

FoodMech, LLC

# Feasibility Assessment: Heneeceibooo Cattle and Bison Slaughter/Fabrication Plant

Prepared for the Cheyenne and Arapaho  
Tribes of Oklahoma

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# **FEASIBILITY STUDY: HENEECEIBOOO SLAUGHTER/FABRICATION PLANT**

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## **EXECUTIVE SUMMARY**

The Cheyenne and Arapaho Tribes of Oklahoma, hereafter referred to as "the Cheyenne-Arapaho" sought to evaluate the market and financial feasibility of developing a livestock slaughter and further processing facility near the Concho, Oklahoma area. FoodMech, LLC ("FoodMech") was contracted to assist the Cheyenne-Arapaho in completing a feasibility study for these purposes and, pending the results of the feasibility study, to develop an appropriate business plan for the facilities.

The feasibility study included a detailed inventory of statewide facilities and capacities, an evaluation of the proposed site, an assessment of supply and demand for cattle and bison with respect to both growing and processing and an evaluation of the regional market for beef and bison on both the demand and supply side. The information gathered from this research is included in the report and accompanying files and appendixes.

Given the research, observations regarding both the demand and supply side markets, and evaluations of market forecasts, we conclude there is the potential to launch a Cheyenne-Arapaho beef and bison slaughter/processing program. However, certain factors may impact that feasibility, including the capacity for nearby feedlots (cattle and bison), unrecognized future competition from other tribes also pursuing similar opportunities, and any changes in the branding/marketing programs for Cheyenne-Arapaho products both domestically and internationally.

It is our opinion that the Cheyenne-Arapaho tribe can build and operate a sustainable venture, but the revenue potential for a facility will be driven more by value-added marketing opportunities than the availability of tribal/local-sourced cattle and bison. For some products, such as beef jerky and beef snack sticks, the facility might be better served by purchasing bulk beef rounds and trimmings from larger slaughter facilities at the outset to create a Cheyenne-Arapaho branded line of products to market through the tribes' casinos, travel centers and other outlets, using a combination of educational and support services to add value to the brand.

A slaughter operation is conceivably feasible if more than the tribe's livestock are used to fulfill plant capacity potential. Fabrication is a next-step feasible operation in the mid-term, if and when the branding and marketing program reaches a critical mass where such an investment is both necessary and practical insofar as managing risk. Educational, quality assurance and producer support programs are also feasible, involve very little risk and hold the potential to add value, support the brand, and reach the point of critical mass.

### **Markets and Marketing Opportunities**

The tribe's built-in market potential and the high beef consumption capacity of the region suggest opportunities for both branded and co-packed beef and bison products generated in a

proposed facility. However, the availability of new and existing small plants in the region and the wide availability of commodity beef suggest that niche-marketing opportunities will need to be carefully vetted before committing to specific marketing ideas. The unique ceremonial processing facility located adjacent to the livestock slaughter/processing plant may provide unexpected answers to niche marketing opportunities, depending on how it is managed and operated.

### **Livestock (Input) Availability**

Area livestock availability is suitable for supporting this plant at the proposed small level. Nearby feedlots can provide finished cattle for slaughter and the tribe's herds (cattle and bison) can provide a sustainable supply of animals for the facility. Besides the tribe's own livestock supply, the facility could serve as the co-packer for other livestock producers – and even tribes – to further capture local livestock supplies.

### **Location Assessment**

The primarily proposed area for operation is near Concho, OK. Access to livestock supplies, market centers (e.g., OKC), distribution routes (I-40, I-35, and I-44), and service providers suggest great potential for the proposed site. Furthermore, the tribe's immediately-accessible bison herd makes the handling and processing of bison much easier for the facility. Land, water, and utility access should not be an issue, plus air emissions should not be enough to cause problems with the small-but-nearby populations.

### **Regulatory Issues**

It is theorized that any plant located in the suggested region would pursue a certificate of inspection from the USDA Food Safety Inspection Service. A meat plant located in the Cheyenne-Arapaho region of Western Oklahoma would be a new facility, as opposed to a converted non-food-processing facility, so its designs should avoid regulatory compliance issues associated with retro-fitting existing facilities. FoodMech, LLC, has provided preliminary plans for a plant that has the flexibility to perform a variety of slaughter and further processing activities. The combination of FoodMech's plant design experience, pursuing input from USDA inspectors prior to construction, and following USDA-approved operating standards should eliminate regulatory concerns.

### **Economics of Operation**

As with most facilities of this size, a small meat processing venture faces inherent challenges to profitability. However, given the resources of the tribe and the potential for grants to support its startup, a facility of this size can potentially generate the net cash flows necessary to ensure its long-term sustainability while meeting the community and economic needs of the tribe.

Sensitivity analyses indicate that returns are subject to small changes in commodity prices, suggesting the need to focus on niche marketing opportunities and keeping qualified management personnel to ensure financial viability. As with all small meat processing



businesses, the probabilities for economic success significantly increase if the plant operates closer to its stated maximum capacity for livestock slaughter.

## **Recommendation**

Assuming a continued interest in pursuing this venture, the next step involves a change in thinking: from “Should we pursue a 50 head/week plant?” to “What is the best operational structure for a 50 head/week beef and bison slaughter plant?” This involves considering options for smaller niche markets and/or addressing economies of size/scale. This will require a more detailed and specific outline of value-added processing opportunities and fresh-versus-further processing operating expectations. Additional assessment work includes:

- Determining tribal and producer support for a facility by canvassing livestock producers in the market region.
- Pursuing letters of intent for the plant’s services (e.g., ranchers and non-slaughter plants needing guaranteed slaughter numbers) and letters of agreement for provided services (e.g., utility companies, rendering and solid waste pick-ups).
- Pursuing quotes on new, used, and refurbished equipment to best manage the costs of preparing the facility for all expected slaughter, further processing, packaging, and retail operations.
- Adjusting financial/economic analyses to be more precise in terms of PP&E, labor costs, utility expenses, debt financing, and additional sources of revenues/expenses.
- Determine tribal interest and plans for the ceremonial processing facility and how it will be managed and operated. One of the outcomes of the facility could be the ideation and development of new value-added products from beef and bison slaughter.

## **FEASIBILITY STUDY PURPOSE**

Feasibility studies are commonly performed to assess the viability of a potential business venture or a public sector investment. In the case of potential business ventures, feasibility studies can either be conducted before or while writing a business plan. A feasibility study provides an objective analysis of an idea's viability and focuses on answering one question: "Should we proceed with the proposed project idea?" If the decision is made to move forward with the idea, a business plan answers the next logical question: "How will we develop the proposed business?" The contents of this feasibility study are directed toward answering the former question.

The purpose of this study is to evaluate the feasibility of establishing a 10-to-15 head/day slaughter plant to be located somewhere in the Cheyenne-Arapaho tribal area, primarily emphasizing a site location in Concho, OK. This study examines five general areas of feasibility:

- Market viability (i.e., potential state benefits from the plant beyond educational/research efforts)
- Input supply
- Location assessment
- Regulatory issues
- Economics of operation (processing/manufacturing alternatives, financial)

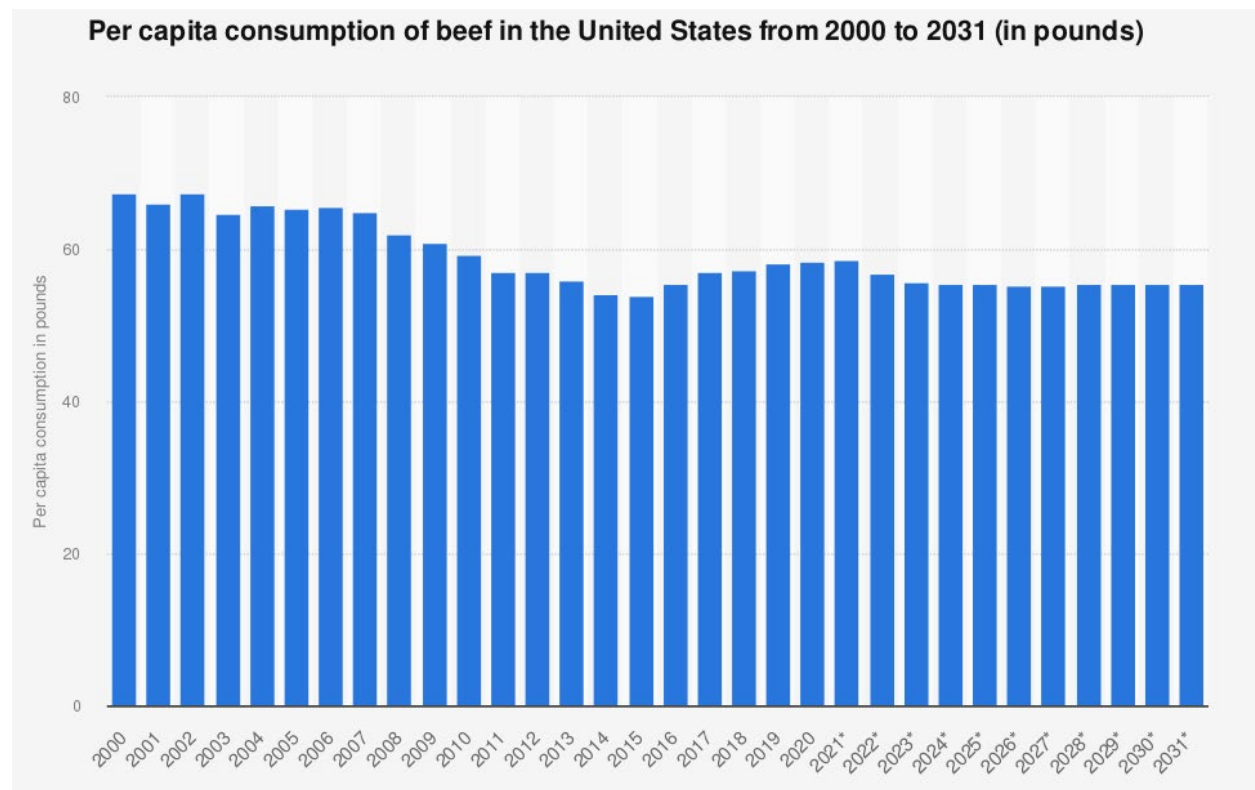
The scope of the study, and the basic layout of a plant, considers slaughter and fresh/frozen meat processing opportunities for cattle and bison. Because of the agricultural makeup of the region, and the greater market emphasis for beef over bison, the study will place an emphasis on cattle/beef as the primary meat type. Bison production is still advancing for the tribes, but meat demand suggests that beef is a more likely primary activity.

This study includes an estimation of economic and market opportunities, the jobs created by the development of a meat plant, and an assessment of the dollars generated by the proposed economic activity. A unique, ceremonial processing facility is also included alongside the main plant.

## MEAT INDUSTRY ASSESSMENT

### National Per Capita Meat Consumption Trends

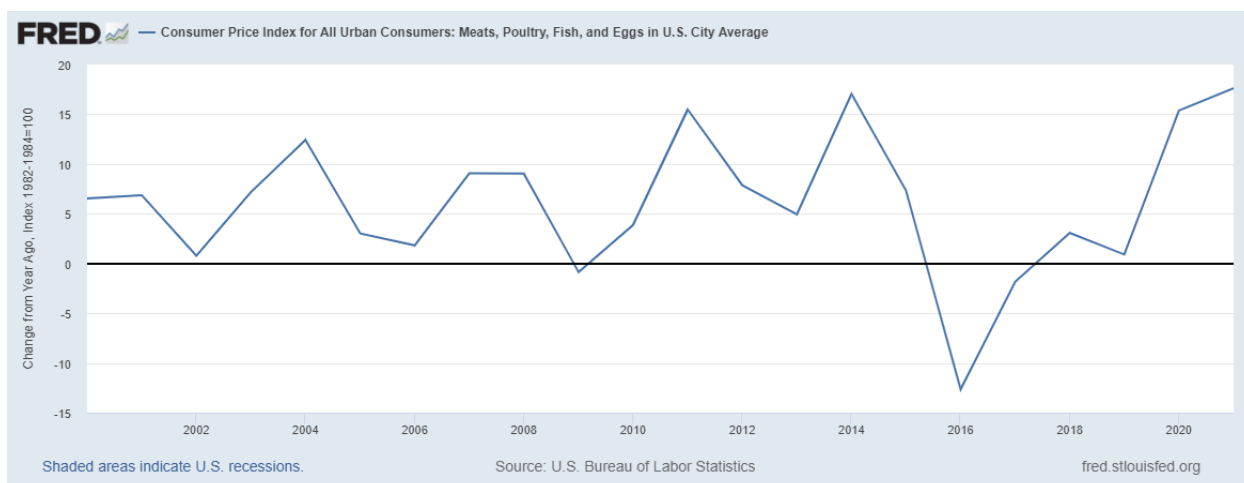
Over the past 40 years, the US red meat market has experienced a structural change. Beef consumption, for example, peaked in the 1970s but afterwards experienced a long but marked decline, dropping from a high of 95 lbs./person in 1976 to roughly 51.2 lbs./person in 2015. Meanwhile, annual chicken consumption has surpassed all other forms of animal protein consumption (excluding dairy products), peaking at over 60 lbs./person per year. However, a growing demand for high-protein diets (e.g., keto-friendly, low-carb) stopped that downward trend and actually resulted in a rising beef demand. In 2020, the Covid pandemic-fueled surge in demand for beef bolstered performance in the beef industry and spurred growth in all sizes of beef slaughter and further processing businesses. USDA's Economic Research Service (ERS) projects a slight leveling-off of per capita beef consumption for the next decade. Still, the growing population and a steady per capita demand represent market opportunities in the beef industry. (Figure 1)



**Figure 1: Annual Per Capita Beef Consumption, 2000-2031 (est.). (Source: USDA-ERS)**

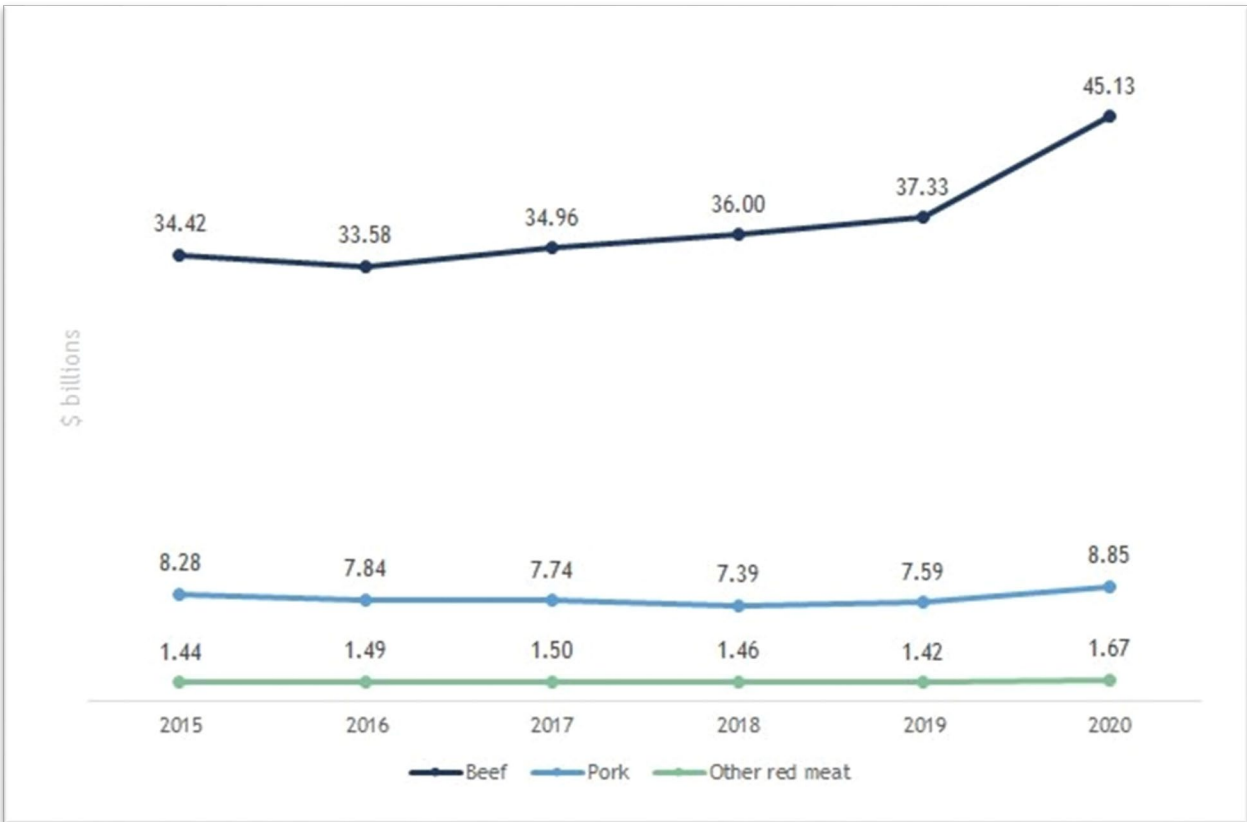
Red meat consumption and availability can vary due to a number of factors: herd declines, efficiency of the meat processing industry (e.g., Covid limitations), increased export demand that

impacts domestic meat prices, costs of finished livestock stemming from changes in feed grain prices, and various consumer trends and attitudes. Regardless of the level of impact from each factor, the resulting higher prices for beef have impacted the meat mix in consumers' grocery baskets. Figure 2 depicts the volatility of price indexes for meat, poultry, fish, and eggs in general since 2000.



**Figure 2: Percent Changes over Last Year's Consumer Meat/Poultry/Fish/Eggs Price Indexes, 2000-2021. (Sources: St. Louis Federal Reserve Economic Data (FRED))**

It appears that the combination of smaller US beef cattle herds, a steady export demand, and higher input costs combined to create higher wholesale and retail prices for beef. Even with these factors, beef is still driving packaged meat sales (Figure 3).

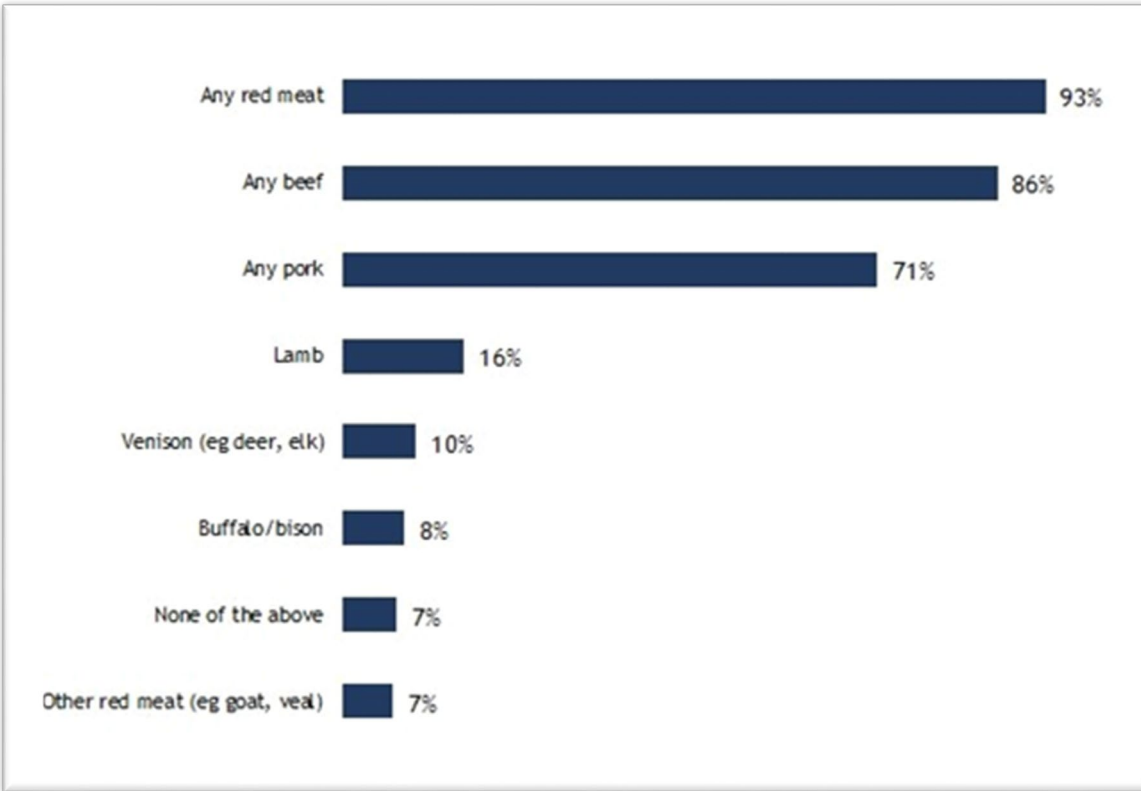


**Figure 3: Sales of Packaged Red Meat, by Segment, 2015-2020. (Sources: IRI, US Census Bureau, BeefRetail.org, and FMI "Power of Meat" reports.)**

### **Beef – It's Still What's for Dinner, But...**

Beef drives the overall market for red meat products. According to The Beef Checkoff<sup>1</sup>, beef represented roughly 54% of total meat dollar sales in 2021. Beef demand is relatively inelastic, meaning that a larger percentage change in price results in a smaller negative percentage change in quantity demanded. To illustrate that point, in 2021 as the value of beef sales rose the actual quantity of beef sold dropped by 5.7%. This is in part due to drastically high retail meat prices during the pandemic and corresponding price increases in meat entrée items served at restaurants in post-pandemic sales. Figure 4 shows findings from a 2021 Mintel survey of weekly store shoppers indicating their consumption of red meat choices (no poultry or dairy proteins) over a six-month span in 2021.

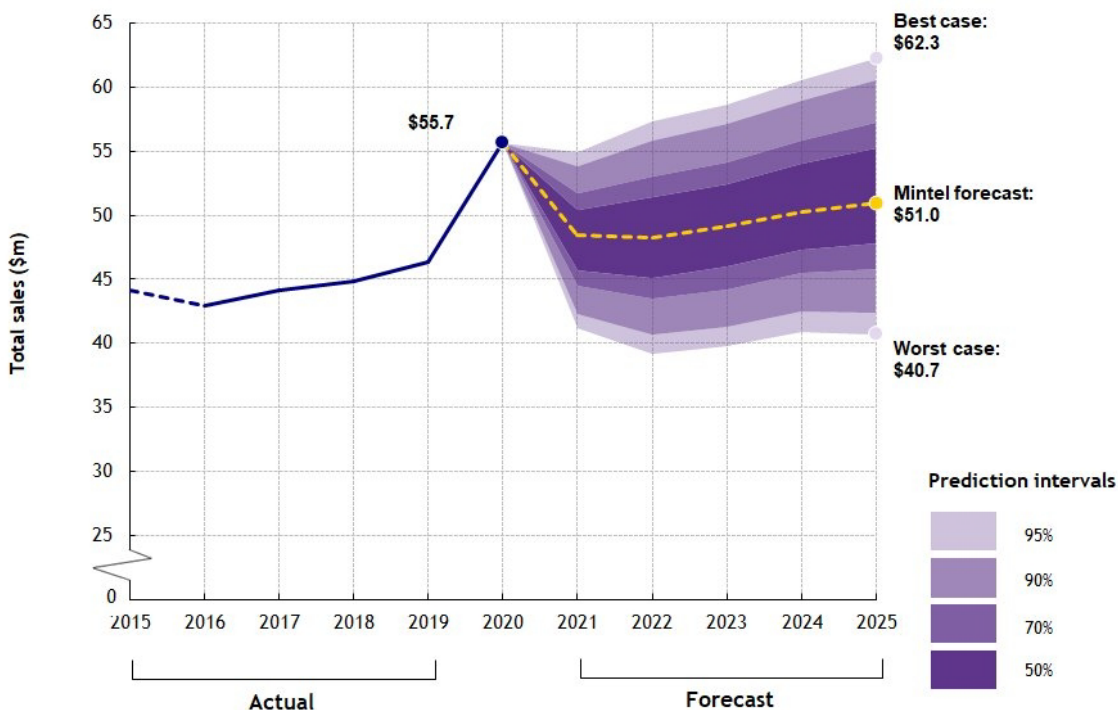
<sup>1</sup> [www.beefretail.org](http://www.beefretail.org).



**Figure 4: Weekly Consumption of Meat Sources over the Past 6 Months (January 2021 Basis). (Source: Lightspeed/Mintel)**

### **National Retail Meat Marketing Trends**

Retail sales of packaged red meat leveled off nearly a decade ago, following a 20-year decline. The market for red meat had stayed relatively steady up to a slight decline in 2016, falling an estimated 6.1% before the industry once again saw increases leading up to 2019. During 2019-2020, packaged red meat sales surged to create strains on both the packing industry and the retail sector. The following 2020-2021 dip in sales was due to pandemic supply chain issues, but now the industry seems poised to maintain a steady but small annual growth level. (Figure 5)



**Figure 5: US Sales and Fan Chart Forecast, Packaged Red Meat, 2015-2025. (Sources: IRI/BEA/Mintel)**

According to the *2021 Power of Meat®*<sup>2</sup> (POM) study, retail meat department dollars increased by 19.2% and volume increased by 11%. This was largely driven by at-home cooking due to Covid concerns and the desire to “mix it up” for lunch and dinner meal offerings. Household penetration of meat, i.e., the percent of households buying meat, remained very high at 98.4%.

While it is difficult to forecast the future demand for meat products, it is possible to survey consumers to ascertain their current purchasing habits and how those habits have changed in recent years. The POM, jointly prepared by the American Meat Institute and the Food Marketing Institute, surveyed retail shoppers to determine their meat purchasing habits.

