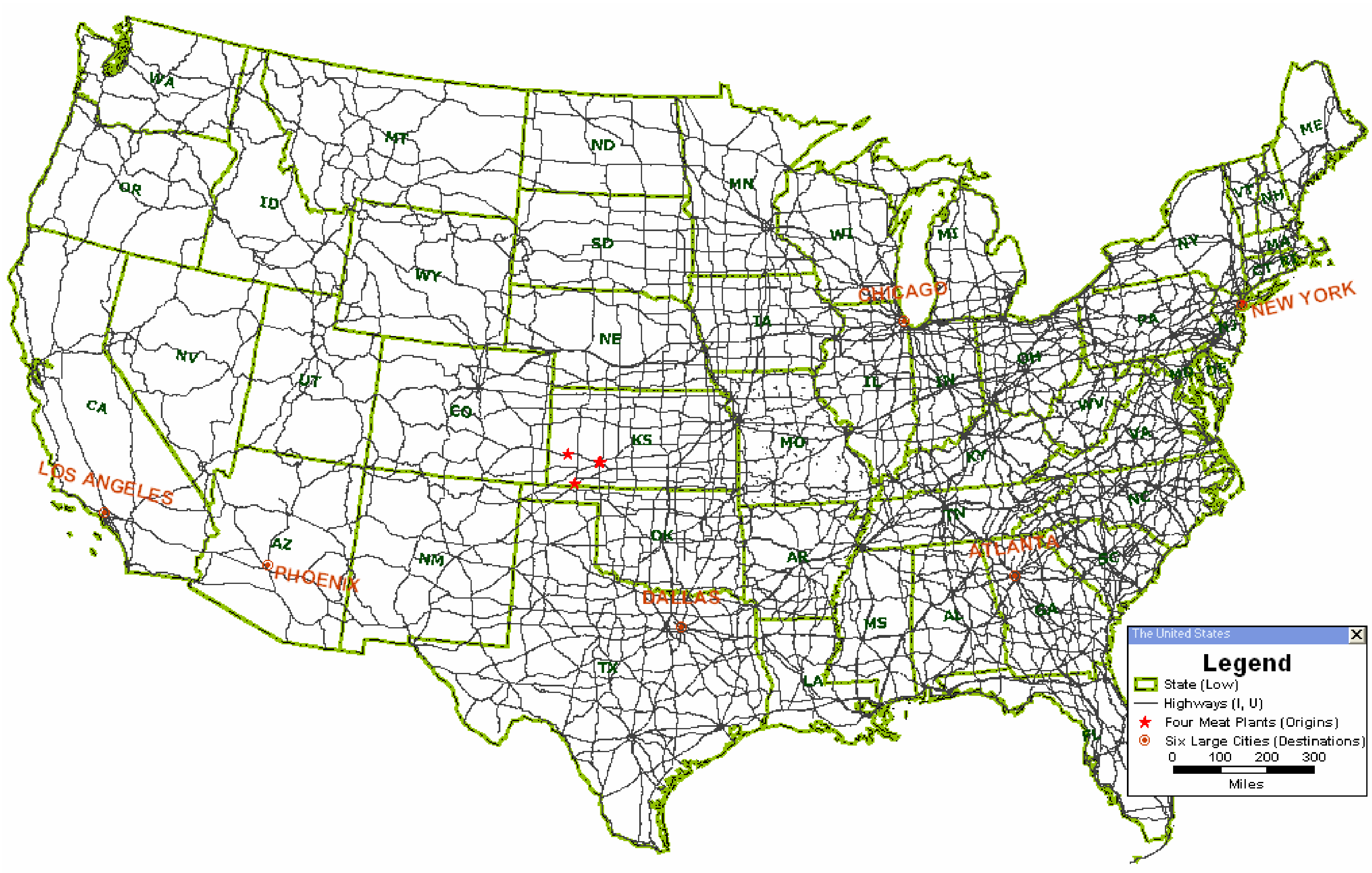


Figure IX.1: Map of Meat Processing Plants (Origins) and Six US cities (Destinations)