### Brand Loyalty and Marketing Promotions

Fresh meat brands have never drawn a distinctive following or brand loyalty, with past POM studies reporting up to 73% share of “switchers” (i.e., shoppers with no preference for national brands or private labeled meat/poultry). Brand loyalty has even lagged for processed meat products, dropping to roughly 25% according to recent research. Consumers are pursuing savings over brand loyalty in all aspects of meat purchases. More shoppers looked for promotions across stores (68%) or at their primary store (78%) as they shifted to buying in

<sup>2</sup> *2021 Power of Meat: An In-Depth Look at Meat Through the Shoppers’ Eyes*. Published by the American Meat Institute and the Food Marketing Institute, this annual study’s results are presented by 210 Analytics, LLC, each year at the AMI Annual Meat Conference.

bigger quantities to freeze and use over time. The digital circular gained big, but in-store signage remained the most popular way to research meat specials.

With price pressures and product availability as key retail drivers, consumers' spending habits were changed over the past two years. According to the POM study, the results are that shoppers are now buying differently, whether different types of red meat (42%), cuts (40%) or brands (45%). Many (71%) are putting effort into choosing nutritious and healthful meat and poultry choices. High interest in these areas expresses itself in vastly different protein choices, including purchasing claims-based meat, blends, alternatives and eating a little less of it.

## **Product Claims, Sustainability, and Other “Process Verified” Meats**

According to the POM study, 49% of consumers consider sustainability factors when making meat purchases including better for the planet (34%), the worker/rancher (29%) and the animal (27%). Sixty percent of shoppers try to do their part for the environment and 43% believe that ranchers take steps to protect the planet. The 37% share of consumers who are unsure about environmental measures taken signal an important education opportunity for the meat retailing industry.

Plant-based proteins are now a consideration as a “process verified” competing alternative. At \$475 million, refrigerated plant-based meat alternatives experienced robust growth. Just shy of 10% of households bought alternatives in 2020, but 40% did so only once (IRI). While meat alternatives sales grew by 83.9% in 2020, they still represent only 0.6% of combined meat/plant-based alternatives sales. Vegetable/meat blends, such as mushroom burgers, have greater appeal, and can be a bridge between continued meat consumption and providing benefits people look for in plant-forward eating.

A number of major meat brands are seeking to separate themselves from their competition by leveraging product integrity as well as animal and environmental welfare attributes. Smithfield Foods' online ingredient glossary lists and describes ingredients used in products across the company's brands, promising "greater assurance of Smithfield's commitment to transparency and producing safe, high-quality foods." In addition, the company's new Food Safety & Quality section details investments in "pioneering research, technology and projects that advance food safety practices across the company and throughout the industry." Smithfield has also expanded its MBGro program designed to "advance on-farm conservation practices and food supply chain sustainability." It is part of the company's efforts to reduce fertilizer runoff and greenhouse gas emissions, which have come under increasing scrutiny as an environmental threat. By 2025, it aims to reduce its emissions by 25% (equivalent to 4 million metric tons), as measured from a 2010 baseline.

Cargill, meanwhile, is reducing the use of antibiotics in its cattle supply, eliminating 20% of antibiotics used on about 1.2 million cattle annually (roughly 18% of the cattle Cargill processes). The move stems from some public health concerns that the use of antibiotics may be fueling the rise of antibiotic-resistant bacteria. The FDA has voluntary guidelines for drug



makers and agricultural companies to phase out antibiotic use as a growth enhancer in livestock, though they could still be used to treat illnesses in animals raised for meat.

Cargill has also created the Pasture Crafted Beef brand, something of a bridge for consumers who may not be able to afford more-expensive organic meats. Pasture Crafted Beef is grain-finished, and traceable to birth on sustainably operated ranches, the company notes. Traceability appears key to the initiative, affording the consumer an awareness of the source of the meat. A quarter of consumers (26%) indicate claims as important to their red meat choice, and an even greater percentage (39%) considers the source of the meat in their purchase decision, both higher among consumers than an organic claim (24%).

Brands are striving to provide a greater degree of transparency to their meat product offerings. Efforts have even included measures noting how animals were raised on "stress-free" farms and minimally processed. Red meat launches promising to be all-natural have surged in the past decade (Table 1), but these claims remain well shy of the number bearing "no additive/preservative" and reduced-allergen claims. This is likely because of a significant expense involved in such sustainable efforts. Nevertheless, such measures would appear to be meeting a consumer need that they may not entirely recognized at present but which could play a sizable role in their purchase decision in the near future.

**Table 1: Incidence of Packaging Claims on Red Meat Product Launches, 2015-2021.**  
(source: Mintel GNPD)

<b>Claim/Marketing Year (May-April timeframe)</b>	<b>2015-2016</b>	<b>2016-2017</b>	<b>2017-2018</b>	<b>2018-2019</b>	<b>2019-2020</b>	<b>2020-2021</b>
	%	%	%	%	%	%
Microwaveable	38	44	49	58	53	59
Low/no/reduced allergen	44	55	47	51	49	40
Gluten free	44	55	46	49	49	39
No additives/preservatives	38	38	38	41	42	38
All natural product	17	22	21	27	17	28
Hormone free	18	17	24	21	26	22
Ease of use	17	17	20	26	21	20
Free from added/artificial preservatives	4	11	16	22	15	18
Premium	14	17	17	19	16	17
Free from added/artificial flavorings	4	10	11	12	10	13
Ethical – Animal	7	6	12	12	14	11
Low/no/reduced fat	14	12	16	12	10	10
Free from added/artificial colorings	3	9	8	11	7	10
Social media	9	16	13	10	12	9
Convenient packaging	16	17	17	11	11	8
Organic	3	3	4	5	5	6
Low/no/reduced lactose	2	2	3	4	3	6
Ethical – Environmentally friendly package	8	7	7	7	5	5

## Local and Cheyenne-Arapaho Area: Target Market and Meat Consumption Trends

### Area Demographics

Using Concho, OK, as the location for a meat processing facility, an area demographic analysis was performed using ESRI® Business Analyst. The following figure is a capture from that report, with data from both the 2010 and 2020 U.S. census and a five-year trend analysis for 2022 and 2027. It is noteworthy that forecasted household annual incomes are expected to grow at a higher rate than the population, but that income growth rate may not match recent inflation growth.

	25 miles	50 miles	75 miles
<b>Census 2010 Summary</b>			
Population	346,182	1,256,126	1,708,524
Households	140,123	491,144	663,902
Families	90,513	319,941	434,276
Average Household Size	2.42	2.49	2.48
Owner Occupied Housing Units	91,159	317,163	429,546
Renter Occupied Housing Units	48,963	173,981	234,355
Median Age	36.0	34.5	34.5
<b>Census 2020 Summary</b>			
Population	426,909	1,425,837	1,879,773
Households	167,316	552,727	724,555
Average Household Size	2.50	2.51	2.51
<b>2022 Summary</b>			
Population	441,886	1,464,156	1,919,638
Households	172,807	567,171	739,254
Families	111,690	364,740	476,630
Average Household Size	2.50	2.52	2.51
Owner Occupied Housing Units	115,040	366,352	478,760
Renter Occupied Housing Units	57,766	200,819	260,494
Median Age	37.8	36.7	36.7
Median Household Income	\$72,259	\$66,656	\$63,345
Average Household Income	\$97,065	\$93,936	\$89,500
<b>2027 Summary</b>			
Population	461,715	1,511,886	1,968,910
Households	179,863	584,619	757,069
Families	116,746	376,593	488,785
Average Household Size	2.52	2.52	2.52
Owner Occupied Housing Units	121,459	382,092	495,869
Renter Occupied Housing Units	58,404	202,527	261,200
Median Age	38.3	37.4	37.5
Median Household Income	\$82,178	\$77,963	\$74,384
Average Household Income	\$110,907	\$107,767	\$102,541
<b>Trends: 2022-2027 Annual Rate</b>			
Population	0.88%	0.64%	0.51%
Households	0.80%	0.61%	0.48%
Families	0.89%	0.64%	0.50%
Owner Households	1.09%	0.84%	0.70%
Median Household Income	2.61%	3.18%	3.27%

**Figure 6: Population Trends for 25-, 50-, and 75-Mile Radii of Concho, OK. (source: ESRI)**

The following figures from the same analysis include projections for changes in household income and population breakdowns by age, respectively. Overall, the ages of citizens within 75 miles of Concho, OK, are normally distributed in a pattern reminiscent of the state of Oklahoma.

	25 miles		50 miles		75 miles	
<b>2022 Households by Income</b>	<b>Number</b>	<b>Percent</b>	<b>Number</b>	<b>Percent</b>	<b>Number</b>	<b>Percent</b>
<\$15,000	11,291	6.5%	50,317	8.9%	69,939	9.5%
\$15,000 - \$24,999	11,654	6.7%	43,218	7.6%	61,315	8.3%
\$25,000 - \$34,999	13,187	7.6%	44,012	7.8%	59,596	8.1%
\$35,000 - \$49,999	21,160	12.2%	69,011	12.2%	93,359	12.6%
\$50,000 - \$74,999	31,606	18.3%	103,603	18.3%	136,351	18.4%
\$75,000 - \$99,999	26,522	15.3%	77,342	13.6%	100,140	13.5%
\$100,000 - \$149,999	31,525	18.2%	98,545	17.4%	124,357	16.8%
\$150,000 - \$199,999	13,694	7.9%	41,700	7.4%	48,963	6.6%
\$200,000+	12,159	7.0%	39,358	6.9%	45,162	6.1%
Median Household Income	\$72,259		\$66,656		\$63,345	
Average Household Income	\$97,065		\$93,936		\$89,500	
Per Capita Income	\$38,105		\$36,533		\$34,632	
<b>2027 Households by Income</b>	<b>Number</b>	<b>Percent</b>	<b>Number</b>	<b>Percent</b>	<b>Number</b>	<b>Percent</b>
<\$15,000	9,361	5.2%	42,106	7.2%	59,085	7.8%
\$15,000 - \$24,999	9,492	5.3%	36,248	6.2%	51,416	6.8%
\$25,000 - \$34,999	11,050	6.1%	36,690	6.3%	50,477	6.7%
\$35,000 - \$49,999	19,285	10.7%	63,060	10.8%	85,987	11.4%
\$50,000 - \$74,999	30,897	17.2%	101,656	17.4%	133,872	17.7%
\$75,000 - \$99,999	27,818	15.5%	81,557	14.0%	105,935	14.0%
\$100,000 - \$149,999	38,641	21.5%	119,085	20.4%	149,987	19.8%
\$150,000 - \$199,999	18,850	10.5%	57,455	9.8%	66,911	8.8%
\$200,000+	14,458	8.0%	46,702	8.0%	53,334	7.0%
Median Household Income	\$82,178		\$77,963		\$74,384	
Average Household Income	\$110,907		\$107,767		\$102,541	
Per Capita Income	\$43,341		\$41,811		\$39,587	

**Figure 7: Household Income Trends for 25-, 50-, and 75-Mile Radii of Concho, OK.**  
(source: ESRI)

	25 miles		50 miles		75 miles	
2010 Population by Age	Number	Percent	Number	Percent	Number	Percent
Age 0 - 4	25,071	7.2%	92,235	7.3%	123,243	7.2%
Age 5 - 9	23,572	6.8%	88,096	7.0%	118,240	6.9%
Age 10 - 14	22,680	6.6%	83,672	6.7%	112,609	6.6%
Age 15 - 19	21,686	6.3%	87,421	7.0%	121,697	7.1%
Age 20 - 24	22,945	6.6%	99,929	8.0%	141,678	8.3%
Age 25 - 34	52,609	15.2%	186,066	14.8%	247,815	14.5%
Age 35 - 44	44,746	12.9%	157,128	12.5%	209,663	12.3%
Age 45 - 54	48,408	14.0%	173,385	13.8%	234,919	13.7%
Age 55 - 64	39,496	11.4%	140,323	11.2%	190,243	11.1%
Age 65 - 74	23,422	6.8%	81,262	6.5%	114,605	6.7%
Age 75 - 84	15,035	4.3%	47,908	3.8%	67,830	4.0%
Age 85+	6,511	1.9%	18,703	1.5%	25,980	1.5%
2022 Population by Age	Number	Percent	Number	Percent	Number	Percent
Age 0 - 4	28,614	6.5%	94,632	6.5%	122,302	6.4%
Age 5 - 9	29,443	6.7%	96,146	6.6%	123,715	6.4%
Age 10 - 14	29,549	6.7%	95,744	6.5%	122,791	6.4%
Age 15 - 19	26,658	6.0%	96,528	6.6%	128,010	6.7%
Age 20 - 24	25,850	5.8%	104,489	7.1%	143,950	7.5%
Age 25 - 34	62,451	14.1%	209,409	14.3%	273,630	14.3%
Age 35 - 44	62,638	14.2%	195,366	13.3%	250,059	13.0%
Age 45 - 54	51,874	11.7%	165,307	11.3%	214,267	11.2%
Age 55 - 64	52,837	12.0%	174,950	11.9%	230,514	12.0%
Age 65 - 74	41,443	9.4%	136,461	9.3%	181,446	9.5%
Age 75 - 84	21,783	4.9%	69,274	4.7%	94,008	4.9%
Age 85+	8,746	2.0%	25,851	1.8%	34,946	1.8%
2027 Population by Age	Number	Percent	Number	Percent	Number	Percent
Age 0 - 4	30,017	6.5%	97,868	6.5%	125,412	6.4%
Age 5 - 9	30,336	6.6%	97,687	6.5%	125,141	6.4%
Age 10 - 14	30,680	6.6%	98,482	6.5%	126,269	6.4%
Age 15 - 19	28,331	6.1%	99,734	6.6%	131,695	6.7%
Age 20 - 24	26,624	5.8%	106,600	7.1%	145,576	7.4%
Age 25 - 34	62,952	13.6%	203,936	13.5%	262,372	13.3%
Age 35 - 44	66,084	14.3%	207,554	13.7%	264,894	13.5%
Age 45 - 54	54,784	11.9%	173,053	11.4%	222,513	11.3%
Age 55 - 64	49,607	10.7%	161,959	10.7%	212,338	10.8%
Age 65 - 74	45,504	9.9%	149,434	9.9%	198,207	10.1%
Age 75 - 84	27,191	5.9%	86,597	5.7%	115,688	5.9%
Age 85+	9,604	2.1%	28,980	1.9%	38,805	2.0%

**Figure 8: Population Age Trends for 25-, 50-, and 75-Mile Radii of Concho, OK. (source: ESRI)**

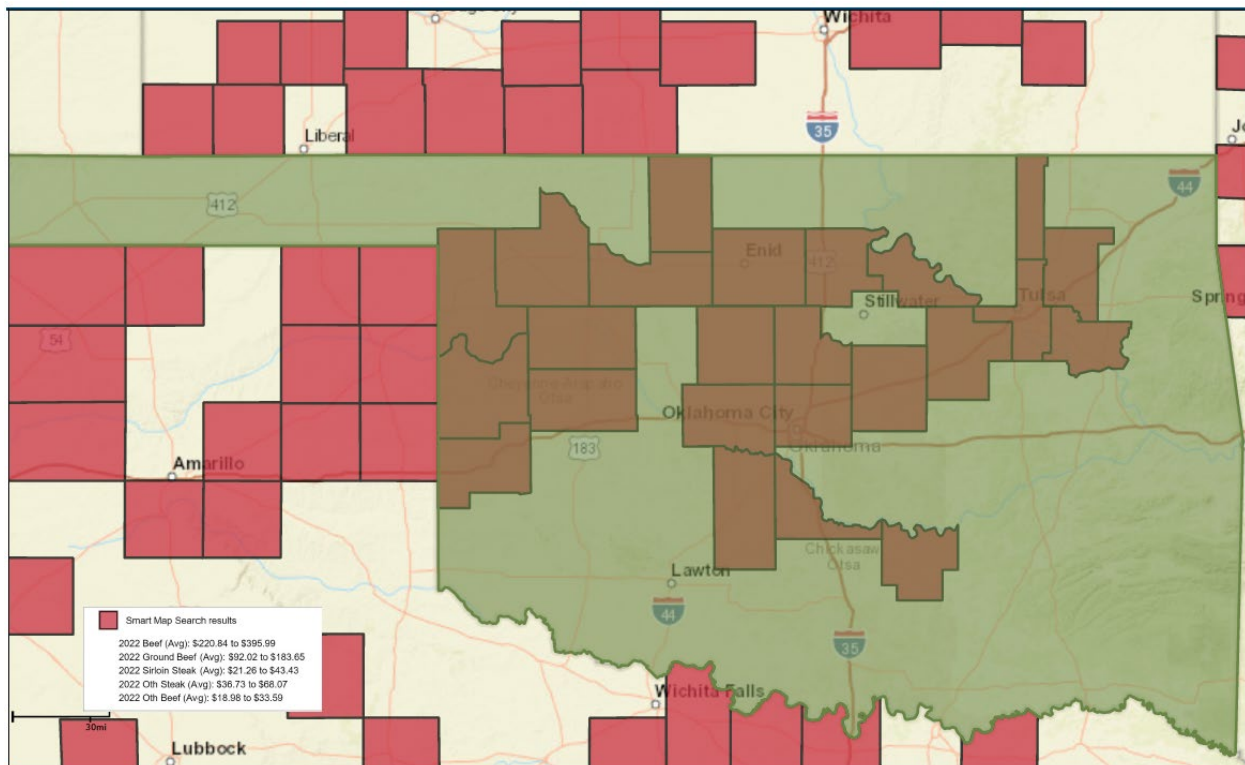
## Area and Statewide Meat Consumption Trends

Oklahoma is a relatively high per-capita meat consumption state, and the counties in the Cheyenne-Arapaho tribal region comprise some of the largest beef consuming counties in the state. According to an ESRI® Business Analyst assessment, 2022 projected expenditures on beef for consumption at home within 25 miles of Concho, OK, will exceed \$58 million. Expanding the analysis to a 50-mile radius (all of OKC and Clinton/Weatherford) and a 75-mile radius (adds Elk City, Stillwater, and Shawnee) suggest 2022 estimated area food-at-home beef expenditures of \$187 million and \$237 million, respectively. From a consumer spending standpoint, this averages about \$337 per person. Focusing specifically on the 25-mile radius, notable meat consumption statistics include:

- 2022 estimated beef purchases for at-home consumption: \$58,310,444
  - Ground beef: \$22,674,447

- Sirloin steaks: \$6,849,545
- Round steak and other steaks: \$1,4776,265
- 2022 estimated pork purchases for at-home consumption: \$40,520,487
  - Pork chops: \$6,172,803
  - Ham: \$8,037,961
  - Sausage: \$8,673,844
  - Bacon: \$8,672,559
- 2022 estimated poultry purchases for at-home consumption: \$40,472,329
- 2022 estimated lamb/other meat purchases for at-home consumption: \$3,066,738

Since this plant will have a primary focus on beef, it is important to focus the target market analysis on beef consumption. Fortunately, as shown in the following figure, many of the state's counties with higher-than-average per-capita beef expenditures are located in the Cheyenne-Arapaho region.



**Figure 9: Oklahoma and Regional Counties' Per-Capita Beef Consumption Comparisons.**  
(source: ESRI Business Analyst)

A more detailed comparison of beef expenditure data for Oklahoma's highest beef consuming counties is provided in the following table. Counties in the Cheyenne-Arapaho region are highlighted in yellow.

**Table 2: 2022 Highest County Average Per-Capita Beef Expenditures, Oklahoma. (source: ESRI)**

Oklahoma County	All Beef	Ground Beef	Sirloin Steak	Other Steak	Other Beef
Alfalfa	\$379.49	\$183.65	\$28.23	\$52.78	\$30.07
Beckham	\$328.08	\$137.45	\$33.40	\$51.39	\$27.93
Canadian	\$341.81	\$131.41	\$40.68	\$60.30	\$29.01
Creek	\$319.30	\$129.63	\$33.78	\$54.09	\$27.00
Custer	\$306.19	\$127.82	\$31.67	\$50.04	\$26.21
Dewey	\$391.91	\$166.32	\$38.45	\$58.77	\$33.58
Ellis	\$375.51	\$172.10	\$31.77	\$53.98	\$30.79
Garfield	\$314.75	\$128.49	\$34.51	\$52.38	\$25.07
Grady	\$362.68	\$144.39	\$40.70	\$61.39	\$30.06
Kingfisher	\$389.65	\$173.42	\$35.65	\$58.32	\$31.57
Lincoln	\$324.69	\$136.08	\$32.29	\$52.66	\$27.26
Logan	\$389.80	\$154.02	\$43.43	\$68.07	\$33.05
Major	\$346.86	\$160.64	\$28.54	\$50.50	\$27.98
McClain	\$368.90	\$144.56	\$42.24	\$63.78	\$30.84
Noble	\$315.60	\$133.31	\$32.02	\$50.81	\$25.38
Oklahoma	\$325.87	\$127.31	\$38.10	\$57.37	\$28.21
Pawnee	\$314.88	\$134.35	\$30.05	\$50.28	\$26.54
Pontotoc	\$303.23	\$125.59	\$31.71	\$50.13	\$25.22
Roger Mills	\$353.23	\$161.25	\$30.14	\$50.90	\$29.04
Rogers	\$344.55	\$134.08	\$40.10	\$59.83	\$28.52
Tulsa	\$332.38	\$129.33	\$38.99	\$58.80	\$28.50
Wagoner	\$346.00	\$136.05	\$39.43	\$59.68	\$28.92
Washington	\$338.22	\$136.20	\$37.54	\$57.58	\$27.56
Woodward	\$395.99	\$170.23	\$38.22	\$60.40	\$33.59

Overall, the data suggests local and area support for the meat processing industry. However, the true market potential for a new meat processing venture will be determined by efforts made to combat existing competitors with strong marketing messages tied to locally-sourced products with a high quality profile and recognized/respected brand awareness.

## LIVESTOCK SUPPLY

### National Livestock Inventories

Since the late 1990s, the impact of ethanol production on feed grain prices, economic distress (nationally and internationally), and US regional droughts have been realized in both livestock numbers and livestock/meat prices. Economists and industry insiders have noted that the time-honored “cattle cycle” depicting the rise and fall cattle herd numbers on a 4-year cycle is no longer the norm. Assumed reasons for the changing nature of livestock cycles and prices vary, but most definitely involve changes in international trade and domestic consumption.

As seen in Figure 6, the U.S. beef cow inventory has declined substantially in the past 25 years, and even more significantly from its peak in the early 1970s. Recent years of drought in key cattle-producing states have further exacerbated the issue, with herds being liquidated due to lack of feed and water. These liquidations may have impacted the distribution of the U.S. cattle herd from the 2017 Census of Agriculture, as shown in Figure 7, but long-term data show little change in geographic concentrations of beef cattle over the past three decades.

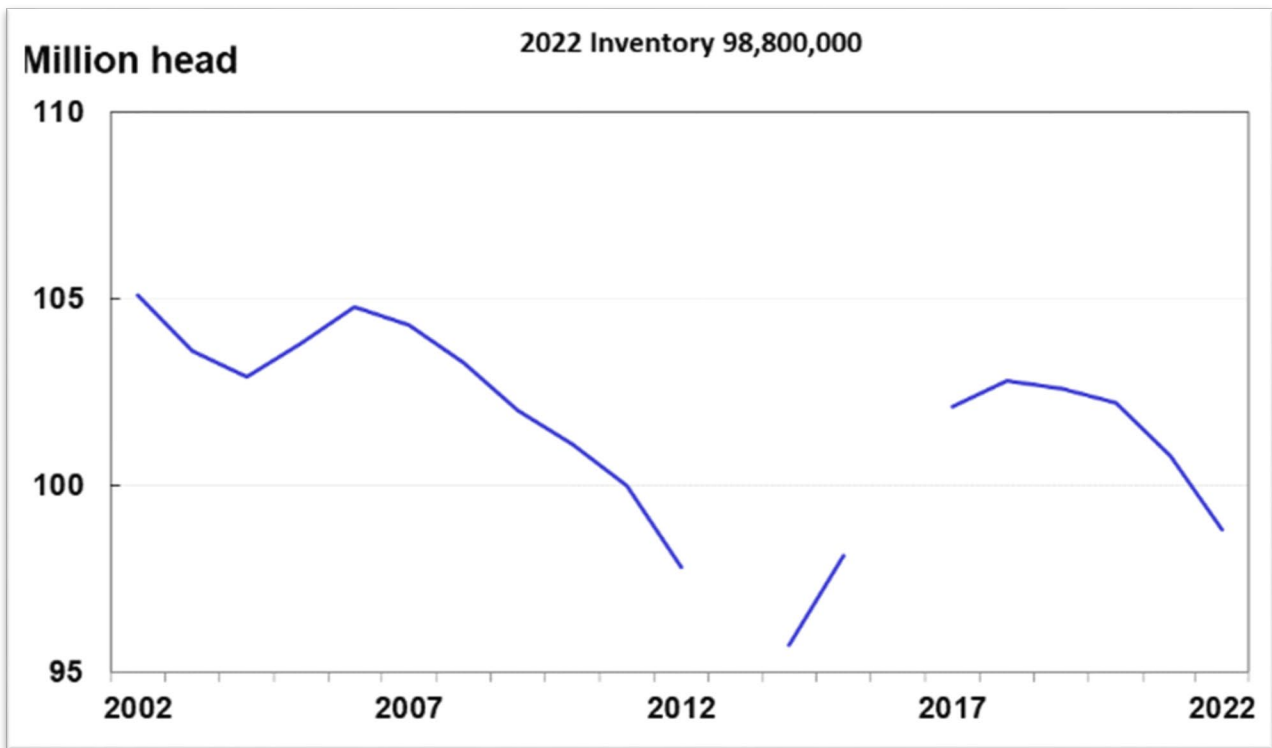
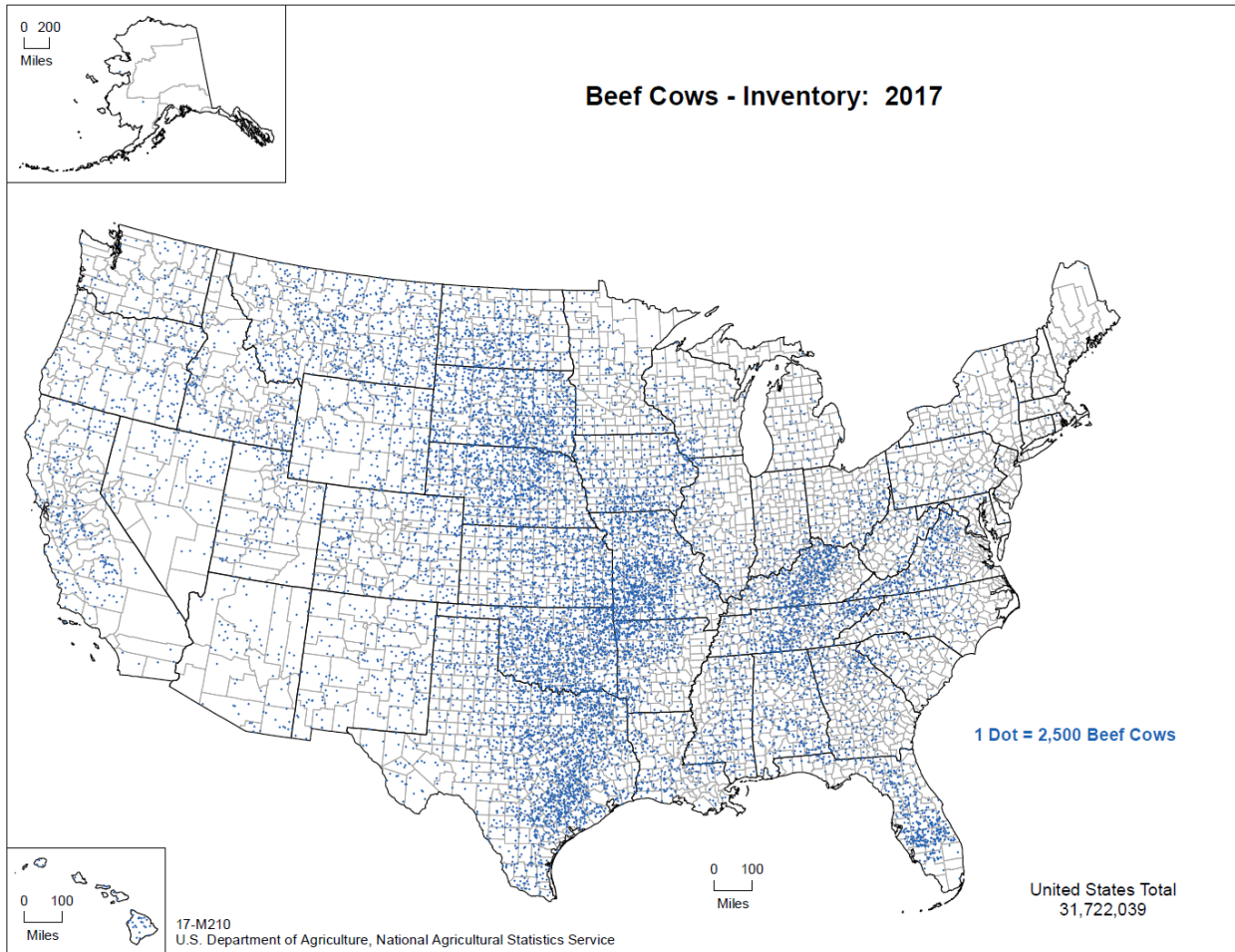


Figure 10: US Cattle Inventory 2002-2022 (excl. 2013, 2016 reports). (Source: USDA-NASS)





**Figure 11: Beef Cow Inventory, 2017. (source: USDA Census of Agriculture, 2017)**

## Regional Livestock Inventories

Because the stated intent of the proposed plant is to emphasize processing of locally sourced steers and bison (primarily cattle, but including Cheyenne-Arapaho bison), regional livestock assessment will primarily focus on the availability of cattle supplies. Without the availability of adequate cattle inventories to supply the plant in its early years of operation, most other aspects of plant feasibility are null and void.

The following table provides an overview of recent beef cattle inventory (beef cows and on-feed inventory) estimates from USDA's National Agricultural Statistics Service (NASS) for the Oklahoma counties in the Cheyenne-Arapaho region. At full capacity, a 50 head/day slaughter plant operating 250 days/year would require 12,500 cattle or cattle equivalents per year. Using those estimates, and not including years when counties did not report numbers, a Cheyenne-Arapaho plant would have to acquire somewhere between 5-15% of all beef cattle in the region. Even without assuming a majority of those cattle are available from the tribe's herds or herds owned by tribal members, this is a large percentage of the cow inventory to be acquired by a new plant.



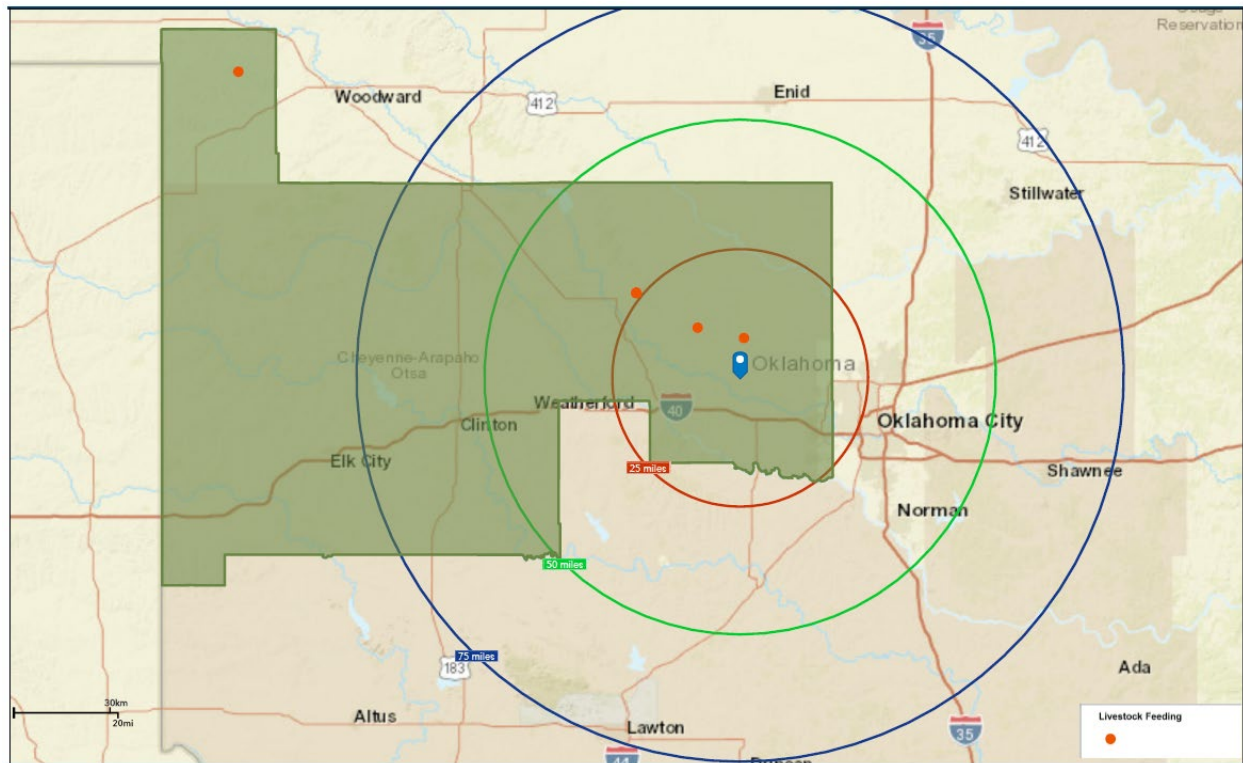
**Table 3: USDA January 1 Beef Cows and On-Feed Inventory Data, Cheyenne-Arapaho Tribal Area, 2012-2022.**

County	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	Avg.
CANADIAN	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	23,500	23,500
KINGFISHER	34,500	35,500	34,000	35,000	34,000	29,500	27,500	26,500	25,000	24,000	24,000	29,955
ELLIS	(D)	(D)	(D)	(D)	(D)	23,500	21,500	21,000	19,500	19,100	20,000	20,767
BECKHAM	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	D
BLAINE	34,500	35,500	34,000	34,500	33,500	28,000	25,500	25,000	23,000	22,500	24,000	29,091
CUSTER	35,000	35,000	35,000	35,500	34,500	(D)	(D)	(D)	(D)	(D)	22,000	32,833
DEWEY	27,500	28,000	27,000	27,500	26,500	(D)	(D)	(D)	(D)	(D)	20,000	26,083
ROGER MILLS	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	25,000	25,000
WASHITA	32,500	33,500	32,500	33,000	32,000	25,500	23,500	23,000	21,500	20,500	(D)	27,750
Totals (excluding "D" data)	164,000	167,500	162,500	165,500	160,500	106,500	98,000	95,500	89,000	86,100	158,250	214,979

Beyond the overview of cattle inventories, a meat processing facility must emphasize the local potential for finished cattle to ensure its supply of wholesale/retail-ready beef cuts. The following table and figure identify feedlot operations in the Cheyenne-Arapaho area suggest the possibility of keeping a steady stream of finished cattle supplied to the facility. These animals may be from the tribe's own herd (custom fed for this facility) or purchased when needed for the facility's supply capacity.

**Table 4: Cattle Feedlots in the Cheyenne-Arapaho Region.**

Feedlot Name	City
Alig Bob Feed Lot	Okarche
Cattlemans Choice Feedyard	Gage
Excel Feed Yard	Watonga



**Figure 12: CAFO Licensed Cattle Feedlots within 25 (Red), 50 (Green), and 75 (Blue) Miles of Concho, OK.**

## MEAT PROCESSING INDUSTRY

The meat processing industry is a story of two environments: one for large slaughter plants, and one for small, custom business plants. The meat processing industry has for some time faced excess slaughter capacity, but mainly in the large, integrated operations. The 2013 closing of a Cargill Excel plant in the Texas Panhandle is indicative of this situation. Very small meat processing plants (<50 head/week), however, have faced quite a different environment over the past two decades.

As shown in Figure 8, the meat processing industry is a mature industry. Industry revenue has grown at a rate roughly equivalent to that of the general economy, and efficiencies associated with size and scope drive consolidation and any new technological developments. This also means that, while brand may have value, consumer decisions weigh heavily on price and thus most products/brands have low margins.



Figure 13: Meat Processing Industry - Industry Stage. (Source: IBISWorld)

The indicated stagnant growth in numbers of establishments for the industry is somewhat misleading. In the last decade, increased demand for locally grown food products and USDA's "Know Your Food, Know Your Farmer" campaign has resulted in small plants facing increased demand for services and the development of some new plants. However, that increase follows a drastic three-decade-long decline in plant numbers. Changes in consumer tastes and preferences have also generated premiums for products branded as locally grown, all natural, organic, source verified, and/or with approved animal management practices. These factors have combined to result in some new plants, both large and small, that emphasize specific practices and/or efficiencies in use of energy, water, and waste.

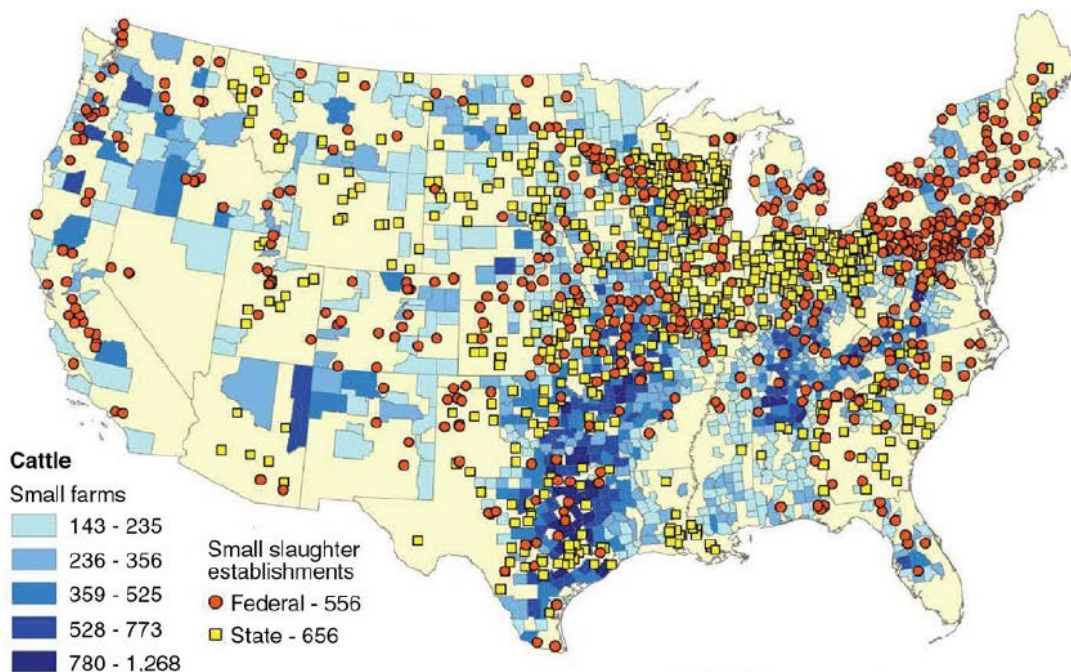
While small plants with a local/niche market focus have found increased demand for their services, the levels between very small and very large plants have almost disappeared. This may be due to the lack of efficiencies of size/scale experienced by much larger plants and the difficulties of securing and maintaining customers of adequate size to sell all of their production. Contrary to very small plants, which focus on a small market area and fill processing capacity by slaughtering small numbers of animals for many different clients, the in-between plants benefit more from coordinated supply arrangements and bulk/wholesale output sales. The challenges for these plants include trying to build market loyalty like small plants while finding ways to capture efficiencies and market share like larger plants.

## **Plant Competition**

The growth in local foods demand over the past 20 years has led to a significant change in the competitive landscape for small processors. With the inception of Hazard Analysis of Critical Control Points (HACCP) food safety regulations in the late 1990s, an already declining small plant sector saw an even more pronounced decrease in industry participants. However, the local food movement reversed that trend. Now there are many more options for locally sourced slaughter and further processing than there were since the phase-out of small- and medium-sized slaughter plants that began in the early/mid-1980s.

Ten years ago, USDA attempted to map federal-inspected and state-inspected beef slaughter plants, as a means of supporting the local food movement. Plants and local availability of livestock from "small" farms were simultaneously mapped to indicate both the availability of local processing and the availability of livestock from a pre-defined list of "small" farms and ranches. The following figure depicts plant and small farm livestock availability for cattle from this USDA effort, but to understand the map one must understand USDA's assumptions about "small":

- "Small" farms were identified as those with less than \$250,000 in annual income from livestock sales.
- "Small" slaughter establishments – both federal-inspected and state-inspected – were identified as those with fewer than 500 employees.
- 143 is the median number of cattle farms per county for the nation. Blue-shaded areas represent counties with more than 143 cattle farms that fit the previously defined "small" farm category.



<sup>1</sup>143 is the median number of U.S. cattle farms per U.S. county. Small slaughter establishments are defined as having less than 500 employees. Small livestock/poultry farms are defined as having \$250,000 or less in annual income from livestock sales.

**Figure 14: Meat Processing Capabilities and Small Farm Proximities for Cattle, 2012.**  
(source: USDA-NASS)

USDA has not updated this 2012 map to include the recent wave of new plant openings. However, even in its original form this map is not an accurate depiction of the true competition for any new plant. To truly understand the types and nature of competition for slaughter services, one must recognize the alternatives for facilities and the limitations for those alternative forms. The four primary types of slaughter plants are:

1. **USDA-FSIS (aka, “federal-inspected” or “federal” plants)** – These plants are under the oversight of the USDA Food Safety Inspection Service and an inspector – who is a federal employee assigned to the facility by USDA – must be present for pre- and post-slaughter evaluations of the animals being harvested. Meat products generated from these facilities carry the stamp of USDA inspection and the facility’s establishment number. These products can be sold in any retail or foodservice establishment in the country. With proper certifications, these products can also be sold internationally.
2. **State-inspected (aka, “state plants”)** – Some states, but not all, have a state meat inspection system. Oklahoma is one state with such a system. USDA requires that state meat inspection programs have standards that are “equal to or better than” USDA-FSIS requirements for inspected establishments. Meat products from these plants can be sold in retail outlets or restaurants, and much like FSIS establishments they must adhere to HACCP protocols. However, products from state-inspected establishments are only allowed to be marketed through in-state channels, i.e., in-state stores, restaurants, and other food marketing outlets. No out-of-state marketing options are currently allowed for these facilities, even though lobbying efforts to promote changes to the laws have been ongoing for decades.

3. **Talmadge-Aiken Act (aka, “TA plants”)** – The Talmadge-Aiken Act partially bridged the gap for smaller plants from states with a state meat inspection program to access out-of-state markets. These TA plants have a USDA establishment number, but instead of a USDA inspector these plants have an inspector from the state’s meat inspection program. Oklahoma’s TA plants have USDA establishment numbers but their inspectors are employees of the ODAFF Food Safety Division.
4. **Custom-exempt (aka, “custom plants” or just “custom”)** – Custom-exempt plants must meet state and local food safety guidelines, but they do not have inspectors in their facilities and any meat products generated from their operations are not approved for sale to consumers via retail or foodservice channels. For these plants, it is a matter of “your animal coming in, your meat going out.”

Due to the large number of cattle, hogs, and bison operations and the prevalent demand for “freezer meat,” the Southern Plains region has retained a higher-than-average concentration of state and federal slaughter plants. However, one missing factor from the map above is the prevalence of custom-exempt slaughter facilities. While custom-exempt facilities cannot market products through retail or foodservice channels, they do represent a significant competition for inspected plants, especially for consumers interested in “freezer meat” from owned/purchased livestock.

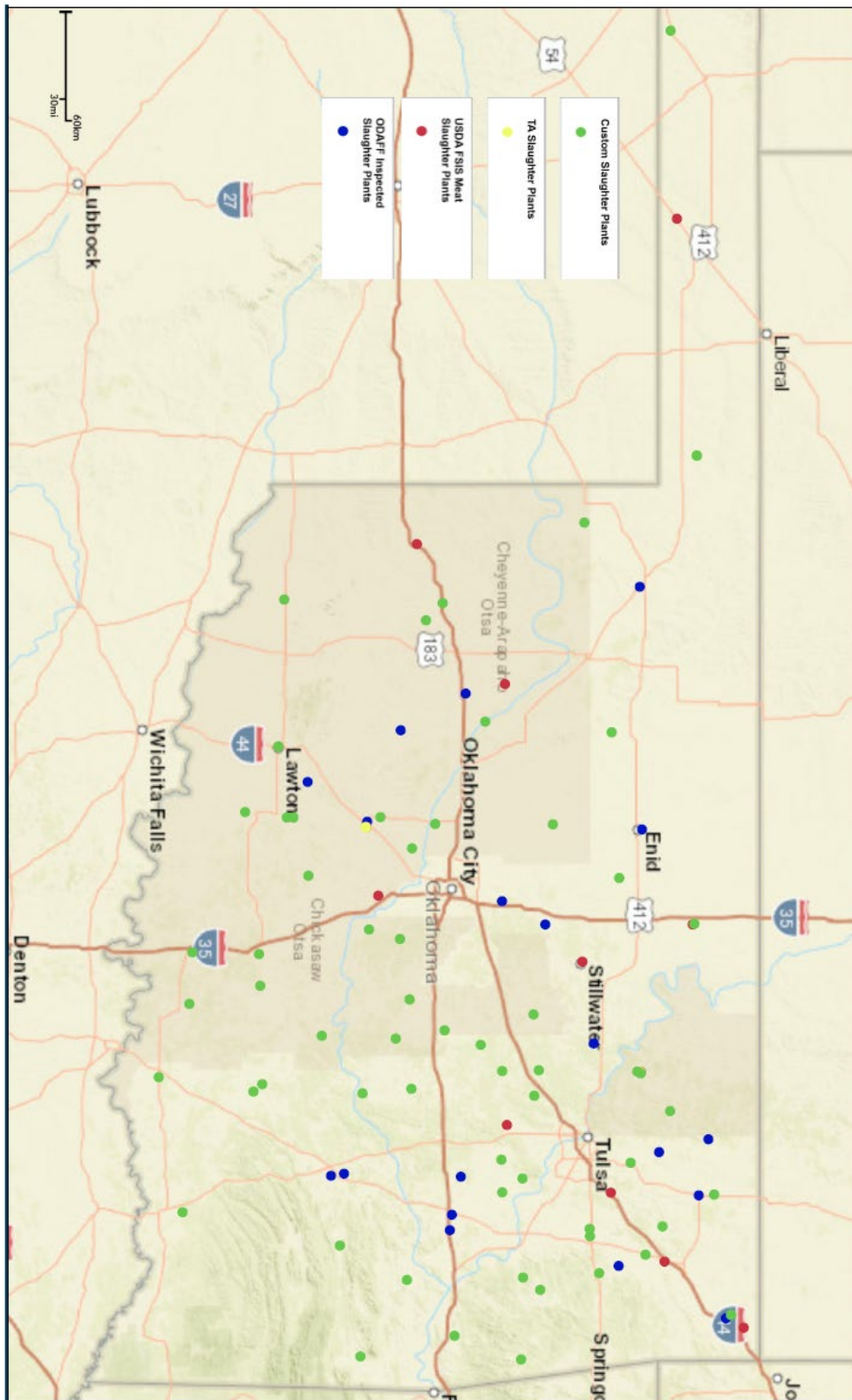
The prevalence of custom-exempt plants is also exacerbated by the fact that not all states have a state meat inspection system. Arkansas is an example of one such state, so while the USDA map only shows four (federal-inspected) slaughter plant options, it leaves out the dozens of custom-exempt facilities that slaughter significant numbers of locally-raised livestock and hunter-harvested animals (primarily deer and wild hogs).

## **Local/Regional Meat Slaughter Plants**

A thorough assessment of competition requires a more precise view of facilities in the region. State and federal lists of facilities do not provide a full picture of processing capabilities, as recent state and federal incentives have resulted in many custom-exempt plants considering steps to obtain some level of inspection. Thus, the availability of facilities with the capability to slaughter and process livestock – even if they are not inspected facilities – is still relevant to the feasibility of a plant to be constructed in the Cheyenne-Arapaho area.

The following map and corresponding tables provide the locations of federal, state, TA, and custom-exempt livestock slaughter facilities in Oklahoma.