Figure IX.2: Shortest Path Map from Four Meat Processing Plants to Six US Cities

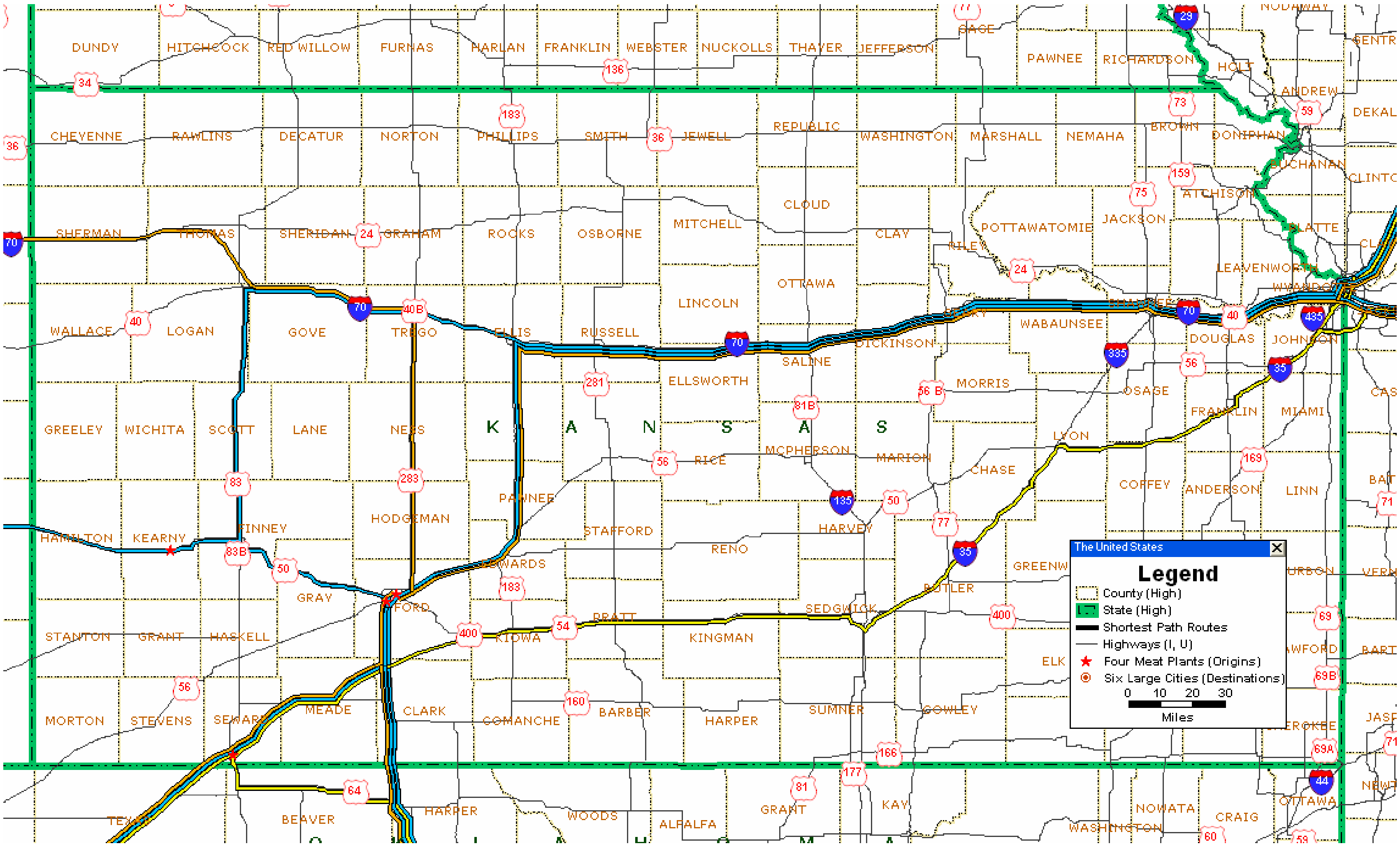


Figure IX.3: Shortest Path Map from Four Meat Processing Plants to Six US Cities (Kansas Part)