**Figure 15: Federal, State, TA, and Custom-Exempt Livestock Slaughter Facilities in Oklahoma, 2021.**

**Table 5: Oklahoma USDA-FSIS Inspected Red Meat Slaughter Plants, 2022 (source: USDA-FSIS).**

<b>Establishment Name</b>	<b>City</b>	<b>State</b>	<b>Postal Code</b>
Walke Brothers Meat Processing	Claremore	OK	74019
Route 66 Meat Processing	Sayre	OK	73662
Looped Square Meat Company	Beggs	OK	74421
South Canadian Meats	Thomas	OK	73669
Tonkawa Processing Corp	Tonkawa	OK	74653
Butcher House Meats	Hominy	OK	74035
Harker Meats, LLC.	Washington	OK	73093
Green Country Premium Beef, LLC	Big Cabin	OK	74332
Quapaw Food Services Authority	Miami	OK	74354
Chickasha Meat Company, LLC	Chickasha	OK	73018
Panhandle State University	Goodwell	OK	73939
Robert M. Kerr Food and Agricultural Products Center	Stillwater	OK	74078

**Table 6: Oklahoma State-Inspected (ODAFF) Red Meat Slaughter Plants, 2021. (source: ODAFF)**

<b>Establishment Name</b>	<b>City</b>	<b>State</b>	<b>Zip</b>
Ft. Cobb Locker Plant, LLC	Ft. Cobb	OK	73038
Fifth Avenue Processing	Sterling	OK	73567
Mike's Famous Beef Jerky	Chickasha	OK	73018
Enid Packing Company	Enid	OK	73701
Ray's Meat Market, Inc.	Woodward	OK	73801
Market 54	Weatherford	OK	73096
Country Home Meat Company	Edmond	OK	73034
Homestead Meats & Processing LLC	Guthrie	OK	73044
Butcher House Meats	Hominy	OK	74035
Mayes County Processing	Pryor	OK	74361
American Heritage Beef	Nowata	OK	74048
Rainey's Custom Butchering, Inc.	Ramona	OK	74061
Peck's Dewey Custom Butchering	Dewey	OK	74005
Watson Farms Meat Processing & Market	Council Hill	OK	74428
Cook's Processing	Miami	OK	74354
R & D Meats	Jennings	OK	74038
Agri Services Meat Proc. Plant	McAlester	OK	74502
3F's Poultry and Rabbit Processing	Checotah	OK	74426



Checotah Meat Company LLC	Checotah	OK	74426
Kay's Custom Company	McAlester	OK	74501

**Table 7: Oklahoma Talmadge-Aiken Act (TA) Slaughter Plants, 2021. (source: ODAFF)**

Establishment Name	City	State	Zip
Chickasha Meat Co. LLC	Chickasha	OK	73018
Butcher House Meats	Hominy	OK	74035

**Table 8: Oklahoma Custom-Exempt Slaughter Plants, 2021. (source: ODAFF)**

Establishment Name	City	State	Zip
Larry's Meat & Produce	Union City	OK	73090
Freedom Processing	Marlow	OK	73055
Quartz View Meat Company	Altus	OK	73521
The Butcher Block	Canute	OK	73626
Keith's Butcher Shop	Burns Flat	OK	73624
Thunderbird Meat Processing	Norman	OK	73026
Prairie Rose Processing	Chickasha	OK	73018
Lawton Meat Processing	Lawton	OK	73502
Ed's Deer Processing	Marlow	OK	73055
Hilltop Processing, LLC	Lexington	OK	73051
Temple Processing	Temple	OK	73529
Harryman's Custom Meat	Tuttle	OK	73089
Cutting Edge Processing, LLC	Lindsay	OK	73052
C & C Custom Cuts	Laverne	OK	73848
Rios Custom Processing	Dover	OK	73734
Bass ButcherShop, LLC	Felt	OK	73937
Bob McKinney & Son	Cushing	OK	74023
Elmer Miller Packing Company	Covington	OK	73720
Gage Locker Company	Gage	OK	73848
Fairview Packing Company	Fairview	OK	73737
Tonkawa Meat Processing	Tonkawa	OK	74653
Meat Market 580	Arnett	OK	73832
The Fatted Calf	Geary	OK	73040
Rancho LosTres Potrilos #2, Inc	Okmulgee	OK	74447
Hrem Processing Center	Haskell	OK	74436
H & H Meats, LLC	Kellyville	OK	74039
Carnivore Cuts Custom Butchery	Haskell	OK	74436

Bailey's Midway Meat Processing	Paden	OK	74860
M&M Custom Butchering	Miami	OK	74354
Stubblefield's Processing	Bristow	OK	74010
Mitch's Meat Market	Bristow	OK	74010
Wild Country Meat Market	Hominy	OK	74035
Rick's Custom Butchering	Collinsville	OK	74021
Barnsdall Meat Processing	Barnsdall	OK	74002
Lyles Custom Meat	Chelsea	OK	74016
Anderson's Processing LLC	Delaware	OK	74027
Apex Chop House	Prague	OK	74361
Kellogg Custom	Hominy	OK	74035
3 South Processing	Ada	OK	74820
Tucker's Slaughterhouse	Durant	OK	74701
7 Oak Meat Company	Sallisaw	OK	74955
Cherokee Nation Meat Processing	Tahlequah	OK	74464
Butler's B&B Processing	Madill	OK	73446
White's Slaughterhouse	Ft. Gibson	OK	74434
WR Meat Company	Sulphur	OK	73086
Davis Arctic Processing	Davis	OK	73030
Adair Custom Processing	Adair	OK	74330
Brown's Meat Processing	Holdenville	OK	74848
Thompson's Butcher Barn	Chouteau	OK	74337
H & L Custom Processing	Coalgate	OK	74538
Ernie's Meat Market	Ardmore	OK	73401
Weaver's Meat Proc., Inc.	Poteau	OK	74953
Rickman's Custom Processing, LLC	Hugo	OK	74743
Unrau's Meat Processing	Inola	OK	74036
Eastern Oklahoma State College	Wilburton	OK	74462
Bill's Custom Processing LLC	Coalgate	OK	74538
Eaton Custom Processing	Stilwell	OK	74960
Homegrown Processing	Locust Grove	OK	74352
Kilgore's Meat Processing	Stigler	OK	74462
Sweazea's Custom Meat Processing	Wetumka	OK	74883
Scotts' Farm	Tecumseh	OK	74873
Butch's Processing, Inc.	Seminole	OK	74868

# PLANT LOCATION ASSESSMENT

## General Site Selection Criteria

Site location is a critical issue for any food processing operation, but especially so for meat processing. The transport of live animals, high water utilization, the sensitivity of the products to nearby sources of noxious odors and potential contaminants, and the sensitivity of the surrounding area to the smells and noises of a beef slaughter facility are all key considerations. From an economic standpoint, the best site for location will also involve the examination of potential community incentives, low cost and available utilities, state/local tax incentives, and the possibility for federal incentives in areas labeled as Enterprise and Empowerment Zones. It is understood that for this project, the plant will be located in the White Wolf Industrial Park, at or near Concho. The White Wolf Industrial Park will be designed to host several businesses, including greenhouses and the meat processing plant. Nevertheless, the following site selection criteria list is recommended for consideration:

- The proposed site must be easily accessible to trucks bringing in live cattle/bison and loading out finished product.
- A crucial issue is finding land suitably zoned for operating a food processing plant. There should be minimal impact on the local community visually, ecologically and environmentally. An all-around buffer zone is desirable, including landscaping.
- Soil types subject to large expansion and contraction or water logging should be avoided. The site should lend itself to construction of sound and separate drainage systems for process wastewater, storm water and sanitary waste.
- The availability of land area sufficient for the envisioned operation with space for future expansion is another issue worthy of consideration. Some meat plants have adjacent land for livestock grazing and holding prior to slaughter to ensure continuity of supply. This is especially significant for facilities slaughtering bison, which may be more easily herded from adjacent paddocks into the slaughter facility instead of transported on trailers.
- The availability of a clean, fresh water supply that is potable or can be made potable easily (a requirement of USDA licensed premises). This study assumes that ample potable water is available onsite for the facility.
- The waste handling systems ultimately used will be a huge issue. Whether the plant utilizes the local governmental systems or carries out primary or full treatment on site, gaining acceptance of the relevant local/state authorities will consume much time. This study assumes that wastewater treatment is provided by others or is available onsite with ample capacity for the proposed facility.
- Consideration must be given to the supply of energy (electricity, gas) and whether it is already at the boundary of the site. This study assumes that ample electricity and gas (natural gas or propane) are available onsite for the facility. The potential use of alternative energy sources (e.g. anaerobic digester, wind turbine and solar panels) may add to supply of electricity and/or natural gas, but should be considered as a

supplementary source because of the variable production rate and difficulties with storage.

- The suitability of the land for the proposed operation should include consideration of the water table and natural drainage. The water table could have an immediate bearing on the decision for foundation structure.
- Modern meat processing plants must have systems in place for the disposal of used packaging material and any other waste that is produced, other than effluent.
- Road transport connection to the site for both livestock deliveries and dispatch of finished products should be paved or sealed to minimize dust and to enhance appearance.
- An all-around buffer zone of 0.3 miles (500 meters) minimum from residential, light industry or commercial premises is desirable, and even more space may be necessary to accommodate livestock holding paddocks near the plant.

Final plant design and site location decisions should include input from a USDA regional inspector. Inspectors are able to provide perspectives based upon personal experiences with other facilities, experiences from their circuit inspectors related to other facilities, and the latest regulations and requirements for new facilities. Utilizing their expertise early on has proven to be a time- and money-saving exercise that limits the potential for fines, penalties, and renovations later on.

## **REGULATORY COMPLIANCE ASSESSMENT**

### **USDA Inspected Meat Processing Facilities**

The USDA issues a “grant of inspection” to approved facilities, thus USDA facilities are referred to as “inspected”, not “licensed”. USDA inspected meat processing facilities that have been issued a “grant of inspection” may butcher and/or process amenable livestock or poultry under the Federal Meat Inspection Act. A USDA plant must conform to the “Code of Federal Regulations for Animals and Animal Products”. Inspected meat from these USDA inspected plants can be sold anywhere in the United States and exported to sell or trade in international markets.

Federal meat inspection requires that a USDA Food Safety Inspection Service (FSIS) inspector at a USDA inspected slaughterhouse must inspect the carcasses. The inspector must address all federal regulations outlined in the code. He must verify not only that the carcass is wholesome but also that the facilities, equipment and procedures conform to the owner’s approved HACCP (Hazard Analysis Critical Control Point) plan. Third party testing of specific meat samples is required as part of the HACCP plan. Currently, the salary of this inspector is paid for by federal tax dollars.

There are strict federal mandates regarding the:

- 1) health of the animals permitted to enter the plant;
- 2) care of the animals at the plant;
- 3) parts of the animal that can be used for human consumption; and
- 4) disposal of animal parts not used for human consumption.

In general, the physical requirements for a USDA inspected slaughterhouse are the following:

- 1) Facilities and equipment must be validated by owner’s HACCP plan to be hygienic.
- 2) In general, a wholesome plant is required to have:
  - a. easily cleanable equipment
  - b. washable, nonporous walls and ceilings
  - c. lack of condensation
  - d. appropriate rail heights
  - e. sufficient drains
  - f. sufficient lighting (50 ft candle lights in the processing area)
  - g. floor plan that keeps livestock and livestock contaminated material well separated from inspected meat
  - h. well running and appropriate coolers, rails, drains and hooks
  - i. sufficient septic or municipal sewage facilities
  - j. pest control
  - k. potable water
- 3) It must have employee welfare facilities (lunch locker, bathroom)
- 4) It must have inspection facilities (private room with filing cabinet and chair; bathroom facilities can be shared with employees)

5) Livestock must be stunned prior to slaughter unless the plant has a religious exemption.

There are some conditions where meat is exempted from having to conform to all or part of this code.

## **Non-Amenable Slaughtering and Processing Facilities**

These are specialized state licensed facilities that conduct butchering and/or processing operations that are exempt from federal inspection but require licenses in order to operate. One type of classification is for plants that process non-amenable farm raised game species (bison, farmed deer/elk, rabbits, etc.). Non-amenable livestock and poultry species can be slaughtered at a licensed plant without federal inspection.

Products manufactured from this facility may be offered for sale by the farmer who raised them. The slaughterhouse may also buy the meat from the farmer and market it themselves in a meat shop affiliated with the slaughterhouse or sell the meat to a wholesale or retail outlet. The meat can be sold within state or across state lines but must be sold directly to an end consumer or a restaurant, hotel, boarding house, caterer or similar retail business. Both states must agree to the transaction. Some states, in an effort to protect their wild game populations and protect their own game meat industries, have opted not to allow product into their state from outside of it.

If the meat is processed by mixing it with meat or fat from a conventional (amenable) livestock species or if the meat is cured using nitrate then further restrictions may apply.

The carcasses are not inspected, though the owner/operator of the facility has the right to reject a carcass or product. All non-amenable species must also have certified health papers from the farmer's veterinarian stating that the animals are in good health and are eligible to enter the food chain.

These facilities are inspected by state employees and are held to a higher standard than conventional custom plants. For example, hot water must be 180°F. A blueprint or schematic of the plant must be submitted and approved prior to licensing. HACCP plans documenting the handling of products for resale may be required.

## **Humane Handling of Livestock**

Because of some very high profile events in recent years (e.g. "insider" videos of slaughter plant activities posted by the Humane Society of United States), more focus has been placed on humane handling than in the past. The new scrutiny placed on animal handling has had an impact on the designs of unloading areas and animal holding pens for new plants.

The design of the stunning box to handle the various sizes and species of animals is an important consideration. In a small multi-species meat processing plant, all animals are typically rendered

unconscious in the same chute, from lambs to bulls. Understandably, it is difficult to design a facility that will function well for all animals between those two extremes. Even if a facility will only slaughter custom exempt animals, they must follow the same guidelines as an inspected facility for humane handling.

The following information was obtained from FSIS Directive 6900.2 Revision 1, which combined information from the Humane Methods of Slaughter Act of 1978 and federal requirements from 9 CFR 313. The Humane Methods of Slaughter Act of 1978 (Section 1901, 1902 and 1906) requires that the handling and slaughtering be accomplished by humane methods. The USDA has some clearly defined parameters for humane handling and slaughter of livestock in FSIS Directive 6900.2:

- Humane methods are methods that prevent needless suffering of animals.
- Once a vehicle carrying livestock is on an official establishment's premises it is part of the official establishment and is then subject to 9 CFR 313.2.

Provisions in 9 CFR 313.2 state that:

- (a) Driving of livestock from the unloading ramps to the holding pens and from the holding pens to the stunning area shall be done with a minimum of excitement and discomfort to the animals. Livestock shall not be forced to move faster than a normal walking speed.*
- (b) Electric prods, canvas slappers, or other implements employed to drive animals shall be used as little as possible in order to minimize excitement and injury. Any use of such implements which, in the opinion of the inspector, is excessive, is prohibited. Electrical prods attached to AC house current shall be reduced by a transformer to the lowest effective voltage not to exceed 50 volts AC.*
- (c) Pipes, sharp or pointed objects, and other items which, in the opinion of the inspector, would cause injury or unnecessary pain to the animal shall not be used to drive livestock.*
- (d) Disabled livestock and other animals unable to move. (Also refer to FSIS Directive 6900.1, Humane Handling of Disabled Livestock).*
  - (1) Disabled animals and other animals unable to move shall be separated from normal ambulatory animals and placed in the covered pen provided for in section 313.1(c).*
  - (2) The dragging of disabled animals and other animals unable to move, while conscious, is prohibited. Stunned animals may, however, be dragged.*
  - (3) Disabled animals and other animals unable to move may be moved, while conscious, on equipment suitable for such purposes; e.g., stone boats.*
- (e) Animals shall have access to water in all holding pens and, if held longer than 24 hours, access to feed. There shall be sufficient room in the holding pen for animals held overnight to lie down.*
- (f) Stunning methods approved in section 313.30 shall be effectively applied to animals prior to their being shackled, hoisted, thrown, cast or cut.*

Facilities are subject to 9 CFR 313.1 as it relates to the conditions of pens:

- (a) Livestock pens, driveways and ramps shall be maintained in good repair. They shall be free from sharp or protruding objects which may, in the opinion of the inspector, cause injury or pain to the animals. Loose boards, splintered or broken planking and*

*unnecessary openings where the head, feet, or legs of an animal may be injured shall be repaired.*

*(b) Floors of livestock pens, ramps, and driveways shall be constructed and maintained so as to provide good footing for livestock. Slip resistant or waffled floor surfaces, cleated ramps and the use of sand, as appropriate, during winter months are examples of acceptable construction and maintenance.*

*(d) Livestock pens and driveways shall be so arranged that sharp corners and direction reversal of driven animals are minimized.*

Animals must also be rendered unconscious instantly and remain so before being slaughtered. Four methods are deemed acceptable to render an animal unconscious: chemical (carbon dioxide), captive bolt (i.e. bolt gun), gunshot, and electrical stunning.

## **FSIS Grant of Inspection, HACCP and Other Processing Protocols**

HACCP, quality control, and food safety regulations are significant to site selection, plant construction, and operations management. Suggested food safety and quality control planning materials/guidelines are provided in Appendixes 1-6. USDA has provided a guide that walks prospective plant owners through the steps for obtaining FSIS inspection for a small or very small plant, referencing several CRF regulations. It is available at <https://www.fsis.usda.gov/inspection/compliance-guidance/small-very-small-plant-guidance>.

In 1996, FSIS issued the Pathogen Reduction/Hazard Analysis Critical Control Point (HACCP) final rule. As the name implies, there are two components to the 1996 rule: the reduction of pathogens and the development and implementation of HACCP systems. Today, all federally inspected meat and poultry establishments are operating under a HACCP system and all new establishments must have a HACCP inspected meat system developed before receiving a grant of inspection. HACCP allows establishments to identify food safety hazards that are reasonably likely to occur in the process or type of product being produced and establish points of control to prevent adulteration from occurring. FSIS inspection personnel verify that an establishment has developed and is implementing the HACCP system as designed.

The HACCP final rule also requires the development and implementation of Sanitation Standard Operating Procedures (SSOPs). These programs are intended to prevent direct product contamination or adulteration, and focus on pre-operational and operational activities. Every establishment must develop, implement, and maintain effective SSOPs. FSIS has developed generic HACCP and SSOP plans to aid prospective applicants in developing these required components.

The inspection process starts with the live animal. Ante-mortem inspection involves a visual and physical evaluation of the live animal prior to slaughter to identify any conditions that may indicate disease or illness. Humane handling is also a primary concern. Strict guidelines are in place and are strongly enforced to prevent the mishandling of animals. FSIS inspection personnel are responsible for conducting a thorough examination of all slaughtered animals. The Post



mortem inspection allows inspection personnel to further evaluate the health of carcass and tissues.

The inspection system continues throughout the entire processing segment of the industry, including both raw and fully cooked products. Inspection personnel are responsible for verifying that an establishment is maintaining sanitary conditions and following all food safety related procedures and labeling regulations.

## ORGANIZATIONAL ASSESSMENT

### Basic Operational Structure

The facility, as described in this study, will be located at the White Wolf Industrial Complex in/near Concho, OK. Operational structure of the facility has not been determined, and the financial analysis spreadsheet developed for this proposed facility allows for options for different structures. The following business structure options are presented as alternatives for co-owned operation of the facility.

### Business Structures

The business structure of a slaughter/processing plant can impact tax liabilities and owner asset exposure in the event of a lawsuit<sup>3</sup>. The most common forms of business structures are sole proprietorships, partnerships, corporations (C corporations and S corporations), and the limited liability company (LLC). Sole proprietorship or general partnership are unlikely for a venture of this magnitude, so those options will not be discussed further. Cooperatives are a special form of corporation and may be an appropriate structure if the proposed plant is to be owned by the tribe and participating livestock producers, if the entity's processing capacity consists of more than 50% cattle/bison sourced through the tribe/participating producers. However, the most likely venture will be a corporation or LLC owned by the Cheyenne-Arapaho, processing both Cheyenne-Arapaho and non-tribal livestock. The following paragraphs describe the most likely business structures to consider:

#### C Corporation

The C corporation is the traditional form of corporation, which is a business entity that provides limited liability to its owners and shareholders, meaning the personal assets of the owners and shareholders are protected from the financial issues of the corporation (Legalzoom.com, 2006). Unlike a sole proprietorship or partnership, a corporation exists as a separate legal entity, and therefore is taxed separately from its directors and shareholders. When a C corporation goes public, it may have an unlimited number of shareholders (who are the legal owners of the corporation).

The C corporation is managed by a board of directors elected by the corporation's shareholders and makes policy decisions on the corporation's behalf, while the officers and employees of the corporation conduct the business dealings of the entity. A tribal-owned corporation may allow the facility to operate as a separate legal entity from the tribe's other assets/holdings. As mentioned, the directors, employees, and shareholders of the corporation are not personally liable for the corporation's debts. However, it is the responsibility of the directors and officers to ensure that certain formalities are observed on the corporation's behalf. This includes formalities

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<sup>3</sup> "Locally Produced Livestock Processing and Marketing Feasibility Assessment," Technical Report UCED 2006/07-13: University Center for Economic Development, Department of Resource Economics, Curtis, K. R., M. Cowee, A. Acosta, W. Hu, S. Lewis, T. Harris, University of Nevada, Reno, <http://tinyurl.com/y8wnpu6>, 2007, pps. 44-55.

such as annual meetings, appointment of officers and election of directors, and issuance of stock. Perhaps the largest responsibility of the corporation is to maintain enough capital to protect the corporation from any business debts. In the event that these formalities are not observed, shareholders may be held personally liable for corporate debts.

## S Corporation

S corporations are C corporations that have elected to file for S corporation tax status. Filing as an S corporation combines the limited liability of the C corporation with the tax status of the sole proprietorship or partnership. The main difference between C corporations and S corporations (and also the major advantage to S corporations) is the tax treatment. While C corporations are subject to double taxation, S corporations are granted "pass through" taxation because all of the corporation's profits are passed on to the shareholders in the form of dividends, so there is no taxation at the corporate level. Another advantage to the S corporation is that the corporation's directors may pass business losses through to their personal income tax return. The biggest disadvantage of the S corporation is the restrictions that are placed on shareholders: an S corporation may not have more than 100 shareholders, who must be citizens or residents of the United States and cannot be other corporations (which will possibly exclude this option with the tribe).

## Limited Liability Company

As the name implies, a limited liability company (LLC) is a business ownership structure that provides limited liability to its owners, called members. The main differences between the LLC and the corporate structure are that the LLC is more flexible and less formal than the corporation, and the two entities are subject to different tax laws. An LLC can also serve as the general partner in a limited partnership, giving the individual owners protection from liability, financial or otherwise.

Some of the advantages of the LLC are the operating flexibility they provide, including the fact that a board of directors is not required as with corporations. As with S corporations, LLCs are also free from double taxation because the LLC members report their share of profits or losses on their personal income taxes. "Personal" can be individuals or other corporations or LLCs, depending on the makeup of the LLC's ownership. The LLC is not taxed at the business entity level. The final advantage to the LLC is the limited liability the entity provides to its owners. Disadvantages of the LLC are that they do not require an operating agreement, the lack of which may lead to management issues if multiple persons/entities have ownership stakes in the venture.

## Financing/Funding Considerations<sup>4</sup>

Because of the high capital commitment for a meat processing plant, a combination of sources may be needed to fund the project start-up. Reliable cost estimates for plant construction, equipment and operations are essential for determining the required amounts of investment capital and working capital. For many reasons, a facility in the Cheyenne-Arapaho region may qualify as an economic development project, which presents opportunities for various federal loans and grants.

### Loans and Grants

#### USDA Rural Development Business and Industry Loan Guarantee Program

Loan guarantees can enable firms to obtain loans that they would otherwise not be able to secure. The 2014 Farm Bill provided for loan guarantees for businesses involved in local and regional food distribution, processing, aggregation, and marketing. These guarantees are designed to secure private bank loans of up to \$5 million to receive an 80% guarantee. The average loan value being guaranteed by this program is for \$2 million. The projects must be located in rural areas, but there are criteria which can allow producer-owned cooperative entities and other urban-located cooperatives to be eligible. The “rural” definition includes communities of “rural character.”

A USDA Rural Development feasibility study may be required. USDA examines each project on a case-by-case basis and makes a determination about the feasibility study during the pre-application process. General guidelines as to whether a feasibility study is needed include:

- Required for a start-up business.
- Required for a renewable energy project.
- Required for an existing business that lacks a profitable history (or when past performance does not support the new debt service).
- Required for an existing business that will develop an independent operation in a new location.

#### USDA’s Rural Business Enterprise Grants Program (RBEG)

Infrastructure costs could potentially be funded using the RBEG program. The RBEG funds typically go to a rural public entity, which in turn uses the funds to assist a for-profit entity with its development needs. Examples of eligible uses for the RBEG program include: acquisition or development of land, easements, or rights of way; construction, conversion, renovation, of buildings, plants, machinery, equipment, access streets and roads, parking areas, utilities; pollution control and abatement; capitalization of revolving loan funds including funds that will make loans for start-ups and working capital.

#### Rural Economic Development Loan and Grant (REDLG, aka “Red Leg”)

This program has considerable history of use by small meat processors. A significant number of processors have been built or renovated over the years with these funds. The program is in

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<sup>4</sup> Meat Processing Feasibility Study, Economic Development & Financing Corporation, <http://ucanr.org/blogs/LivestockRangeTopics/blogfiles/3109.pdf>, March 2009

essence a zero percent interest loan for 10 years, but the loan can only be accessed through a local rural electrical or telephone cooperative. Through a lien on its own assets, the cooperative applies to borrow money from the federal government for the sub-applicant business. If successful in its application, the co-op passes the money on to the sub-applicant business. The maximum loan amount is presently \$750,000. Applications from businesses in communities of fewer than 2,500 people are more favorably considered. The co-op can charge up to 1 percent per year to finance its own administrative costs. Payment on principal may be deferred for up to a year for an existing business and up to two years for a new business.

#### Small Business Administration's (SBA) Certified Development Corporation ("504") Loan Program

This option may be considered if the proposed plant's primary owners decided to co-own/operate the facility with an outside entity, and the outside entity pursued low-interest loans. Commonly referred to as "504 Loans," this program basically provides partially-subsidized and guaranteed loans where a local lender covers up to 50% of the project costs, the SBA covers up to 40%, and the entity owner must put in at least 10%. The local bank is put in a senior collateral position, which means that if the owner defaults on the loan, they collect on collateral up to the amount the owner owed them before the SBA. The SBA portion of the loan is usually below market rate, and the local bank is generally happy to be in a senior collateral position with only 50% of the investment. The loan can be amortized over 10 or 20 years, but the fees associated with the loan that equal 3% of the SBA portion are a drawback (3% of \$500,000 is \$15,000).

# Pilot Abattoir: Proposed Design and Operational Considerations

## Project Assumptions and Known Information

This section lists the updated assumptions and known information related to the facility conceptual design. Items are roughly separated into thirteen categories.

- General:
  - Beef is primary target with bison as a secondary species.
  - USDA/State inspected.
  - Capacity minimum 10 beef per day.
  - 48-hour carcass chill capacity.
  - Ideal location: White Wolf Industrial Park, at or near Concho, OK.
  - Will not accommodate extensive public tours, based on insurance requirements and the food defense plan.
  - Retail sales on site are a possibility.
  - Raw meat processing (ground, patties, sausage, vacuum packed, etc.).
  - Ready-to-eat (RTE) processing of jerky and snack sticks.
  - Dehumidifier (to prevent icing in freezer and dripping in cooler).
  - Startup expense included as optional costs: permits, general, engineering, contingency, spare parts.
- Waste:
  - Retain offal on site in containers under refrigeration for collection by third party.
  - Liquid waste from process drains is pumped to a local municipality for treatment or pumped to anaerobic digester/wastewater treatment plant by others (design not included).
  - Solid waste receptacles for trash and process waste (bones); collected periodically by renderer or waste contractor and/or transported to sanitary landfill.
  - Septic system for sanitary sewage (handled separately from other liquid waste). Sanitary sewage system design is not included.
  - Grease trap included for separation of fats in process drain.
- Refrigeration:
  - Ammonia vs. halocarbons (assume halocarbon)
  - Wet vs. dry aging (assume wet aging to save space and reduce risks and expense)
- Animal receiving:
  - Sized for 25 beef.
  - Covered area.
  - Concrete pad.
  - Animals delivered by semi-trailer; transfer chute that accommodates trailer heights.
  - Flexible pen configurations with sweep gates for herding.
  - Water troughs and supply (freeze protection).
- Beef slaughter:
  - Motorize hoist with option for second hoist for “parallel” processing.

- Knock box for non-ritual slaughter (accommodates both beef and bison).
- Impact stunner.
- Dehorner.
- Head inspection stand and flushing cabinet.
- Well saw for multipurpose cutting.
- Dedicated saw for carcass splitting.
- Hide puller.
- Brisket saw.
- Hock cutter.
- Evisceration spreader.
- Evisceration cart.
- Circular saw for spinal cord.
- Blade re-conditioner.
- Platforms:
  - Evisceration
  - Splitting
  - Wash and Trim
- Bison slaughter:
  - Modified beef knock box (handles both beef and bison).
  - Impact stunner.
- Carcass sanitation:
  - Carcass wash station with antimicrobial spray option.
- Processing (approximately 10 beef per day):
  - Carcass droppers to transfer carcass from rail to heavy work (landing) table.
  - Band saw.
  - Mixer grinder.
  - Patty former.
  - Stuffer.
  - Scales.
  - Vacuum packer.
  - Work tables.
- Packaging
  - a. Scales.
  - b. Wrapper.
  - c. Rollstock packaging machine.
  - d. MAP packaging machine
  - e. Box tapers, automated.
  - f. Box coders (dot-matrix type printer).
- Facility extras includes small allowances for the following:
  - Office furnishings.
  - Outdoor lighting.
  - Pavement/gravel parking.
  - Site work.
  - Utilities connections.

- Laundry machines.
- Fire protection not included.
- Cleaning and sanitation:
  - Secure chemical storage locker.
  - Foam generator (portable).
  - Hose stations (fixed in 4 locations).
  - Dry vacuum (portable).
  - Pressure-wash system (portable).
  - Waste receptacles.
  - CIP systems (optional).
- Utilities:
  - Hot water heater (boiler).
  - Steam generator.
  - Air compressor.
  - Budget allowance for piping for cold and hot water and compressed air
  - Emergency electric generator.
  - Data and phone lines.
- Materials handling:
  - Pallet jacks.
  - Shelves/racks.

## Process Narrative

The purpose of this section is to briefly describe the overall process undertaken at the proposed facility. Descriptions of some of the physical components of the facility are included in the narrative to help improve the understanding of the process. The facility (Cheyenne-Arapaho Abattoir) is envisioned as a fully-inspected, self-contained slaughter facility designed to process beef and bison. The main goals of the Cheyenne-Arapaho Abattoir are production, food safety, quality and sustainability.

An inspected slaughter facility located in a major production region has a number of advantages compared to traditional abattoirs. Access to large livestock herds, active and supportive stakeholders, and available land and infrastructure. The Cheyenne-Arapaho Abattoir is also located in a region that has proximity with good markets for products.

The Cheyenne-Arapaho Abattoir may be built from several choices of construction materials, but most modern abattoirs of similar size are steel-framed structures on concrete slabs. Tilt-up concrete panels is an option that may be favorable based on design features and cost. Concrete panels that are formed on site can be decorated using a custom form liner or mold. For example, form liners are available ([customrock.com](http://customrock.com)) that have patterns representative of feathers. A number of local contractors have experience building metal structures on concrete slabs, but special care must be taken to ensure both the concrete floor and the metal building are prepared to withstand cold storage temperatures, incorporate floor drains consistent with inspection



standards, and have walls/floors and ceilings that will meet inspection standards for cleaning and sanitation.

Clean and orderly processing and refrigerated environments are among the most important and valuable conditions provided in a slaughter facility. The floor, walls, ceiling, and processing components must be suitable for cleaning with hot water and chemicals. Temperature and humidity are regulated to prevent condensation from forming on surfaces and dripping onto production areas. Insects, dust and debris are kept outdoors or quickly removed from the building. A positive ventilation system with a filter removes airborne contaminants and prevents their entry through small crevices in the building shell. Outdoor traps are used to attract and capture pests before they have opportunity to access the facility, and pests that do gain entry are quickly captured and eliminated with indoor traps.

The fundamental design requirements for the Cheyenne-Arapaho Abattoir include:

1. Meet or exceed regulatory inspection requirements.
2. Process beef and bison.
3. Cater to local markets.
4. Affordable.
5. Sustainable.

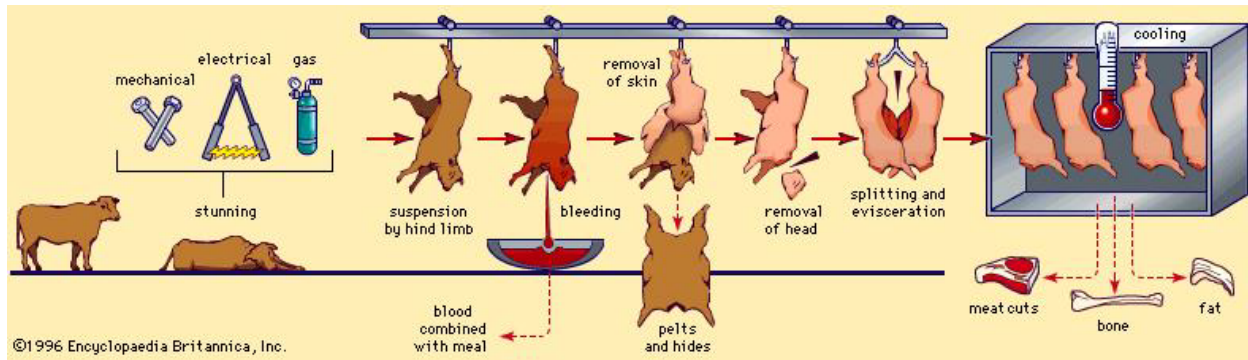
Safe and humane livestock handling procedures are practiced throughout the facility. The first step in the on-site slaughtering process begins at the pens. Animals will be herded in groups of up to 25 (for cattle, fewer for bison), and put into a crowding tub. From the crowding tub, cattle will be guided into the lane leading to the knock box. With an average capacity of 10 head/day, one beef must be knocked and shackled every 40 minutes (assuming 6-hours of available time, with the first beef knocked at time zero and leaving at least 2 hours for processing of the last animal and subsequent cleanup).

After an animal is knocked, it will be shackled and bled. After bleeding, horns and ears will be removed and the head will be skinned. The carcass will then be transferred from a shackle hold system to the hook and trolley conveyance of the high skinning platform. Once on the high skinning platform, the legs and rump will be skinned and the carcass will be bunged.

The animal will be transferred to the low skinning platform to prepare the lower part of the carcass for the hide puller. After the hide is removed, the weasand is separated and tied off. Finally, the head is removed before animal is sent to the evisceration station. At the evisceration station, the carcass is opened and the organs are removed.

After evisceration, carcasses are split lengthwise, making two sides. Sides are conveyed to a trim station for removal of any observed contamination. Once trimmed, the sides will enter the washer/sanitizer, which is followed by the cooler for chilling.

Cooling beef or bison sides requires approximately 48 hours. After the side has cooled, it will be moved to the fabrication area. In fabrication, sides are processed into primal cuts, and further processed into the desired products such as cut meats, tenderized meat, marinated cuts, injected portions, ground meat, patties, sausage, and/or other products. Figure 16 illustrates the process.



**Figure 16: Basic slaughtering process.**

Bison will be able to be processed on the same line as beef. Some strength modifications will be made to the beef knock box to facilitate the movement of bison into the box and up on to the rails. The knockbox will be located outside and adjacent to the abattoir for safety reasons. It will prevent live bison and fired rounds from entering the kill floor.

Automation considerations are listed in an appendix to this report. For primary construction or future expansion, these could include:

- Walking rails could be installed in the abattoir and hot box cooler to move beef/bison.
- Carcass wash automation.
- Conveyors can be used in processing to move cuts to packaging and then to move boxes to storage.
- Air knives can be used for skinning of the beef/bison carcass and for deboning.

## Facility Design

The following illustration provides a brief overview of the facility's design and layout. A drawing will be provided as electronic file accompanying this report. The overall footprint of the facility is approximately 13,000 sq. ft. Of that total, about 8,000 sq. ft. are non-refrigerated, including offices, human welfare, preparation, storage and offices. Offices and human welfare areas are cooled for human comfort. About 5,000 square feet are refrigerated (chill and holding coolers, product cooler, freezer, value-added processing). The slaughter room is designed for carcass processing around the perimeter of the room, starting from the knocking pen to the carcass chillers. The space is heated in the winter with a ventilation system designed to remove odors and summer heat with fresh, makeup air. The knocking pen is located outdoors to add an extra factor of safety for bison processing. A vertically-lifting metal door separates the knocking pen from the abattoir.

Waste storage and offal rooms share a waste dock and are outdoors, separate from the facility. Although they are separate, offal and waste storage rooms are immediately adjacent to the slaughter floor and fabrication. Maintaining waste storage outdoors provides an extra boundary of protection for contamination and odor control, especially in instances of equipment and power failure. Bones will kept in the waste storage room until they are shipped out for further

processing or disposal. The offal processing room has space for offal storage where it will be accumulated for pickup by a rendering service.

The loading dock is positioned adjacent to the finished goods freezer, dry storage and the value-added processing room. Location of the loading dock makes loading of finished product and offloading of packaging materials and ingredients convenient.

Fabrication is a large open room with ample space for worktables, grinders, packaging machines, saws, vacuum tumblers, mixers, and other equipment needed to produce boxed, ground, and other value-added raw meat products. Personnel enter the fabrication room through a gowning area in the locker rooms that provides a means of separating the fabrication room from the other processing areas of the facility. The gowning room allows employees to don their boots, aprons, gloves, and other PPE that are dedicated for use the fabrication room.

Value added processing activities take place in the room bearing this name, and include a tunnel smokehouse and tunnel dehydrator (together referred to as cookers). The tunnel cookers empty into the RTE room that is restricted to cooked, Ready-To-Eat products. Other value added processing activities include marinating, vacuum tumbling, vacuum-packaging, patty and sausage forming and packaging of raw meat cuts. An advanced MAP packaging machine is included in this space.

The utilities room houses the refrigeration compressors, water heater, water softener, and like equipment. It can be accessed from an outside door, making it possible for maintenance personnel to enter the room without accessing any of the processing areas of the facility. The maintenance shop provides a space for light equipment maintenance and activities. Some equipment or parts can be transported to the maintenance shop for work.

Employee welfare occupies a significant portion of the facility, emphasizing its importance for product quality and worker comfort. A generous training room is the centerpiece of the employee welfare space and is surrounded by lockers and bathrooms, a laundry room, offices, the main employee entrance, a break room and the USDA inspector's office.

The layout of the facility is designed to prevent cross-contamination and to simplify paths of materials flow. The locker rooms and the waste dock areas are separate from the slaughter and fabrication/processing areas to prevent cross-contamination in the facility. Animals enter the outdoor knock box from the holding pens located just outside the facility. Movement of carcasses/sides in the slaughter and carcass chiller rooms are completely separate from areas where live animals will be present, and where cooked products will be prepared. Value-added product flow takes place in the fabrication, freezer and value-added processing rooms. RTE processing takes place in the RTE room and adjacent product cooler.

Expansion of the facility is designed to take place on the "paper" north and west sides. These sides primarily hold rooms that are the most critical to growth.

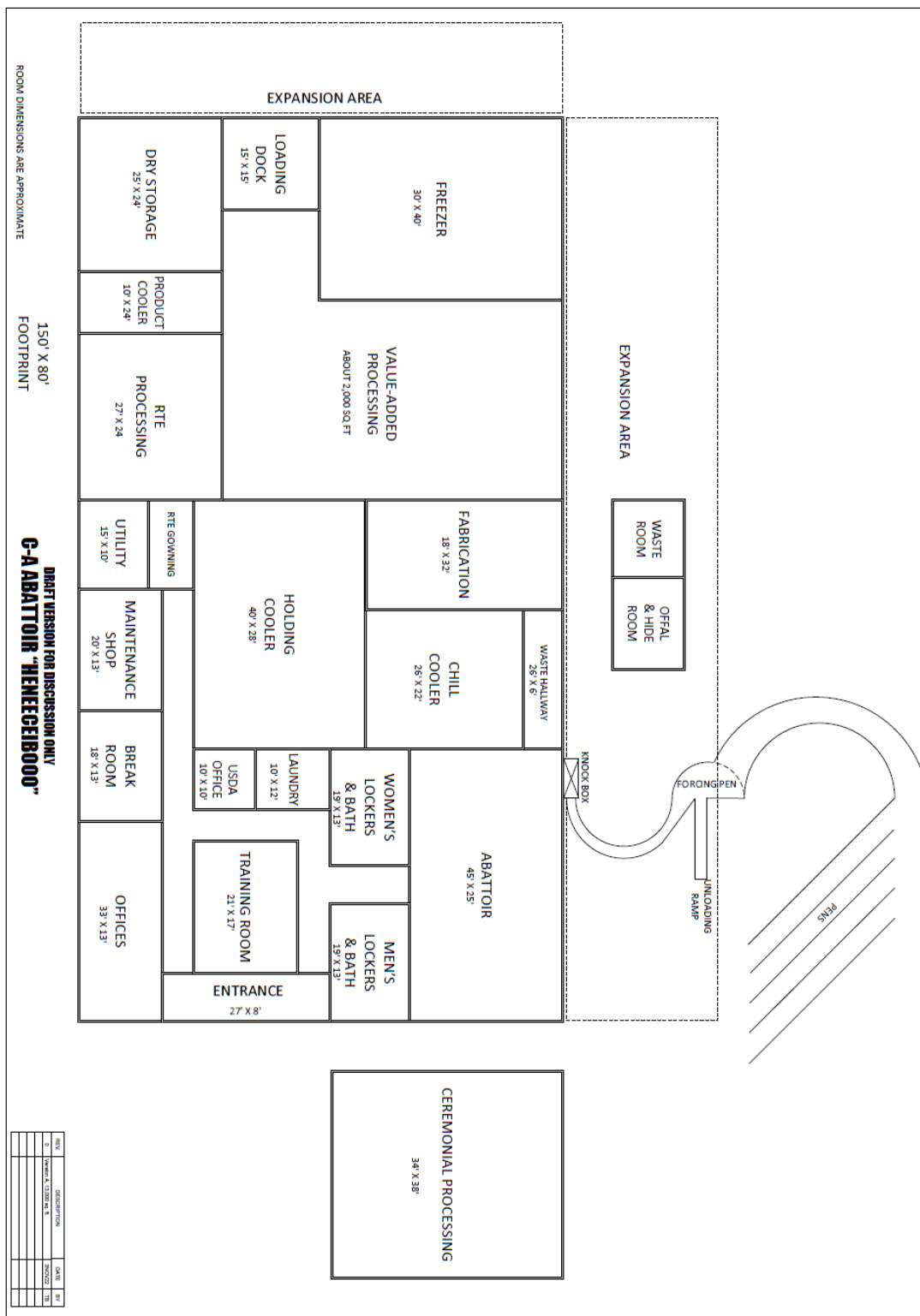


Figure 17: Heneceibooo Slaughter/Fabrication Plant, Conceptual Design.

## Utilities

Utilities are a primary concern for the functioning of any food processing facility. Examples of utilities include (but are not limited to): sewage, wastewater treatment, potable water (hot and cold), electric, solid waste disposal, natural gas, propane, compressed air, and steam. Most processing facilities are completely dependent on the availability, consistency and quality of utilities. This section discusses the major utilities required for the Cheyenne-Arapaho facility.

Ample potable water will be needed to operate the Cheyenne-Arapaho facility. Potable water is used for cleaning, washing, flushing, rinsing, diluting, and other purposes to an estimated level of 300 gallons per carcass. A reliable and verified supply must be available on site during every moment of operation. The USDA requires an annual certificate of inspection for the water to verify its purity (normally supplied by the municipal water authority). It is recommended that water be filtered and softened on-site for general use in the plant, and these features are included in the design. Further treatment may be required for the hot water heater, or other processes/equipment, depending on the properties of the supply. Consistent water supply pressure and volume should be verified, and storage tanks and booster pumps installed if needed. Appropriate backflow equipment must be included.

Waste materials must be quickly and efficiently removed from the premises. Significant accumulation of waste on-site will force processing operations to cease. Plans to remove offal and liquid process wastes involve sending process waste to an existing treatment facility or a facility designed by others.

Solid offal waste will be marked as condemned product using permanent ink and stored in a refrigerated room in barrels or totes. The barrels will be periodically emptied by a local rendering company or similar service provider. Liquid waste will be screened, passed through a grease trap, and sent to a local wastewater treatment facility. Optional, additional treatment steps (by others) may include a DAF unit, BOD removal, filtration, sludge treatment and land application. Hides will be salted and stored in a refrigerated room for shipment or pickup by a tanner or third party.

A “gut buggy”, or offal cart, is included in the equipment list for the slaughter floor. This buggy is capable of collecting offal in a bin and then raising the bin to dump the contents into an upright barrel for temporary storage and subsequent collection.

Sanitary sewage from bathrooms should be maintained separately from liquids that enter process drains. Based on the size and location of the Cheyenne-Arapaho facility, it is recommended to install an appropriate septic system for the location. Backflow measures should be included.

Electricity is needed to power equipment on site including lighting, motors, sensors, displays and controls. Single and three phase power must be available on the selected site in ample quantities. Refrigeration motors will be operational during all times to maintain cooler and freezer temperatures and prevent losses. A propane or natural gas-powered generator is included in the design with 60 kW of capacity to power refrigeration motors in an emergency.

Propane, if required in lieu of natural gas, will be stored on site in a tank provided by the supplier. Propane or natural gas will be used for hot water generation, space heating, and the emergency generator. The propane supplier will provide and maintain the tank and keep it filled.

Hot water, primarily used for cleaning and rinsing, will be generated on site in a heater. Makeup water may be preheated using heat recovered from the refrigeration equipment and/or the anaerobic digester or other sources (e.g., solar). The cost/benefit of heat recovery equipment is not included in this design.

Utilities usage rates are estimated and tracked in the included equipment and facilities spreadsheet. The estimates are useful to predict needs and expenses. It is emphasized that the rates are only estimations and actual use will vary depending on many factors like facility policies, personnel, weather conditions and accidents.

## **Animal Welfare**

Animal welfare is an ongoing concern at any slaughter facility and is important for successful operation. This section outlines important animal welfare concepts for the Cheyenne-Arapaho meat plant. Semitrailers will be the primary means to deliver livestock to the plant. A height-adjustable unloading ramp will accommodate trailers with different deck heights. The unloading ramp should slope no more than 25 degrees. Plant management should organize deliveries to minimize the time that animals are held prior to slaughter. Non-ambulatory livestock are to be offloaded from trailers first, euthanized, and disposed of.

Pen space should be based on an expected need of 20 square feet for each 1,200-pound bovine animal processed at the Cheyenne-Arapaho Facility.<sup>5</sup> Bison will have higher space requirements, and it is recommended that the pens never be more than 2/3 full when bison are the targeted slaughter species for the day.

Adequate space for animals to lie down in pens is recommended (9CFR313.2(e)). Ramps should only be used in the unloading area, with the remainder of the facility designed on level space (except for drainage slope). Concrete flooring should be non-slip. An 8-inch grooved diagonal or square pattern is recommended. Grooves should have a 1-inch square profile.

Crowding pens and alleys should have solid walls where possible without sharp corners or hang-points to bruise or injure animals. Alleys should have one-way gates or anti-backing provisions. Adequate lighting for livestock handling and safety is extremely important. Livestock are less likely to enter a dark passage. Lights should not be directed into the eyes of livestock. Visual distractions should be eliminated in pens and alleyways by blocking views and by keeping them clear of foreign objects, drains, hoses, garbage, or other items that might look unusual or attract the attention of livestock.

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<sup>5</sup> Grandin, T. 2010. Recommended Animal Handling Guidelines & Audit Guide: A systematic approach to animal welfare. AMI Foundation.

Ventilation in the abattoir is an important issue, especially near the knock box, or restrainer. Care should be taken to ensure that air ducts are not directed onto animals. Separate restrainers should be used for cattle/bison and smaller livestock. The budget includes a restrainer for beef and bison, but not for smaller animals such as hogs or sheep.

Noise can be reduced at the stunning area to help calm sensitive animals. A large captive bolt should be used for stunning bison, which would be more than sufficient for cattle. Stunning equipment must be checked periodically for mechanical wear and effectiveness. The Recommended Animal Handling Guidelines & Audit Guide (by T. Grandin, 2017, published by the NAMI and available for download: [http://animalhandling.org/producers/guidelines\\_audits](http://animalhandling.org/producers/guidelines_audits)) should be consulted for signs of a properly stunned animal and other important handling issues. The NAMI document also includes audit forms that will help the owner prepare to meet industry standards.

In the event of a catastrophic event such as a tornado, snowstorm, fire or other disaster, the Cheyenne-Arapaho plant must have an emergency livestock management plan. Key issues to address include food and water, power, housing, and evacuation. The plan should be recorded, filed and reviewed at least annually. Emergency practice drills are recommended.

## **Employee Welfare**

Employee welfare is an important consideration for successful operation of Cheyenne-Arapaho meat plant. Hand wash sinks (separate from bathrooms) with hot water, soap and towels are required. Multiple hand wash sinks should be accessible to personnel in each of the following process areas: slaughter, offal processing, fabrication, value-added processing and RTE processing. A hallway would be a good location for an additional sink that could be used primarily by visitors.

Separate men's and women's restrooms include toilets and showers. Small lockers or cubbies will be included near showers. Two separate gowning rooms for the fabrication and slaughter areas provide employees a secure space to store street clothing and change into clean uniforms and put on personal protective equipment (aprons, eye protection, knife guards, etc.). Lockers double as gowning rooms and a separate RTE gowning room is located at the end of the hallway near the maintenance shop. Toilets may need to be included in the RTE gowning area to reduce traffic and potential avenues of cross contamination.

A break room is included for resting, eating meals and snacks, and meetings. A dedicated refrigerator and water fountain are included in the break room for employee use. A table and comfortable, cleanable chairs for resting and meals are also included. Water fountains in gowning rooms are not required but may be considered to reduce traffic and cross contamination.

Soiled work clothes may be stored in locker rooms and transferred to the laundry room periodically for washing. Soiled clothing may also be stored in the laundry room. Care should be used in identifying separating, transporting, and storing soiled and cleaned laundry. Dedicated baskets, carts, racks, and hangars with distinctive colors and/or labels are recommended.

Offices are included in the facility design for employees with administrative duties. A USDA office is also included to satisfy regulatory requirements. The USDA office must have a secure, lockable door and a dedicated phone line.

The utility room may include workbenches, a hoist, welding booth, and space for maintenance work activities. Access to the utility room may be gained from the outside, so employees working in utility room will not need to cross through process areas.

The total number of the Cheyenne-Arapaho Abattoir employees varies depending on numerous factors like skill levels, throughput, and size and species combinations of animals slaughtered. The following full and part-time job positions must be filled:

- Managers: facility, administrative, human resources, quality and food safety, slaughter floor, fabrication, cleanup and sanitation.
- Staff: quality and food safety, animal receiving, slaughter operators, fabrication operators, cleanup and sanitation operators, janitorial staff, and maintenance personnel.

## **Facility Inspection**

Depending on the types of processing activities and the potential for non-meat food products handling, the Cheyenne-Arapaho facility may be inspected by multiple entities such as the USDA, FDA, state and local agencies, and third parties. In general, the USDA Food Safety Inspection Service (FSIS) sets the national standard of inspection and the facility is designed to meet or exceed this target. The appendix includes a checklist that USDA inspectors use for new slaughter facility startups. USDA requires a separate office in the facility with a lockable door and a secure telephone line.

Inspectors continuously work at the slaughter facility alongside livestock owners and operators to check and evaluate animal health and good sanitary practices. Process focus areas for inspectors include live animal checks, head and entrails inspection, and carcass inspection and grading. Good lighting and access are important issues that facilitate inspection. Program focus areas include all food safety programs, sanitation performance standards, sanitation operating procedures, training, and validation.

Where there are no requirements or expectations for inspectors beyond those set by the USDA, experience has shown that most inspectors are very interested in the mission and success of the facility. Good management can result in relationships that are extremely beneficial to all parties, including stakeholders. The success of a well-run slaughter facility can set new standards and provide valuable benefits for the entire industry. Success can be more fully achieved through close cooperation with regulatory agencies and inspectors.

Because the facility will also be processing bison, the facility will incur charges for the inspection of this non-amenable species.<sup>6</sup> Because the facility will be slaughtering and further

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<sup>6</sup> See the May 20, 2022 version of USDA FSIS Directive 12600.1, “Voluntary and Other Reimbursable Inspection Services.” Available online at [https://www.fsis.usda.gov/sites/default/files/media\\_file/2022-05/12600.1.pdf](https://www.fsis.usda.gov/sites/default/files/media_file/2022-05/12600.1.pdf).



processing bison under FSIS inspection, it will incur charges for inspector time. For purposes of this feasibility study, an estimate of annual FSIS inspector wages/fees is included in the personnel expenses section of the financial analysis.

## **Ceremonial Processing**

The ceremonial processing facility (approximately 1,300 square feet) is a separate space that is dedicated to ritual processing of animal-based materials. Its purpose is threefold: (1) maintain, practice and teach ritual processing; (2) renew ritual processing, practices, products, artwork, tools and objects; and, (3) find new or rediscover old uses for animal-based materials.

The design of the ceremonial processing facility is conceptual and requires substantial development beyond the scope of this study. To the best of our knowledge, this construction of a ceremonial processing facility would be the first of its kind. A high level of trial and error in design and operation is expected, compared to a clearly defined manufacturing space.

The ceremonial processing facility design incorporates the following features:

- Comfortable, quiet, clean, dedicated and secure workspace
- Artisan/Practitioner workspaces (three shared or dedicated stations, tools and storage)
- Refrigerated storage for animal-based and other materials (walk-in freezer and cooler)
- Common work space for group and large projects
- Adjacent to abattoir, but outside of USDA inspection

Note: the physical separation of the ceremonial processing facility from the meat processing facility nullifies requirements for inspection (e.g. USDA and third party).