Table IX.1: Highway Mileages from Four Meat Processing Plants to Six US Cities

No.	Origin	Destination	Kansas Highway Mileage (Miles)																	Outside Kansas Highway Mileage (Miles)	Total Route Length (Miles)
			Southwest Area									Other Areas								Kansas State Total		
			East/West Highway					South/North Highway			South-west Total	East/West Highway		South/North Highway					Other Total			
			US 50	US 54	US 56	US 160	US 400	US 83	US 183	US 283		US 54	I 70	I 35	US 83	US 183	I 235	US 283				
1	Excel	Atlanta	34.91		11.91		0.44		44.50		**91.76**		262.27			16.94			**279.21**	**370.97**	**804.70**	**1175.67**
2	Excel	Chicago	34.91		11.91		0.44		44.50		**91.76**		259.45			16.94			**276.39**	**368.15**	**530.59**	**898.74**
3	Excel	Dallas		68.35	0.99	6.58				56.39	**132.31**								**0**	**132.31**	**326.56**	**458.87**
4	Excel	Los Angeles		66.40	0.99					19.22	**86.61**								**0**	**86.61**	**1205.89**	**1292.50**
5	Excel	New York	34.91		11.91		0.44		44.50		**91.76**		262.27			16.94			**279.21**	**370.97**	**1252.21**	**1623.18**
6	Excel	Phoenix			0.99					19.22	**20.21**								**0**	**20.21**	**904.30**	**924.51**
7	NB Dodge City	Atlanta	34.91		7.47				44.50		**86.88**		262.27			16.94			**279.21**	**366.09**	**804.70**	**1170.79**
8	NB Dodge City	Chicago	34.91		7.47				44.50		**86.88**		259.45			16.94			**276.39**	**363.27**	**530.59**	**893.86**
9	NB Dodge City	Dallas			3.44	6.58	0.44			56.39	**66.85**								**0**	**66.85**	**394.91**	**461.76**
10	NB Dodge City	Los Angeles	4.98							65.55	**70.53**		128.24					20.28	**148.52**	**219.05**	**1194.14**	**1413.19**
11	NB Dodge City	New York	34.91		7.74						**42.65**		259.45			16.94			**276.39**	**319.04**	**1299.25**	**1618.29**
12	NB Dodge City	Phoenix			0.99					19.22	**20.21**								**0**	**20.21**	**907.20**	**927.41**
13	NB Liberal	Atlanta						3.00			**3.00**								**0**	**3.00**	**1175.86**	**1178.86**
14	NB Liberal	Chicago		116.00							**116.00**	90.25		195.69			20.67		**306.61**	**422.61**	**512.65**	**935.26**
15	NB Liberal	Dallas						3.00			**3.00**								**0**	**3.00**	**453.92**	**456.92**
16	NB Liberal	Los Angeles						3.00			**3.00**								**0**	**3.00**	**1209.72**	**1212.72**
17	NB Liberal	New York		116.00							**116.00**	90.25		195.69			20.67		**306.61**	**422.61**	**1235.47**	**1658.08**
18	NB Liberal	Phoenix						3.00			**3.00**								**0**	**3.00**	**841.73**	**844.73**
19	Tyson	Atlanta	21.90					50.70			**72.60**		345.61		27.53				**373.14**	**445.74**	**806.88**	**1252.62**
20	Tyson	Chicago	21.90					50.70			**72.60**		345.61		27.53				**373.14**	**445.74**	**529.95**	**975.69**
21	Tyson	Dallas	71.40		3.44	6.58	0.44			56.39	**138.25**								**0**	**138.25**	**402.82**	**541.07**
22	Tyson	Los Angeles	43.97								**43.97**								**0**	**43.97**	**1256.85**	**1300.82**
23	Tyson	New York	21.90					50.70			**72.60**		345.61		27.53				**373.14**	**445.74**	**1254.38**	**1700.12**
24	Tyson	Phoenix	43.97								**43.97**								**0**	**43.97**	**879.89**	**923.86**
Total			439.48	366.75	69.25	19.74	2.20	164.10	222.50	292.38	**1576.40**	180.50	2730.23	391.38	82.59	101.64	41.34	20.28	**3547.96**	**5124.36**	**20715.36**	**25839.52**

Note: NB: National Beef Pacing Co. LLC

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**KANSAS TRANSPORTATION RESEARCH
AND
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A COOPERATIVE TRANSPORTATION RESEARCH PROGRAM BETWEEN:

KANSAS DEPARTMENT OF TRANSPORTATION

THE UNIVERSITY OF KANSAS

KANSAS STATE UNIVERSITY