The ceremonial processing facility design includes provisions for the following equipment:

- Walk-in freezer and cooler (each 10 x 14')
- Work stations (three industrial work benches)
- Tool crib with \$15k allowance for storage containers and tools.
- Poly top work table (commonly used in meat processing)
- Hoist and I-beam trolley to manage heavy projects
- Floor scale
- Batch style dehydrator and smokehouse

## **Tribal Theme**

We believe the name of the facility should incorporate the purpose as well as the heritage of the people of the Cheyenne and Arapaho Tribes. We were very excited to learn that there are many Cheyenne and Arapaho words used to describe buffalo and meat, and the activities and concepts surrounding them. We selected “Heneeciebooo” as an example of one choice that we understand means the “buffalo way” in a sense that includes a trail or passage of life both physically and supernaturally. This is a wonderful example of a single word that includes a complex and beautiful message that is far beyond paragraphs in English.

Appearance of the facilities (both meat processing and ceremonial) and their surroundings should reflect the life, values and symbols of the Cheyenne and Arapaho tribes. Suggestions for decorations and physical layout of the facilities and property are included in this section.

Tilt-up concrete walls are a common technique used to construct similar processing facilities. Concrete, exterior walls are relatively inexpensive and durable. The process of fabricating and installing tilt-up concrete walls involves building horizontal forms (on the ground) and pouring concrete in-place. The forms are stripped and the cured concrete walls are then tilted erect to establish the exterior walls of the facility. During the construction of the forms, it is a simple matter to insert patterns, or designs, that will leave imprints on the surface of the concrete wall. Custom Rock (customrock.com) is an example of a manufacturer of stock and custom formliners for poured concrete structures. Examples are shown in the figures below:



**Figure 18: Example of Detailed Design on a Poured Concrete Retainer Wall.**

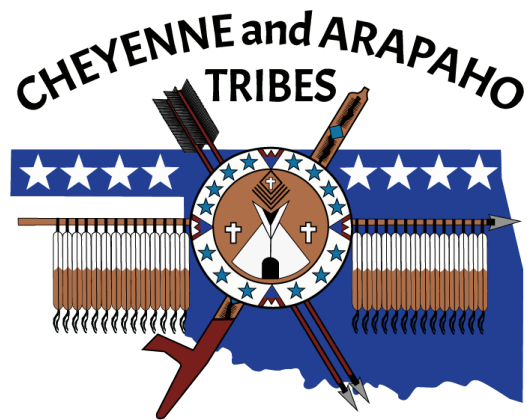


**Figure 19: Closeup Details on the Concrete Retainer Wall.**



**Figure 20: Example of Stock Form Liner with the Appearance of Vertical Feathers Similar to the Cheyenne and Arapaho Tribes' Flag. (source: Custom Rock)**

Symbols from the Cheyenne and Arapaho Tribes flag could be included in the walls of the processing and/or ceremonial facilities. A horizontal row of stars, a spear at the cornice, vertical feathers, cross teepee, and other symbols could be incorporated in the exterior design.



**Figure 21: Cheyenne and Arapaho Tribes' Flag.**

The following photo is an example of a building design that incorporates a teepee symbol.



**Figure 22: Building Design Incorporating Teepee Image.**

## ECONOMIC MODEL FOR THE CHEYENNE-ARAPAHO FACILITY

The true costs and revenues of a meat processing plant vary greatly by the size and scale of operations, inspection status, the amount of capacity utilized by different species/classes of livestock, and the various fabrication/further processing activities performed by the plant. Accuracy of cost/revenue estimates are contingent upon factors such as: having finalized plant drawings, knowing the actual costs and specifications (including utility requirements) of equipment, and the availability of commitments (i.e., letters of intent, contracts with buyers, contracts for livestock procurement) to ensure consistent operations.

The economic model was developed using information from the project organizer, construction companies, equipment suppliers, published reports on meat processing activities, salary information from recent meat processing hires and the U.S. Bureau of Labor Statistics, and research on meat plant operating costs. A template adopted and modified by researchers at Oklahoma State University was further modified to incorporate this data and generate financial projections. This template is provided as a separate file (spreadsheet).

### Basic Operating Assumptions

#### Plant, Property, & Equipment (PP&E)

The baseline model assumes a facility equipped to process 10 head of cattle per day, or 50 head of cattle per week, even though the true capacity may be closer to 15 head of cattle per day. These production estimates do not vary by class of cattle (e.g., cull cows, finished cattle), but with bison processing the plant capacity would roughly equate to 0.5 bison per head of cattle. Holding pens for the livestock to be slaughtered that day are based on a size of 50 head, following a Temple Grandin design. Livestock holding paddocks near/around the plant are assumed to be open pasture. A detailed list of equipment and facility specification is included in the accompanying spreadsheet, and the table below summarizes the capital costs for PP&E.

**Table 9: PP&E for 10 Head/Day Cheyenne-Arapaho Facility.**

<b>Project PP&amp;E Requirements</b>	<b>10 head/day</b>
Fresh & Further Processing PP&E*	\$7,920,701
Wastewater Treatment**	\$500,000
<b>Total PP&amp;E</b>	<b>\$8,420,701</b>

\*Includes installation and contingencies costs for building and all slaughter, fabrication and jerky/sausage/snack stick processing equipment. Land is assumed to cost \$0 if on tribal property.

\*\*Wastewater handling is considered separate of processing facilities and is not included in this design.

However, in addition to PP&E estimates, there are startup costs associated with pre-construction and construction. The legalities, permits, licenses, engineering, accounting, spare parts inventory, and even the purchase of cattle for initial require capital beyond the PP&E. Some of

these estimates are based upon similar costs from previous meat processing construction projects. The following table includes estimates for these activities, contingencies for PP&E, and capital requirements in terms of annual per-head processing capacity.

**Table 10: Total Startup Capital Requirements for Proposed 10 Head/Day Plant.**

<b>Pre-Construction</b>	
Legal	\$10,000
Accounting	\$10,000
Technical*	\$0
<b>Totals:</b>	<b>\$20,000</b>
<b>Construction / Pre-Operations</b>	
Permits and licenses allowance	\$4,000
Freight	\$0
General	\$20,000
Engineering and project management	\$100,000
Contingency	\$20,000
Spare parts	\$10,000
Beef Purchase	\$10,000
<b>Totals:</b>	<b>\$160,000</b>
<b>Total Capital Requirements for Startup Purposes</b>	<b>\$180,000</b>

\* Technical includes feasibility studies, permitting, preliminary architecture and design, preliminary process engineering, site options, geotechnical analysis, and miscellaneous.

## Financing Assumptions

The model can be fit to match a variety of business structures and financing options. The baseline model assumes a corporate or LLC structure, with half of the capital for this project being raised through tribal/member investment and half being financed on a 15-year loan. The following information represents baseline assumptions for the financing of this venture (equity, debt, and grants), plus information on depreciation, earned income interest rates, and income tax rates:

**Table 11: Cheyenne-Arapaho Plant Baseline Assumptions for Equity, Debt, Financing, and Depreciation.**

PP&E Construction	\$8,420,701
Working Capital	\$180,000
Contingency	\$430,035
Total Capital	\$9,030,736
Grant/ Forgivable Loan Amount	\$0
Equity (as % of Capital)	50%
Total Owner Equity	\$4,515,368
Senior Debt Amount	\$4,515,368
Debt Financing Rate	7.5%
Loan Term (Years)	15
Depreciation (straight line years)	12

Tax Rate (if applicable)	35%
Earned Interest Rate for Cash Reserves	1.0%

### Slaughter and Fabrication Assumptions

The plant is assumed to operate as a 10 head/day slaughter facility with fabrication (i.e. carcass breakdown) with limited further processing and bulk/retail packaging capabilities. The associated spreadsheet includes the potential for adding facility space, equipment, personnel, and utilities for a separate further processing facility – i.e., specialty cuts preparation/packaging, seasoning, cooking, and dehydrating. However, because of the size/scale of the facility and the assumption that slaughter personnel would also be used for limited jerky/sausage/snack sticks production in the same building, this baseline model does not consider a fully separate further processing facility. Any changes to the model to incorporate further processing can be performed by FoodMech, LLC.

Livestock purchase values will be based on hanging carcass weights/prices basis rather than live animal weights/prices. Because this proposed facility is assumed to have a primary emphasis on fed cattle and a secondary emphasis on bison, a greater emphasis is placed on fed cattle slaughter. Inputs for slaughter and fabrication assumptions and capacities are as follows:

**Table 12: Assumed Slaughter Capacity Breakdown and Pricing for Purchased Livestock.**

<b>Hanging Carcass Value</b>	<b>lbs / carcass</b>	<b>\$ / cwt</b>	<b>% Plant Capacity</b>
Bison	615.4	\$327.44	20.0%
Finished Cattle	750	\$152.00	80.0%

Carcass conversions and finished product values from carcasses are as follows:

**Table 13: Carcass Conversion and Pricing Assumptions.**

Boxed Beef/Finish Carcass Ratio	70%
Choice Cutout Beef Price (\$/cwt)	\$63.22
Drop Credits (\$/hd - cattle only)	\$14.08
Bison Hide	\$25.00
Bison Skull	\$25.00
Additional Price Premium for Fresh Meats (%)	10%

Market values per head and value increases for subsequent years are as follows:

**Table 14: Initial Fresh/Fabricated And Value-Added Values per Head.**

<b>Market Values (\$/hd)*</b>	<b>Fresh</b>	<b>Value-Added</b>
Bison	\$3,142.76	\$995.71
Finished Cattle	\$1,395.99	\$0.00

\*Value Inflation per Year 1.0%



## Human Resources Assumptions

The base scenario for the facility requires 12 direct production labor employees and four management/administrative employees. The production employees are expected to be used for slaughter, fabrication, and value-added processing activities within the facility. No distinctions are made for employees with regards to cattle or bison processing. It is assumed that all meat production employees will be paid wages consistent with similar positions in larger facilities. For these purposes, the direct and indirect salaries used in the pro forma analysis were taken from regional averages reported by the U.S. Bureau of Labor Statistics.

The following table provides the descriptions and salaries for each of the 16 employees necessary to operate the facility at an average daily slaughter of 10 head/day.

**Table 15: Direct and Indirect Labor Assumptions for Heneceibooo Base Case. (source: BLS)**

Labor Positions	Salary	No. & Salary/Position	
<b>Direct Labor</b>			
Plant Manager/Quality Control	\$65,470	1	\$65,470
Production Manager	\$58,550	1	\$58,550
Kill Floor Operators	\$32,840	4	\$131,360
Fabrication Operators	\$32,840	6	\$197,040
<b>Total Direct Labor</b>		<b>12</b>	<b>\$452,420</b>
<b>Indirect Labor</b>			
General Manager	\$107,050	1	\$107,050
<i>*USDA FSIS inspector time for bison</i>	<i>\$40,000</i>		\$0
Sales, Marketing, Administrative	\$42,250	2	\$84,500
<b>Total Indirect Labor</b>		<b>3</b>	<b>\$191,550</b>
<b>Total Labor</b>		<b>15</b>	<b>\$643,970</b>

## Utilities Assumptions

Meat processing facilities require extensive use of utilities, including potable water, natural gas (or propane) electricity, solid waste disposal and wastewater treatment. Potable water is necessary for cleaning carcasses, equipment, floors, walls, knives, and for cleaning out drains. Natural gas or propane is an economic source of heat for facility space and hot water. The cold storage requirements for meat facilities and equipment motors demand considerable amounts of electricity. Solid waste will be generated in all aspects of the process and is disposed in trashcans or receptacles. Offal will be collected on site and handed off to a contracted waste service. Wastewater treatment is essential for ongoing operations, and onsite storage is not included.



The facility will be located in the White Wolf Industrial Complex (WWIC). This report assumes that WWIC provides access to all of the utilities necessary for operation of the plant. The Reagan Smith study describes costs to provide utilities and other necessities to the plant site, including a roadway. Cost of the features described in the Reagan Smith study are not included in this report, except for a \$500,000 allowance for wastewater treatment. The following table provides the assumptions for the base case scenario.

Utility Area	Assumed Value
Water use (Mgallons/year) 300 gallon per head x 10 head per day x 220 days per year	660
Water cost per Mgal	\$6
Connected horsepower x hour	40,000
Compressed Air (SCMF)	24
Electricity – kW hours/year	600,000
Electricity cost per kW hour	\$0.13
Natural gas – cubic feet/year	509
Natural gas price per MCF	\$8.00
Solids ton/yr (trash, not including offal)	160
Disposal fee estimate per ton	\$40
Liquid waste disposal cost* per thousand gallons	\$20.00

\*Assumed cost for liquid waste that goes to a wastewater treatment facility at the Industrial Complex.

## Baseline Model Results

Detailed results of financial calculations for the baseline model are provided in an accompanying spreadsheet file. It should be noted that the baseline model’s “Year -1” and “Year 0” represents the time period during which the facility is built, equipment is installed, necessary personnel are hired, and a production ramp-up stage where harvesting/processing taking place.

Using the information identified in the previous section’s tables and associated text, baseline results suggest that the proposed plant has the potential to pay for itself while serving the needs of the tribe. However, the returns on such a facility – as is true of similar facilities – are small and subject to drastic changes due to the sensitivity of operations to changes in input and output prices and capacity utilization.

The following table shows the estimated net cash flows (net profit + depreciation – loan principal payments) for the years of pre-startup through Year 5 of full production. These numbers suggest the potential for the plant to cover all operating expenses and generate a return to the tribe, albeit a relatively small return in comparison with the high cost of a brand new, turnkey facility.

**Table 16: Henecceibooo Pro Forma Net Cash Flows, Pre-Construction (Year -1) through Year 5 of Operations. Discounted Rate of Return = 1.2%.**

Year	-1	0	1	2	3	4	5
Net Cash Flow*	-\$4,568,962	\$64,342	\$393,222	\$503,801	\$508,189	\$507,205	\$503,210

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\*Net cash flow = Net Profit + Depreciation (non-cash expense) – Loan Principal Repayment. Year -1 is the initial construction phase, and the \$4.568 million represents the equity put up by the owners at the project's start.

The following bullets summarize the base scenario findings:

- Following the construction and startup phase, the facility is estimated to average approximately \$5.2 million in annual revenue with only basic beef processing and bison retail cuts and jerky/snack sticks. This average is over a 15-year projection timeframe.
- Over that same 15-year timeframe, average annual net earnings are estimated at \$530,775.
- Even with an assumed \$4.6 million loan for PP&E over 15 years at 7.5% interest rates, the plant can average \$487,433 in annual net cash flow to the tribes over 15 years of full-scale operations. However, to do so the plant manager would have to carefully monitor input/output pricing to recover any changes in input costs or output prices.
- Under these assumptions, the discounted rate of return for the years from pre-startup through Year 5 of full production is 1.2%. While this number seems low, it is due to the high price of an all-new facility, no assumed grants to fund part of the facility, very little revenue generation in the startup phase, and an aggressive reinvestment plan for annual depreciation to upgrade/renovate the facilities.
- The pro forma results are based on a conservative assumption of only slaughtering fed cattle as fresh/fabricated beef and limited further processing of bison slaughtered at the facility. The financial potential of the venture can be significantly modified by increased value-added processing of facility-sourced and purchased meat, as well as expanding the wholesale and retail marketing channels for high-end restaurants in the area.

Obviously, these estimates may vary significantly depending on the nature of the facility, its operations, niche market opportunities, the level of case-ready and ready-to-eat processing carried out by the final version of the facility, and the ability to find non-debt sources of funds for the venture. These items will be determined in the business planning portion of the assessment, if the clients wish to further use FoodMech, LLC, for such services. However, the purpose of the pro forma financial analysis was to show the costs of building and operating the facility, and the scale of activities necessary to cover the plant's operating costs.

## **Sensitivity Analyses**

In this stage of analysis, it is difficult to address all the possible options for a facility of this size. However, to show the sensitivity of pro forma financial analyses to changes in basic input/output conditions, the following sensitivity scenarios were generated:

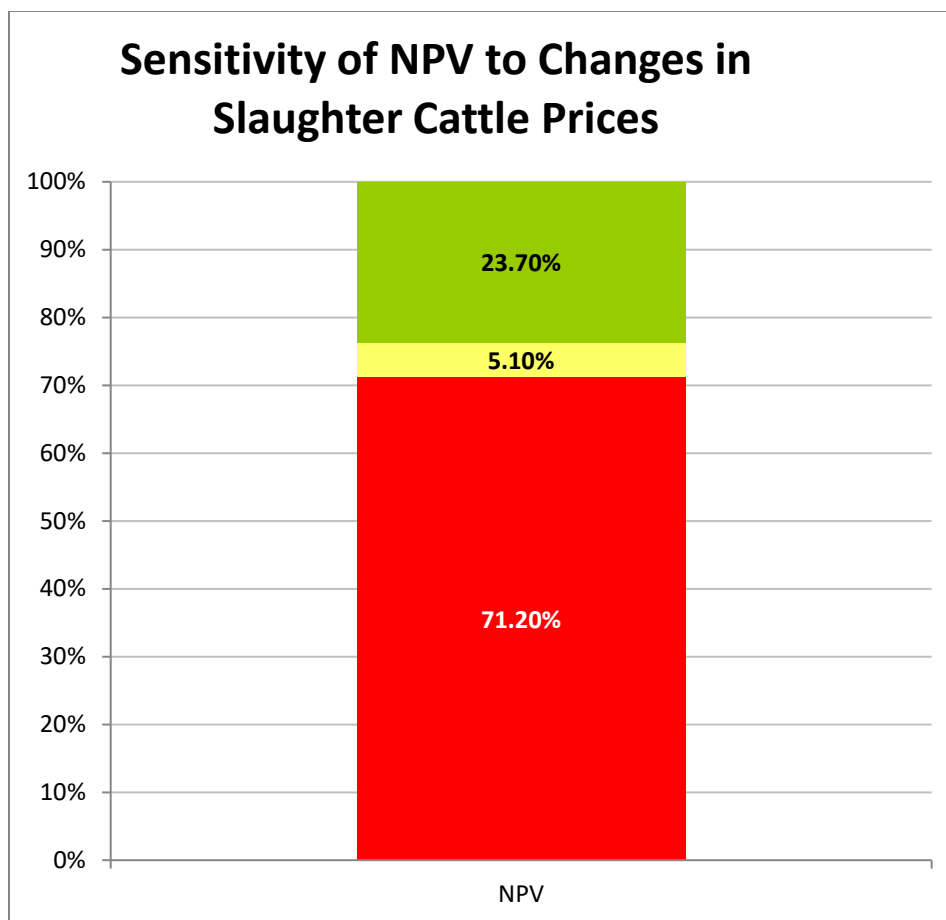
- Sensitivity to changes in carcass-based prices for purchased cattle, using USDA data for all slaughter cattle (steers and heifers, direct and negotiated sales) for the TX-OK-NM region over the past eight years.
- Sensitivity to changes in choice beef cutout values, using USDA data for the past eight years.
- Sensitivity to PP&E values, varying the PP&E from 80% to 110% of the estimated costs in the base scenario.

Slaughter cattle prices for December 2014 through November 2022 were used because the data were readily available for this time frame through USDA’s Agricultural Marketing Service. Prices before December 2014 were not readily available. These prices represent weighted averages for all slaughter cattle in the Texas, Oklahoma, and New Mexico region for each week of the timeframe. These averages take into account contracted, negotiated, and direct sales of slaughter cattle to slaughter facilities. The following table represents the summary statistics of the data points available from USDA.

**Table 17: USDA-AMS Carcass-Basis Price Data (\$/cwt): Summary Statistics for All TX-OK-NM Slaughter Cattle (Steers and Heifers), December 2014 - November 2022.**

MEAN	\$164.3865
STDEV	40.90958
95 % LCI	\$160.4332
95 % UCI	\$168.3397
CV	24.88622
MIN	\$99.23
MEDIAN	\$168.92
MAX	\$265.22
SKEWNESS	0.313247
KURTOSIS	-0.85378

As evident by the figure below, small variations in slaughter cattle prices can drastically impact the NPV of a small slaughter/fabrication facility. Running 1,000 simulations with randomly chosen slaughter cattle prices from the USDA dataset, all else remaining unchanged (i.e., *ceteris paribus*), the proposed facility would have had a negative NPV 71% of the time. This means the non-discounted internal rate of return for the facility would be somewhere below the 10% used as a discount factor for NPV calculations. This sensitivity finding does not mean the facility would not be a viable venture, but it does show the need to have qualified management closely watching input costs to ensure long-term profitability.



**Figure 23: Sensitivity of Heneyeiboo Facility's NPV to Changes in Finished Cattle Prices. (Red=NPV<\$0, Green=NPV>\$500K)**

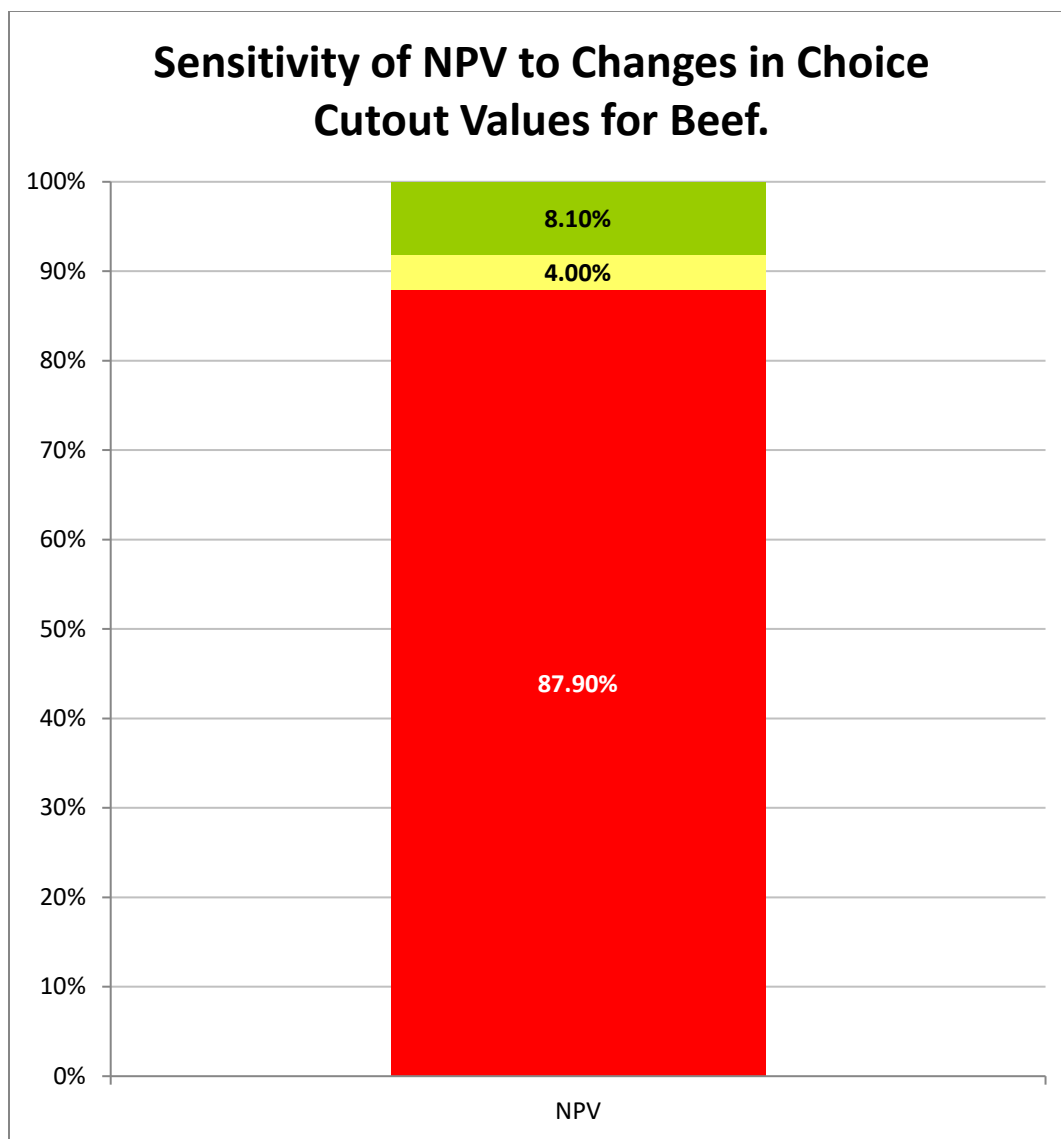
The following table provides the summary statistics for the 2014-2022 choice carcass cutout data. In lieu of any better idea of output product value, the USDA average choice carcass value with a 10% premium was used as the value of wholesale meat cuts generated from the facility. Output pricing and the ability to find niche markets for lower-valued beef cuts are the make-or-break factors driving the sustainability of small meat processing facilities. Beef values varied more than slaughter cattle prices over the eight-year span, in part due to the drastic increase in beef prices leading up to and during the Covid pandemic.

**Table 18: USDA Choice Cutout Values (\$/cwt): Summary Statistics from Weekly Choice Cutout Values for 600-900 lb. Carcasses, December 2014 - November 2022.**

MEAN	\$233.8412
STDEV	36.87805
95 % LCI	\$232.0079
95 % UCI	\$235.6744
CV	15.77055
MIN	\$177.89

MEDIAN	\$223.22
MAX	\$475.39
SKEWNESS	2.0357
KURTOSIS	7.133433

As with the sensitivity analysis for input prices, the sensitivity analysis for output beef prices assumed a *ceteris paribus* situation. Similarly, 1,000 simulations were generated with randomly chosen choice beef cutout values from the USDA dataset. Without proper management of all other venture operations, the proposed facility would have had a negative NPV 88% of the time. This means the non-discounted internal rate of return for the facility would be somewhere below the 10% used as a discount factor for NPV calculations. As previously stated, this sensitivity finding does not mean the facility is a non-viable venture, but continues to drive home the point that commodity-based businesses are greatly impacted by small changes in input and output prices.



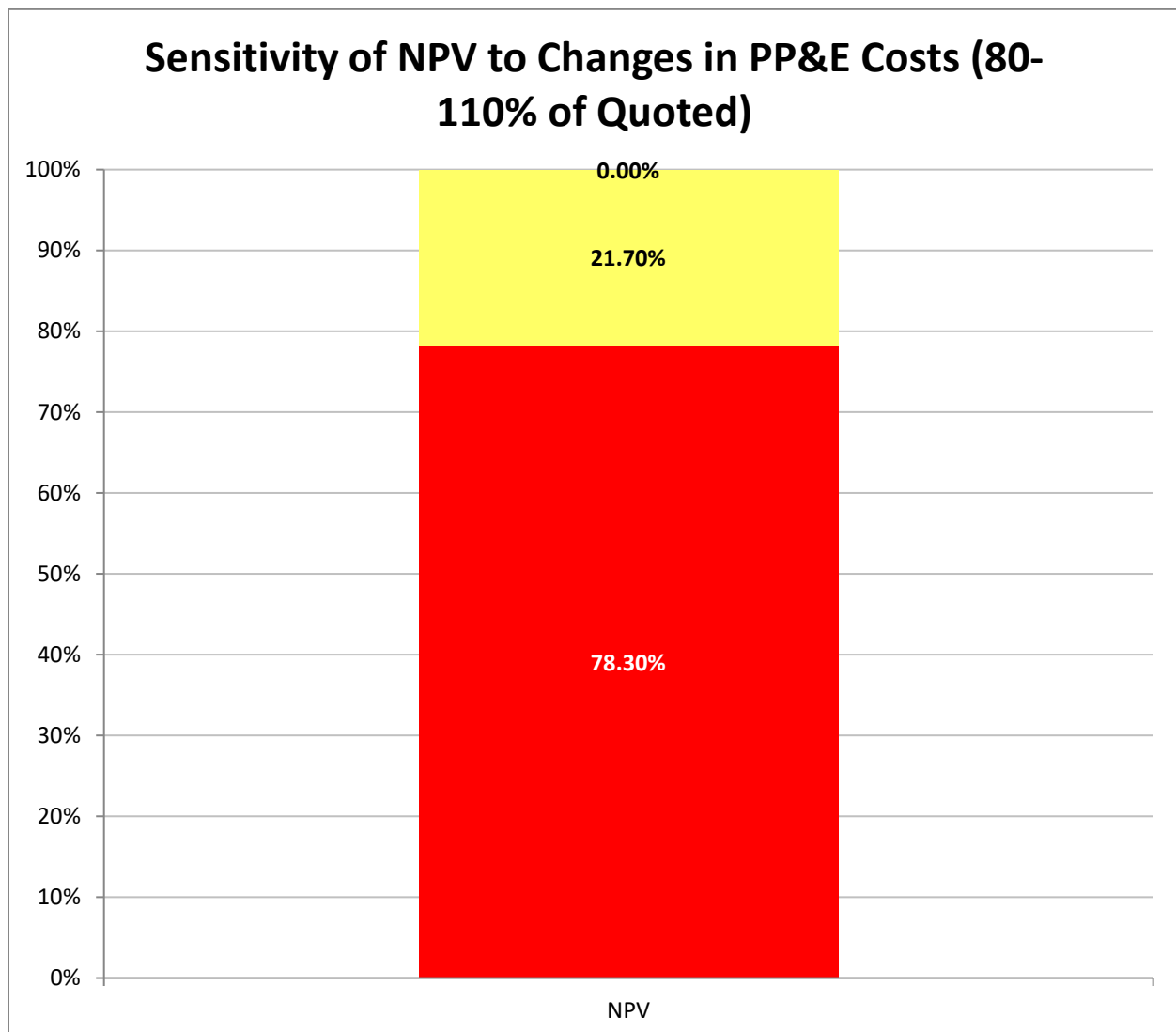
**Figure 24: Sensitivity of Heneceibooo Facility’s NPV to Changes in Choice Beef Cutout Prices. (Red=NPV<\$0, Green=NPV>\$500K)**

Because meat processing business are high-capital-investment ventures, changes in PP&E can drastically impact their long-term viability. To address the sensitivity of pro forma findings to changes in PP&E, another 1,000 iterations of simulated financial results were tabulated. In this case, the only factor allowed to change was the cost of PP&E, which in turn impacted contingency capital and other startup capital requirements. PP&E costs were allowed to uniformly vary between 80% and 110% of the quoted costs for the facility for the 1,000 simulations. The following table illustrates the variations in total capital requirements resulting from the changes in PP&E.

**Table 19: Uniformly Distributed PP&E Costs (80-110% of quoted) and Their Impacts on Heneceibooo Facility NPV.**

Mean PP&E Cost	\$8,614,928.579
StDev	720627.1193
CV	8.364864696
Min PP&E Cost	\$7,367,918.49
Max PP&E Cost	\$9,860,481.49

The figure below illustrates the results of the 1,000 simulations. Essentially, PP&E would have to drop well below 80% of the quoted costs to generate a NPV greater than \$500,000. Conversely, slightly higher than 100% of quoted PP&E costs could result in the internal rate of return falling below a threshold of 10%.



**Figure 25: Sensitivity of Heneceibooo Facility's NPV to Changes in PP&E Costs. (Red=NPV<\$0, Yellow=NPV>\$0 but <\$500K)**

To summarize the results of these relatively simple sensitivity analyses:

- Meat processing is a commodity business, turning commodity inputs into commodity outputs. As explained by economic rationale, they operate near the “marginal revenue equals marginal cost” point of production. Any facility that cannot manage itself to overcome small changes in input/output prices quickly falls into the non-profitable, unsustainable category. This also explains why the larger meat industry firms have adjusted over the decades to take advantage of economies of size/scale.
- The sensitivity findings do not mean the Henneceibooo facility is not a viable venture. However, the findings do illustrate the need for small facilities to find and exploit niche marketing opportunities rather than rely on commodity beef production.
- Good management and any steps taken to reduce capital requirements (e.g., the capturing of grant funds to support development) can lessen the sensitivity of the proposed venture’s financial sustainability to changes in operating costs.



## COMMUNITY AND ECONOMIC IMPACTS

### Community Impact Assessment

Three community impact factors typically garner the greatest attention when assessing a meat plant's potential impact on a community: air pollution (odors), waste handling (solid waste and waste water), and visual impacts. The location for the proposed facility, however, benefits from the sparse human population and the proposed inclusion of an anaerobic digester. Also, the design of the facility will include state-of-the-art processes that will reduce community impact.

#### *Air Pollution*

Facility impact on air pollution is expected to be minimal, based on the rural location and processing methods. Potentially significant air pollution sources include:

1. Dust and airborne contaminants from truck traffic and livestock holding pens
2. Process facility and equipment (HVAC, boiler, wash/sanitize cabinet)
3. Potential wastewater treatment facility

#### *Waste Handling*

Five categories of waste are expected from the facility:

1. Sanitary waste from facility bathrooms, showers and other human welfare sources will be handled by local utility system or an on-site septic.
2. Non-recyclable solid waste will be disposed of in a sanitary landfill or possibly incinerated.
3. Organic solid waste will be collected and stored on site for pickup by an outside service.
4. Liquid process waste will be sent to a treatment system by others.
5. Hides and bones will be accumulated and sold for further processing by others.
6. Condemned and deceased livestock will be buried locally or picked up by an outside service.

#### *Visual Impacts*

The layout of the facility, and the future-determined sites, should preserve the visual appeal of a nearby community. The combination of grassy/wooded buffer zones and landscape contour should be sufficient to avoid any perceived visual impact issues with neighboring ventures/communities. Conversely, the facility will fit in well with the agricultural surroundings of the region. Appearance of the facility may include features like vertically "feathered" exterior concrete walls, horizontal "spear" cornice, "tipi" entrance with appropriate embellishments (e.g. cross, star, map and shield) that reflect Cheyenne-Arapaho national symbols. Tilt-up concrete construction may facilitate many of the facility embellishments with form liners or molds.

### Economic Impact Assessment

It is appropriate to consider the economic contributions of a new entity to the surrounding region. Depending on the source (i.e. U.S. Bureau of Economic Analysis, IMPLAN®, or other providers of impact information), economic impact multipliers for activities such as meat processing can

range from slightly more than 1 to as much as 5. Basically, each dollar or job created by a meat plant result in additional business activity, such that the total economic impacts of jobs or value added by the plant result in 1 to 5 times that base dollar or job. These additional jobs and dollars generated by the plant's activities are referred to as indirect (i.e. the additional business activity generated by suppliers of goods and services to the plant) and induced (i.e. impacts of plant employees living and spending their income in Cookeville).

Multipliers can be found from a variety of sources, but each source makes assumptions that impact the final value. Benchmark multipliers for meat processing such as the RIMS II multipliers (U.S. BEA) may or may not be appropriate for a plant of the proposed size. Similarly, IMPLAN® regional multipliers may or may not be appropriate because of how they capture the related activities for livestock production (e.g. finishing operations for cattle, lamb) that are not prevalent or well captured by state industry statistics.

For this feasibility study, the direct impacts used for impact assessment are the value-added, personnel expenses, and jobs of the facility in Year 1 of the baseline economic model. The multipliers used to assess economic impacts were taken from a 2011 study at Iowa State University<sup>7</sup>. The study compared national and regional multipliers for economic activity generated by the meat industry, and these multipliers are relatively conservative when compared to other sources. The multipliers for value-added relate only to the added product value from turning livestock into meat products or bulk raw meat into RTE products. As shown in the following table, the Year 1 value-adding activities generate an additional.

**Table 20: Estimated Annual Economic Impacts of Proposed Heneeceibooo Facility.**

	<b><u>Direct</u></b>	<b><u>Multiplier</u></b>	<b><u>Indirect &amp; Induced</u></b>	<b><u>Total</u></b>
Value Added*	\$1,196,927	1.56	\$1,867,206	\$3,064,133
Labor Income**	\$429,799	1.32	\$567,335	\$997,134
Jobs	16	1.32	21.12	37.12

\*"Value Added" represents the additional (i.e., beyond the live price) value to Oklahoma livestock generated by the plant's activities from Year 1 of the baseline economic model.

\*\* "Labor Income" addresses on the plant's expenditures on wages/salaries, which are a portion of the value added by the plant.

<sup>7</sup> Swenson, D. "Exploring Small-Scale Meat Processing Expansions in Iowa." Technical report 2011-04, submitted to the Leopold Center for Sustainable Agriculture at Iowa State University, April 2011. Available at <http://www.leopold.iastate.edu/sites/default/files/pubs-and-papers/2011-04-exploring-small-scale-meat-processing-expansions-iowa.pdf>.

## **SUMMARY AND RECOMMENDATIONS**

The purpose of this study was to evaluate the feasibility of a slaughter/fabrication plant in the Cheyenne-Arapaho region with a processing emphasis on finished cattle – primarily cattle from the tribe’s herds or nearby feedlots in early years – and bison almost exclusively sourced from the tribe’s herd. Findings suggest that such a plant has the potential to generate positive cash flows and pay for itself in less than 10 years.

### **Market Viability**

The proposed facility would be located in a high-per-capita beef consumption region of Oklahoma and have access to larger metropolitan markets with a taste for local-sourced beef and bison products (i.e., the Oklahoma City MSA). Demand is consistent on a regional level and the market for beef and bison on a national level may provide opportunities for a centrally-located facility to grasp non-traditional market channels.

### **Input Supply**

Livestock availability in the region to support a 10 head/day plant remains the biggest operational concern for the proposed facility, given the rise of recent competitors within the state. It will become necessary to evaluate the true competitive potential of existing and newly constructed facilities in the area, as well as the potential for proposed larger finished cattle slaughter operations in western Oklahoma. However, from a bison perspective, the facility would have ample opportunities to slaughter the tribe’s bison and serve as a co-packer for (or buyer of) bison from other Oklahoma herds.

### **Location Assessment**

The I-40 corridor provides the Cheyenne-Arapaho region and the proposed plant with direct access to East/West population centers for outputs, and presents opportunities for more direct shipping of livestock to the facilities. I-35 access near Concho via Oklahoma City and I-44 access from Wichita, TX, to St. Louis, MO, represent additional transportation options for inputs and outputs for North/South markets. The suggested plant region has adequate location options that could support livestock facilities, holding pens and truck access. The plant would have to have access to an adequate supply of potable water. The wastewater treatment system (by others) can handle most of the processing waste and wastewater. A septic system is needed to handle sanitary sewage. Solid waste handling can be accommodated by local/regional waste disposal service providers.

## **Regulatory Issues**

The current USDA-FSIS regulatory requirements are not viewed as an obstacle for establishing a plant in the Cheyenne-Arapaho region. Because the plant will be newly constructed, it can be designed to avoid regulatory compliance issues associated with retrofitting existing facilities. Multiple local construction companies have the capabilities for building plants that can meet USDA-FSIS inspection standards. Following the guidelines for USDA certificate of inspection and good manufacturing practices, plus actively pursuing USDA inspector input during plant design and construction, should alleviate most concerns about the plant's regulatory compliance. Other concerns could be mitigated by strictly following appropriate operating standards.

## **Economics of Operation**

Using quotes for plant and equipment, an economic model was developed. Assuming a basic operating model of beef/bison slaughter (80% cattle, 20% bison) with fabrication and limited further processing, a plant will be challenged to generate a 10-year return on investment that would entice investment from non-tribal members. However, for the purposes of tribal food security and maintaining the ownership/value of the tribe's livestock through the marketing chain, the plant has the potential to meet these goals and generate positive cash flows. The economic model assumed new prices for all equipment, roughly 90% capacity utilization for 50 weeks/year (no slaughter 2 weeks/year), higher-than-expected utility costs, and industry averages for employee salaries rather than lower-priced labor. Changes in plant size, construction costs, input/output conversions, and level of automation will impact these findings.

## **APPENDIX 1: BASIC STEPS FOR OBTAINING FEDERAL MEAT AND POULTRY INSPECTION**

Upon receipt of your application and completion of all items, the District Manager or designee will conduct a review of the establishment. If all is found acceptable, a Conditional Grant of Inspection will be issued to allow you 90 days to produce and validate your HACCP Program.

### **Step 1—File an Application for Inspection**

Complete application (FSIS Form 5200.2 – see Appendix 2). Mail completed application to the appropriate District Office, who will have Federal jurisdiction over the operation of your plant. The local Frontline Supervisor or designee can assist if one has questions.

In addition to completing the application, one must pay particular attention to item 106. Attach a Description of the Limits of the Establishment Premises that is to be under Federal Inspection. This can be a written description or a drawing. If a drawing, place a North compass heading on the drawing.

#### *Special note of instruction:*

- Complete all of the sections and numbered items. If an item is not applicable enter “N/A” or none. If blocks 23 and 24 are not applicable, you must write “None.” N/A is not acceptable.
- Item 25—One must develop a written Sanitation Standard Operating Procedure (SSOP) for the Establishment. (See Step 6 – “Standard Operating Procedures for Sanitation.”)

### **Step 2—Facilities Must Meet Regulatory Performance Standards**

Establishments that conduct operations under a Grant of Inspection from USDA’s Food Safety and Inspection Service must conduct operations under the Provisions of Part 416. These requirements include the following Regulations—416.2(a) (b) (c) (d) (e) (f) (g) (h) and Regulation 416.3.

### **Step 3—Obtain Approved Labels and/or Brands**

After an application for inspection has been filed, an official plant number will be reserved upon request by the applicant. This number is used to identify all inspected and passed products prepared in the establishment. All carcasses from slaughtered animals must be ink-branded with the U.S. Inspection legend, which includes the plant number. All packaged meat products must have the U.S. Inspection legend, with the plant’s number printed on the label of the package. All labeling material must be federally approved and on-hand before inspection will be granted. (See Appendix 3 for FSIS Form 7234.1 and instructions. Also, see CFR Parts 316, 317, at [http://www.access.gpo.gov/nara/cfr/waisidx\\_07/9cfr316\\_07.html](http://www.access.gpo.gov/nara/cfr/waisidx_07/9cfr316_07.html) and 381.96 through 381.144 at [http://www.access.gpo.gov/nara/cfr/waisidx\\_07/9cfr381\\_07.html](http://www.access.gpo.gov/nara/cfr/waisidx_07/9cfr381_07.html)).

### **Step 4 —Obtain Approved Water Source Letter**

If the water entering an establishment is supplied by a Municipal water supply system (i.e. city, county, or other public water system) the letter is issued by the Municipality, or the State Public Health Service or its county office. If the water is from a private water supply (such as a private well), the letter must be issued by the State Public Health Service or the appropriate county

office. The letter should identify the source, state that the source is approved, and that the water is potable and meets tests prescribed by the Environmental Protection Agency in its “Drinking Water Standards.” In addition to the water approval letter, a current acceptable water laboratory sample report (water potability certification) must be on file before inspection is granted.

**[Note:** If the water is supplied from private wells, the letter must state that the wells are on the premises of the establishment and are effectively protected from pollution. (See Appendix 4 for Sample Letter for Approved Municipal Water Supply)]

#### Step 5—Obtain Approved Sewage System Letter

State or Local health authorities can provide a letter stating that the plant’s sewage system is acceptable. If State and Local authorities certify the water source, they may certify the sewage system in the same letter. (See Appendix 5 for Sample Letter for Approved Sewage System)

#### Step 6—Provide a Written Standard Operating Procedure for Sanitation

A written “Standard Operating Procedures for Sanitation” (Sanitation SOPs) tailored to each plant will need to be developed before being granted Federal Inspection. (See CFR parts 304.3(a), 416.11 – 416.17 and Appendix 6 for Sample Sanitation Standard Operating Procedure (SSOP))

#### Step 7—Provide a Written Hazard Analysis and HACCP Plan<sup>121</sup>

The Hazard Analysis Critical Control Point (HACCP) system is a scientific approach to process control. It is designed to prevent the occurrence of problems by assuring that controls are applied at any point in a food production system where hazardous or critical situations could occur. Hazards include biological, chemical, or physical contamination of food products. Whenever a hazard analysis identifies that one or more food safety hazards are reasonably likely to occur, a written HACCP plan shall be developed.

**[Note:** One may utilize an outside consultant who is not employed by the establishment. Questions about the use of consultants may be answered by an FSIS representative. Workshops are conducted around the country and a self-study guide and video can be provided by USDA Outreach Program. Each State is also assigned a HACCP Coordinator to assist plants with the development of HACCP Programs. (See CFR parts 304.3(b) and (c) and 417)]

Once the company HACCP team in the establishment has prepared your Process Flow Diagram, they should verify it by walking through the establishment following the flow of product and making sure that all the steps of the process are included in the flow diagram. The team should also review the information provided on the Product Description to make sure all the key facts are included, such as identifying consumers, especially those with particular health problems or known to be at risk.

**[Note:** If one is slaughtering cattle and the process includes steps not included in this example, such as pre-evisceration spray, those steps should be added. Also, if one’s process does not include all the steps identified in this example, those steps would be omitted when conducting the hazard analysis. That is generally, how one can use these generic model examples--just omit

the features which do not apply to an operation or if the operation includes features not included in this example, they should be added.]

By completing a Process Flow Diagram and a Product Description, the plant will have met the requirements of 417.2(a)(2). Plants can use the Process Flow Diagram in particular to help complete the rest of the hazard analysis. Use the flow diagram to systematically review each step in the process and ask the question, "Is there a food safety hazard which is reasonably likely to occur which may be introduced at this step?" In answering the question, the plant HACCP team needs to consider biological (including microbiological), chemical and physical hazards.

#### *Hazard Analysis*

Once the product(s) are accurately described through the flow diagram and product description, the HACCP team should begin work on the **HAZARD ANALYSIS**. The hazard analysis is fundamental to developing a good HACCP plan and one that meets regulatory requirements. The regulatory requirements for a hazard analysis are found at 417.2(a).

When the HACCP team has completed its hazard analysis, it is a good idea to review the flow diagram, the product description and the hazard analysis itself to make sure they are complete. Part 417.2(a)(3) includes a list of sources from which food safety hazards might be expected to arise. Reviewing that list could help the HACCP team check for completeness.

#### *Developing Your HACCP Plan*

The company HACCP team can now take the materials it developed while doing the hazard analysis and use them to build the **HACCP Plan**. Part 417.2 (c) and (d) are the regulatory requirements:

*(c) The contents of the HACCP plan. The HACCP plan shall, at a minimum:*

*(1) List the food safety hazards identified in accordance with paragraph (a) of this section, which must be controlled for each process.*

*(2) List the critical control points for each of the identified food safety hazards, including, as appropriate:*

*(i) Critical control points designed to control food safety hazards that could be introduced in the establishment, and*

*(ii) Critical control points designed to control food safety hazards introduced outside the establishment, including food safety hazards that occur before, during, and after entry into the establishment;*

*(3) List the critical limits that must be met at each of the critical control points. Critical limits shall, at a minimum, be designed to ensure that applicable targets or performance standards established by FSIS, and any other requirement set forth in this chapter pertaining to the specific process or product, are met;*

*(4) List the procedures, and the frequency with which those procedures will be performed, that will be used to monitor each of the critical control points to ensure compliance with the critical limits; Include all corrective actions that have been developed in accordance with §417.3(a) of this part, to be followed in response to any deviation from a critical limit at a critical control point; and*

- (5) Provide for a recordkeeping system that documents the monitoring of the critical control points. The records shall contain the actual values and observations obtained during monitoring.*
- (6) List the verification procedures, and the frequency with which those procedures will be performed, that the establishment will use in accordance with § 417.4 of this part.*
- (d) Signing and dating the HACCP plan. (1) The HACCP plan shall be signed and dated by the responsible establishment individual. This signature shall signify that the establishment accepts and will implement the HACCP plan.*
- (7) The HACCP plan shall be dated and signed:*
  - (i) Upon initial acceptance;*
  - (ii) Upon any modification; and*
  - (iii) At least annually, upon reassessment, as required under § 417.4(a)(3) of this part.*

#### *Identifying CCPs*

Part 417.2(c)(1) and (2) require that the food safety hazards identified in the hazard analysis be listed on the HACCP plan and that there be a CCP for each identified hazard.

#### *Verification*

There are different three types of verification and 9 CFR part 417.4(a)(2) included specific regulatory requirements for each. The regulatory requirements for ongoing verification are:

- (2) Ongoing verification activities. Ongoing verification activities include, but are not limited to:*
  - (i) The calibration of process-monitoring instruments;*
  - (ii) Direct observations of monitoring activities and corrective actions; and*
  - (iii) The review of records generated and maintained in accordance with §417.5(a)(3) of this part.*

#### *Records*

Regulatory requirements are listed in 9 CFR part 417.5(a) and (b):

#### **§ 417.5 Records.**

- (a) The establishment shall maintain the following records documenting the establishment's HACCP plan:*
  - (1) The written hazard analysis prescribed in § 417.2(a) of this part, including all supporting documentation;*
  - (2) The written HACCP plan, including decision making documents associated with the selection and development of CCPs and critical limits, and documents supporting both the monitoring and verification procedures selected and the frequency of those procedures.*
  - (3) Records documenting the monitoring of CCPs and their critical limits, including the recording of actual times, temperatures, or other quantifiable values, as prescribed in the establishment's HACCP plan; the calibration of process-monitoring instruments; corrective actions, including all actions taken in response to a deviation; verification procedures and results; product code(s),*



*product name or identity, or slaughter production lot. Each of these records shall include the date the record was made.*

*(b) Each entry on a record maintained under the HACCP plan shall be made at the time the specific event occurs and include the date and time recorded, and shall be signed or initialed by the establishment employee making the entry.*

#### *Corrective Actions*

The Corrective Actions Log is used to create the records of any corrective actions taken because of deviations from critical limits at CCPs. The regulatory requirements for planned corrective actions are found at 9 CFR 417.3(a):

#### **§ 417.3 Corrective actions.**

*(a) The written HACCP plan shall identify the corrective action to be followed in response to a deviation from a critical limit. The HACCP plan shall describe the corrective action to be taken, and assign responsibility for taking corrective action, to ensure:*

- (1) The cause of the deviation is identified and eliminated;*
- (2) The CCP will be under control after the corrective action is taken;*
- (3) Measures to prevent recurrence are established; and*
- (4) No product that is injurious to health or otherwise adulterated as a result of the deviation enters commerce.*

#### *Preparation completed*

At this point the HACCP team has now completed preparation of the documents which are necessary to meet regulatory requirements for a Hazard Analysis and a HACCP Plan for the cattle slaughter production process. They have secured a copy of FSIS Directive 5000.1, Enforcement of Regulatory Requirements in Establishments Subject to HACCP System Requirements, the HACCP Basic Compliance Checklist which will be used by inspection program personnel. The HACCP team also has modified the inspection form to make the statements into positives, and now has a checklist for its own use to make sure they have not omitted anything in their plan development and preparation. When they are confident that they have done what is necessary, they will turn their Hazard Analysis and HACCP Plan over to the establishment owner for decisions about implementation.

#### General Information

##### *Separation of Official Establishments*

Each official establishment shall be separate and distinct from any unofficial establishment. Inspection will not be granted in any building in which any part of it is used as living quarters, unless the part for which inspection is requested is separated from such quarters by floors, walls, and ceilings of solid concrete, brick, wood, or similar material, and the floors, walls, and ceilings are without openings that communicate directly or indirectly with any part of a building used as living quarters. (See CFR parts 305.1, 305.2 and 381.26)

##### *Inauguration of Inspection*

Prior to the inauguration of inspection, an examination of the establishment and premises will be made by inspection personnel. (See CFR parts 305.4 and 381.27)

#### *Inspection Office*

Office space shall be provided by official establishments, rent free, for the exclusive official of the inspector and other FSIS employees assigned to the establishment. The space set aside for this purpose shall meet with approval of the frontline supervisor. This space should be suitable for the storage of program supplies and for Inspection program personnel to change clothes if such clothes changing facilities are deemed necessary by the frontline supervisor. Laundry service for Inspection program personnel's outer work clothing shall be provided by each establishment. At the discretion of the Administrator, small plants requiring the services of less than one full time inspector need not furnish facilities for FSIS employees as prescribed in this section, where adequate facilities exist in a nearby convenient location. (See CFR parts 307.1, 307.2, 307.3, 381.27 and 381.36(a))

#### *Hours of Operation*

The operator of the official establishment shall inform the inspector in charge (IIC) when work in each department has been concluded for the day, and provide the IIC with the day and hour when work will be resumed by the establishment. Whenever any product is to be overhauled or otherwise handled during unusual hours, the establishment operator shall notify the IIC a reasonable time in advance of the day and hour when such work will begin and such product shall not be handled prior to that time. No department, in which operations are being conducted, that requires inspection, will be operated except under the supervision of an FSIS employee. Prior to the initial start of operations, you will be asked to provide a written schedule of the establishment's your hours of operation. The frontline supervisor for your area will contact you for that information. (See CFR parts 307.4 and 381.37)

#### *Inspection Charges*

Inspection service is provided free of charge for the first 8 hours per shift consecutive days (Sunday through Saturday). Any work conducted over 8 hour shift, or any time past the initial 5 consecutive day period, will be charged to the plant at the prevailing hourly overtime rate. If the operator of the establishment requests inspection during odd hours, a minimum of 2 hours will be charged to the plant at the above rate. This rate is also charged if the plant works on any Federal holiday. Federal holidays are the first day of January, the third Monday of January, the third Monday of February, the last Monday of May, the fourth day of July, the first Monday of September, the second Monday of October, the eleventh day of November, the fourth Thursday of November, the twenty- fifth day of December and any other day designated as a holiday by Federal statute or Executive Order. When any of the above listed holidays fall on a weekday, that day becomes a holiday. When a holiday falls on a Saturday, the preceding work day (Friday) becomes a holiday. When a holiday falls on a Sunday, the next work day (Monday) becomes a holiday. (See CFR parts 307.5, 307.6, 381.38 and 381.39)

#### *Hours of Duty*

The maximum time a slaughter inspector may be assigned daily to a post mortem inspection position is 10 hours per day, and the inspector shall not work more than a total of 12 hours per day. The 10 hour post mortem time, does not include time spent before and after slaughter

operations, conducting ante-mortem, sanitation, and offal inspection; supervising disposal of condemned material, and preparing reports. Processing assignments shall not be more than 12 hours per day. Time used for meals is not included in counting the above hours. Lunch periods shall not be less than 30 minutes nor more than one hour. Lunch periods shall begin between the fourth and fifth hour of duty. (See CFR parts 307.4 and 381.37)

#### *Withdrawal of Inspection*

Inspection may be withdrawn from an establishment where the sanitary conditions are such that its products are rendered adulterated, or for failure of the operator to destroy condemned products as required by the Act and regulations.

The assignment of inspectors may be temporarily suspended, in whole or in part, to the extent it is determined necessary to avoid impairment of the effective conduct of the program when the operator of any official establishment or any subsidiary therein, or any officer, employee, or agent of any such operator, or agency, threatens to forcibly assault or forcibly assaults, intimidates, or interferes with any FSIS employee in or on account of the performance of his/her official duties.

The inspector in charge can withhold inspection (conditional withdrawal or suspension) and notify the establishment. (See Directive 5220.1)

### **Disposal of Offal and Other Slaughter Co-products**

#### *Rendering*

Generally rendering process is accomplished by receiving raw materials followed by removing undesirable parts, cutting, mixing, sometimes preheating, cooking, and separating fat and protein materials. The concentrated protein is then dried and ground. Additionally, refining of gases, odors, and wastewater (generated by cooking process) is necessary. Rendering processes may be categorized as either “edible” or “inedible.”

In “edible” rendering processes, carcass by-products such as fat trimmings are ground into small pieces, melted and disintegrated by cooking processes to release moisture and edible tallow or fat. The three end product portions (proteinaceous solids, melted fat, and water) are separated from each other by screening and sequential centrifugations. The proteinaceous solids are dried and may subsequently be used as an animal feed, water is discharged as sludge, and the edible fat is pumped to storage for refining.

“Inedible” rendering processes convert the protein, fat, and keratin (hoof and horn) materials found in carcasses into tallow, carcass meal (used in livestock feed, soap, production of fatty acids, etc.), and fertilizer, respectively. As was true for the edible process, raw materials in the first stage of an inedible process are dehydrated and cooked, and then the fat and protein substances are separated. The pre-cooking processes mainly include removal of skin and paunch and thorough washing of the entire carcass. The hide is not usually removed from hogs and small animals, but the hair of such animals is generally removed before washing and cleaning. The carcasses are crushed and transported to a weighing bin and then passed through metal and non-metal detectors. These devices in turn sort out nearly all of the magnetic and non-magnetic metal

materials (tags, hardware, and boluses). Metals that may be associated with the carcasses are removed by strong magnets attached to conveyors.

Despite the availability of options for rendering, the costs of doing so on a small scale are difficult to justify, especially since rendered product prices declined following BSE scares in the past decade. Most small plants, unless they have the land and capabilities to either landfill or compost offal, employ the pick-up services of larger rendering companies (e.g. Darling Ingredients in Denver). The regulatory change prohibiting the use of rendered animal products in livestock feed turned a former profit center (small plants were paid for offal on a per-pound basis by large rendering firms) to a per-pickup cost.

### **Religious Exemptions, Certifications, and Cultural Practices**

Some cultures have very strict meat handling requirements. Muslim consumers require their meats to be “Halal” or “lawful” to their religious scriptures. For many Muslims, this means it should be slaughtered using “zabiha” methods. Halal requires that the animal must be humanely killed by an adult Muslim. However, some Muslims will accept Kosher killed meats (especially if Halal is unavailable) and some will accept meat killed by a Christian butcher.

During a zabiha kill, the animal faces Mecca and the Takbir (a blessing invoking the name of Allah, the Muslim word for “God”) is pronounced while the animal is killed without stunning by holding its head back and using a quick, single continuous cut across the throat just below the jawbone to sever the windpipe, esophagus, arteries and veins forward of the neck bone. Ideally, the knife blade should be extremely sharp and twice as long as the width of the animal’s neck. A hand guard is permitted for safety.

Customers who are Orthodox Jews require that livestock be Kosher killed. The animal is killed without stunning by a specially trained religious Orthodox Jew using a properly sharpened special knife with no hand guard, who subsequently inspects the carcass and organs for defects. If the meat is to be certified as “Glatt Kosher”, a stricter Kosher standard, the carcass from a small animal such as a bison must have no lung adhesions. Animals that are exposed to conditions predisposing them to pneumonia (i.e. poor ventilation, overcrowding, etc.) are most likely to have lung adhesions.

The sciatic nerve and various veins, fats and blood are prohibited from Kosher consumption and must be removed. In most cases, rather than going through the difficult procedure of removing the sciatic nerve in the hindquarter, only the forequarter is marketed as Kosher and the hindquarter is sold through other marketing channels.

Federally inspected slaughterhouses need to apply for a “religious exemption” from stunning to conduct Halal and Kosher slaughter. Unlike the “poultry exemptions” or the “custom exemption”, this is not an exemption from federal inspection of the carcass; rather it exempts the plant from having to stun the animal prior to death.

The animal should either be killed on the ground (allowable only for custom or on-farm slaughter), straddled or walked onto a double rail for a religious kill—because it is considered

inhumane to hoist a shackled the animal by its hind legs while still alive. Research has shown that ruminant animals remain very calm when their body's weight is supported by a "double rail". However, the handling and preparation for the ritual falls within the ritual exemption. Therefore, if hanging the animal live is part of the ritual then it is allowed because the handling and preparation falls within the ritual exemption.

## APPENDIX 2: USDA FSIS FORM 5200.2

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0583-0153. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

U.S. DEPARTMENT OF AGRICULTURE FOOD SAFETY AND INSPECTION SERVICE		Instructions: Submit this application to the District/Regional Office, Food Safety and Inspection Service, U.S. Department of Agriculture for import inspection requests. Complete all sections. If a section is not applicable, enter "N/A" or "None." If additional space is needed for any item, attach sheet and number the item.
<b>APPLICATION FOR FEDERAL INSPECTION</b> (Meat, Poultry, Egg Product, Catfish and Import Inspection)		
<b>SECTION I.</b>		<b>ESTABLISHMENT INFORMATION</b>
1. Date of Application	2. Type of Application <input type="checkbox"/> New <input type="checkbox"/> Change of Ownership <input type="checkbox"/> Change of Location <input type="checkbox"/> Application Extension	
3. Type of Inspection Required ( <i>Check box</i> ) <input type="checkbox"/> Meat <input type="checkbox"/> Poultry <input type="checkbox"/> Egg Product <input type="checkbox"/> Import		4. Form of Organization ( <i>Check box</i> ) <input type="checkbox"/> Individual <input type="checkbox"/> Cooperative Association <input type="checkbox"/> Partnership <input type="checkbox"/> Corporation <input type="checkbox"/> LLC
5. If Corporation, Name of State Where Incorporated	6. Address of Corporate Headquarters	7. Date Incorporated
8. Name of Applicant and Mailing Address ( <i>include zip code</i> )	9. Federal Employer ID#	11. Area Code and Telephone Number
	10. Dun & Bradstreet #	12. Firm's Code (Import Only)
13. Actual Name of and Physical Address of Plant	14. Mailing Address if Different from Item 8 ( <i>include zip code</i> )	15. Area Code and Telephone Number
	16. Attach Limits or Establishment Premises to be under Federal Inspection ( <i>for egg plants attach blueprint</i> )	
17. Name and Establishment Number of other official establishments located in the same facility		18. Doing Business As
19. Month and Year when establishment will be ready to operate under inspection		20. Comments
<b>SECTION II.</b>		<b>TYPE OF OPERATION</b>
<b>MEAT AND POULTRY INSPECTION ACTIVITIES (<i>Check all that apply.</i>)</b>		
21 A. Animals to be slaughtered when inspecting is inaugurated ( <i>meat and poultry only</i> )		
a. <input type="checkbox"/> Beef <input type="checkbox"/> Sheep <input type="checkbox"/> Goats <input type="checkbox"/> Swine <input type="checkbox"/> Equine <input type="checkbox"/> Chicken <input type="checkbox"/> Turkeys <input type="checkbox"/> Goose <input type="checkbox"/> Ducks <input type="checkbox"/> Guineas <input type="checkbox"/> Squab <input type="checkbox"/> Ratites		
b. <input type="checkbox"/> Raw - Ground ( <i>Non-Intact Products</i> )		
c. <input type="checkbox"/> Raw - Not Ground ( <i>Intact Products</i> )		
d. <input type="checkbox"/> Thermally Processed Commercially Sterile		
e. <input type="checkbox"/> Not Heat Treated - Shelf Stable		
f. <input type="checkbox"/> Heat Treated - Shelf Stable		
g. <input type="checkbox"/> Fully Cooked - Not Shelf Stable		
h. <input type="checkbox"/> Heat Treated but Not Fully Cooked - Not Shelf Stable		
i. <input type="checkbox"/> Product with Secondary Inhibitors - Not Shelf Stable		

## EGG PRODUCTS INSPECTION

## 21 B. Check the type of product intended for inspection at the establishment (Check all that apply)

- a. ☐ Shell Egg Breaking
- b. ☐ Thermally Processed (*Pasteurized heat treated*)
- ☐ Cans/Pails ☐ Flexible Pouches ☐ Jars ☐ Cartons ☐ Bag-in-Box ☐ Totes ☐ Tankers ☐ Other
- c. ☐ Not Heat Treated - Unpasteurized egg product only
- d. ☐ Heat Treated - Shelf Stable (Dried egg product, 50% Sugar Yolk)
- e. ☐ Heat Treated But Not Fully Cooked - not shelf stable (liquid and frozen egg products)

## IMPORT INSPECTION

## 21 C. Species (Check all that apply)

- ☐ Meat ☐ Poultry ☐ Egg Products ☐ Catfish

22. Check the type of product intended for inspection at the establishment (*Check all that apply*)

- a. ☐ Raw - Non-Intact
- ☐ Ground ☐ Other Non-Intact
- b. ☐ Raw - Intact
- Carcasses: ☐ Beef ☐ Veal ☐ Veal Hide On ☐ Goats ☐ Pork ☐ Lamb
- ☐ Mutton ☐ Equine ☐ Poultry ☐ Ratites
- Other: ☐ Cuts ☐ Boneless Manufacturing Meats ☐ Other Intact
- c. ☐ Thermally Processed Commercially Sterile
- ☐ Cans ☐ Flexible Pouches ☐ Trays ☐ Jars
- d. ☐ Not Heat Treated - Shelf Stable
- e. ☐ Heat Treated - Shelf Stable
- f. ☐ Fully Cooked - Not Shelf Stable
- ☐ Frozen from an APHIS restricted country (9CFR 94.4(b)) ☐ Frozen ☐ Perishable
- g. ☐ Heat Treated But Not Fully Cooked - Not Shelf Stable
- h. ☐ Product with Secondary Inhibitors - Not Shelf Stable
- i. ☐ Shell Eggs/Egg Products
- ☐ Shell Eggs ☐ Liquid ☐ Frozen ☐ Dried

23. Mode of Transportation - Import Inspection Only (*Check all that apply*)

- ☐ Tankers ☐ Rail Cars ☐ Trucks ☐ Ocean Vessel ☐ Airline ☐ Other (*Specify*) \_\_\_\_\_





## APPENDIX 3: USDA FSIS FORM 7234.1

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0553-0052. The time required to complete this information collection is estimated to average 75 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This form has been approved by OMB for web distribution.

<p>U.S. DEPARTMENT OF AGRICULTURE FOOD SAFETY AND INSPECTION SERVICE</p> <p><b>APPLICATION FOR APPROVAL OF LABELS, MARKING OR DEVICE</b></p> <p>FSIS has determined that information provided in items 11, 15, and 16 is exempt from mandatory disclosure under the Freedom of Information Act 5 U.S.C. 552 (b) (5).</p> <p><i>APPLICANT: See Page 5 for instructions.</i></p>	<p>1. AGENT NAME, ADDRESS, TELEPHONE NO. (<i>if using an Agent complete this block, otherwise leave blank.</i>)</p>	<p>2. FOR USDA USE ONLY</p>	<p>3. FOR USDA USE ONLY</p>	<p>4. ESTABLISHMENT NO. / FOREIGN COUNTRY (<i>if applicable</i>)</p> <p>4a. TYPE OF PRODUCT</p> <p><input type="checkbox"/> Egg <input type="checkbox"/> Meat <input type="checkbox"/> Poultry <input type="checkbox"/> Other</p>
<p>5a. NAME OF PRODUCT</p>				
<p>5b. HACCP PROCESS CATEGORY (<i>Select one</i>)</p> <p><input type="checkbox"/> D3U: Slaughter - all species <input type="checkbox"/> D3B: Raw Product - ground <input type="checkbox"/> D3C: Raw Product - not ground <input type="checkbox"/> D3D: Thermally processed - commercially sterile <input type="checkbox"/> D3E: Not heat treated - shelf stable <input type="checkbox"/> D3F: Heat treated - shelf stable <input type="checkbox"/> D3G: Fully cooked - not shelf stable <input type="checkbox"/> D3H: Heat treated but not fully cooked - not shelf stable <input type="checkbox"/> D3I: Product with secondary inhibitors - not shelf stable</p>		<p>5a. TYPE OF APPROVAL REQUESTED</p> <p><input type="checkbox"/> SKETCH <input type="checkbox"/> TEMPORARY <input type="checkbox"/> EXTENSION OF TEMPORARY</p> <p>5b. WAS THE LABEL PREVIOUSLY APPROVED?</p> <p><input type="checkbox"/> YES → Date of approval: _____ Prior approval number: _____ Number of labels on hand: _____ Number of days requested: _____</p> <p><input type="checkbox"/> NO</p>		<p>5a. AREA OF PRINCIPAL DISPLAY PANEL (<i>Square inches</i>)</p>
<p>8. Does this label include a USDA-AMS Child Nutrition Program CN-Logo? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>		<p>9. (FOR USDA-AMS USE ONLY) CN Identification Number Assigned</p>		
<p>10. Are there any special claims, grades, or foreign language on the label? <input type="checkbox"/> YES <input type="checkbox"/> NO (<i>if yes, check all that apply</i>)</p> <p><input type="checkbox"/> Allergen Statements <input type="checkbox"/> Other claims: Specify _____</p> <p><input type="checkbox"/> Animal Production/Feed/Raising <input type="checkbox"/> Grading Terms</p> <p><input type="checkbox"/> Certified/Verified <input type="checkbox"/> Guarantees</p> <p><input type="checkbox"/> Environmental/Green <input type="checkbox"/> Natural/Organic</p> <p><input type="checkbox"/> Export Only Label with deviations from Domestic Requirements <input type="checkbox"/> Nutrition/Health</p> <p><input type="checkbox"/> Foreign Language <input type="checkbox"/> Religious Exemption</p> <p><input type="checkbox"/> Geographic/Unlabeled Style</p>				
<p>11. NAME AND ADDRESS OF FIRM (<i>Below and between dots</i>)</p>		<p>12. SIGNATURE OF APPLICANT OR AGENT</p>		<p>13. DATE</p>
<p>14. (FOR USDA USE ONLY) CONDITIONS APPLYING TO USE OF LABELS OR DEVICE</p>		<p>14. (FOR USDA USE ONLY) CONDITIONS APPLYING TO USE OF LABELS OR DEVICE</p>		

FSIS FORM 7234-1 (11/16/2011)

REPLACES FSIS FORM 7234-1 (03/01/2009), WHICH IS OBSOLETE.

Following this first page of FSIS 7234.1 are additional pages/boxes for:

- Question 15: Product Formula
- Question 16: Processing Procedures

## **APPENDIX 4: SAMPLE LETTER FOR APPROVED MUNICIPAL WATER SUPPLY**

To: Inspector in Charge  
XYZ Meat Packers, Inc. 1001 Main Street  
Florence, Mississippi 39073

Dear Sir:

I certify that XYZ Meat Packers, Inc., located at 1001 Main Street, Florence, Mississippi, is supplied water from the City of Florence Municipal Water Co., which is approved by the Mississippi State Public Health Service. This water is potable, and meets tests prescribed by the Environmental Protection Agency in its "Drinking Water Standards".

Attached please find a current water potability certification and laboratory sample report from the Mississippi State Public Health Service Laboratory, Jackson, Mississippi.

Sincerely,

*Mr. A. B. Clean*

Mr. A. B. Clean  
State Sanitarian

## **APPENDIX 5: SAMPLE LETTER FOR APPROVED SEWAGE SYSTEM**

To: Inspector in Charge  
XYZ Meat Packers, Inc. 1001 Main Street  
Florence, Mississippi 39073

Dear Sir:

I certify that XYZ Meat Packers, Inc., located at 1001 Main Street, Florence, Mississippi, is connected to the City of Florence Municipal Sewage System. I have inspected the plant disposal system and have found them to be acceptable to this department.

Sincerely,

*Mr. A. B. Clean*

Mr. A. B. Clean  
State Sanitarian

## **APPENDIX 6: SAMPLE SANITATION STANDARD OPERATING PROCEDURE (SSOP)**

XYZ Meat Packers, Inc. is a red meat processing establishment. This plant receives beef and pork for further processing. This plant cuts and grinds product and also packages it.

### **MANAGEMENT STRUCTURE**

Owner –

Plant Manager –

Team Captains –

The Team Captains are responsible for implementing and daily monitoring of Sanitation SOP and recording the findings and any corrective actions. The Team Captains are responsible for training and assigning specific duties to other employees and monitoring their performance within the Sanitation SOP. All records, data, checklists, and other information pertaining to the Sanitation SOP will be maintained on file and made available to inspection personnel.

### **I. PREOPERATIONAL SANITATION—EQUIPMENT AND FACILITY CLEANING OBJECTIVE**

A. All equipment will be disassembled, cleaned, and sanitized before starting production.

1. Establishment sanitary procedure for cleaning and sanitizing equipment.
  - a. All equipment will have product debris removed.
  - b. Equipment will be rinsed with water to remove remaining debris.
  - c. An approved cleaner will be applied to equipment and properly cleaned.
  - d. Equipment will be sanitized with approved sanitizer and rinsed with potable water.
  - e. The equipment is reassembled.

2. Implementing, Monitoring and Recordkeeping

Team Captains perform daily organoleptic sanitation inspection after preoperational equipment cleaning and sanitizing. The results will be recorded on a Preoperational sanitation form. If found to be acceptable, the appropriate line will be checked. If corrective actions are needed, such actions will be documented.

3. Corrective Actions

The Team Captains determines that the equipment on hand does not pass organoleptic examination, the cleaning procedure and inspections are repeated. The Team Captains monitor the cleaning of the equipment on hand and retrain employees if necessary. Corrective actions are recorded on Pre-Operational sanitation forms.

B. Cleaning of Facilities including floors, walls, and ceilings.

1. Cleaning procedures:
  - a. Debris is swept up and discarded.
  - b. Facilities are rinsed with potable water.
  - c. Facilities are cleaned with approved cleaner.
  - d. Facilities are rinsed with potable water.

2. Cleaning of floors and walls are done at the end of each production day. Ceilings are cleaned as needed.
3. Establishment monitoring  
The Team Captain performs daily organoleptic inspection before operation begins. Results are recorded on a preoperational sanitation form.
4. Corrective action  
When the Team Captain finds that the facilities do not pass organoleptic inspection, the cleaning procedures and inspections are repeated. The Team Captain inspects the cleaning of the facilities and retrain employees as needed. Corrective action to prevent direct product contamination or adulteration are Recorded on Pre-operational sanitation forms.

## II. OPERATIONAL SANITATION—EQUIPMENT AND FACILITY CLEANING OBJECTIVE

- A. Processing is performed under sanitary conditions to prevent direct and cross contamination of the product.
  1. Sanitary procedures for processing.
    - a. Employees clean and sanitize hands, gloves, knives, other hand tools, cutting boards, etc., as necessary during processing to prevent contamination of products.
    - b. All equipment tables and other product contact surfaces are cleaned and sanitized throughout the day as needed.
    - c. Outer garments such as aprons and gloves are hung in designed areas when employees leave processing area. Outer garments are maintained in a clean and sanitary manner and are changed at least daily and more often if necessary.
  2. Monitoring and Recordkeeping  
The Team Captains are responsible for ensuring that employees' hygiene practices, sanitary handling procedures and cleaning procedures are maintained. The Team Captain monitors the sanitation procedures during the day. Results are recorded on an Operational Sanitation Form daily.
  3. Corrective Action  
The Team Captain identifies sanitation problems and stops production if necessary and notifies processing employees to take appropriate action to correct sanitation problems. If necessary, processing employees are retrained and corrective actions are recorded on Operational Sanitation form.

## APPENDIX 7: AUTOMATION SYSTEMS TO BE CONSIDERED

The following table lists potential automation choices for the Cheyenne-Arapaho Abattoir. Choices are listed in order of increasing relative cost (Note: the cost for each choice may increase or decrease depending on the supplier and options selected).

<b>Automation Choice</b>	<b>Business Area</b>	<b>Relative Cost</b>	<b>Benefit</b>	<b>Disadvantage</b>
Powered conveyor	Slaughter	\$	Reduced labor and injury; improved process flow	None significant
Powered conveyor	Fabrication	\$	Reduced labor and injury; improved process flow	None significant
Powered knives	Fabrication	\$	Increases speed; improves yield	Physical danger; requires compressed air
Powered knives	Slaughter	\$	Increases speed; improves yield	Physical danger; requires compressed air
Carcass Identification	Slaughter	\$\$	Traceability; food safety and quality	None significant
Offal pump	Slaughter/ Waste	\$\$	Reduces traffic and labor; improves sanitation	Requires periodic cleaning; can cripple plant when down.
Training & Education	Personnel	\$\$	On-site training; covers required courses; improved workforce	Requires management; costs for some courses
Variable Speed Drives	Process/ Facility	\$\$	Improved efficiency; reduced maintenance	None significant

<b>Automation Choice</b>	<b>Business Area</b>	<b>Relative Cost</b>	<b>Benefit</b>	<b>Disadvantage</b>
Cleaning Systems	Process and Facilities	\$\$\$	Improved cleaning and sanitation; less chemical and energy usage; improved safety	Requires management; efficacy testing
Integrated information systems	Shipper/ Sale barns/ Customer	\$\$\$	Just-in-time; reduced labor; improved forecasting	Requires management and data input
Local market packaging/labeling	Packaging	\$\$\$	Flexible portion size and label information; targets customer	Expensive; difficult setup and upkeep; requires ongoing management
Maintenance Tracking System	Facility & Equipment	\$\$\$	Preventive maintenance; reduced labor; improved efficiency	Requires management and data input
Automated, local WWTP	Wastewater Treatment	\$\$\$\$	Reduced labor; improved efficiency, potential energy recovery	High cost of system failure unless adequate backup is maintained
Carcass wash system	Slaughter	\$\$\$\$	Meets federal requirement for organism kill	Upkeep and supplies (water and sanitizer); efficacy testing
Robotics, cobots	Slaughter, processing, value-added	\$\$\$\$	Labor cost reduction, quality improvement	Developing technologies, requires enhanced maintenance and training