Ethanol Plant

Feasibility Study

for

Great Northern

Development Corporation

by

RCI-Rural Community Innovations
Bozeman, Montana

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Researched & Written
By the Study Team of:

Chimonas Enterprises
Durante Associates, Inc.
Katzen, International, Inc.

And Team Leader:

RCI Rural Community Innovations

"Rural America...Realize the Possibilities"

210 Cirque Drive
Bozeman, Montana 59718
Ph. 406-587-0783
Fx. 406-587-8828

Contacts for questions:
Michael Utter, michael@rci-usa.org
Sot Chimonas, sotchimonas@msn.com

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I. Executive Summary

Background

This feasibility Study has been undertaken at the request of Great Northern Development Corporation on behalf of the Roosevelt and Valley County Communities. A contract was signed late in March 2006, and work began in April 2006. The scope of services included:

- Conducting public meeting to listen and respond to community concerns.
- Conducting public meeting to present the final results of the feasibility study.
- Researching the potential development.
- Researching the resources present in the region that lend themselves to building and operating a successful ethanol/feedlot production facility including,
  - Availability of wheat and barley
  - Availability of feeder cattle
  - Affordable utilities
  - Access to transportation
  - Access to water
  - Access to energy sources
- Investigating the community suggested sites for the development, and commenting on the most suitable.
- Completing a written feasibility study, which evaluated the following elements: Economic Feasibility, Market Feasibility, Management Feasibility Technical Feasibility, and Financial Feasibility.

Roosevelt and Valley Counties encompass an area of over 7,200 square miles, or approximately 4,600,000 acres. These counties lie in the upper North East part of Montana, and are bisected by the Highline (US Highway 2). The Fort Peck Indian Reservation is located in Roosevelt County. The main industry in both counties is agriculture consisting of small cattle ranches, and farms raising alfalfa, wheat, barley, peas, and lentils. Most of the farming is dry land, and annual precipitation plays a major part of in feedstock availability for an ethanol plant.

A 2005 population estimate has Roosevelt County with about 10,500 people and Valley County with about 7,100.

Summary of Findings

Economic Feasibility

This study has determined that a Wolf Point ethanol plant/feedlot complex is economically feasible. A stand-alone plant with the dynamics in today's ethanol market is feasible with or without a feedlot attached. At current operating costs, a feedlot directly connected with the ethanol plant will produce reduced net profits from a stand-alone ethanol plant; however, the co-located feedlot will create valuable synergies to the overall operations.

Economic feasibility is not guaranteed unless certain risks are wisely managed. The proper pricing of purchased grain feedstocks and a steady supply of feeder cattle need to be planned and managed very professionally. Experienced, qualified grain merchants or buyers need to be employed who understand the volatility of grain markets in the region and can execute purchases and sales based on a sound risk management plan. The choice of feedstocks, cattle purchase prices, and transportation costs of transporting cattle to processing will affect profitability of the complex.

- **Feedstock availability:** Grain prices are affected by a number of factors including, weather, imports, national reserves, domestic consumption, government policy, and changing consumer demands, among others. The Wolf Point complex must deal with the added risk of costs associated of transporting grain to the plant. If insufficient grain feedstocks are available in Montana, feedstocks may need to be imported from the Midwest, the northern plains, or Canada.
  - The northern tier of counties in Montana grows substantial amounts of barley for feedstocks. The table below shows that using barley would make the plant profitable.
  - Wheat at current prices is not profitable as a feedstock for the ethanol plant. As can be seen from the table below, using either the current price for wheat or the 10-year average yields almost the same result. The price of wheat would make the ethanol plant unprofitable.
  - Short season corn is a viable option because it can be imported from the Upper Midwest and it has a high starch content. To be grown locally will require significant time for farmers to adopt this grain as a rotation crop. The table shows that using corn delivered FOB to Wolf Point from the surrounding areas would also be profitable.
  - Several plants are being considered in areas adjacent to the proposed Wolf Point Plant. The Rocky Boy Reservation's plant in North Central Montana is still in the planning stages. Rocky Boy is researching the possibility of using a wheat/corn/barley combination as feedstock. The proposed Williston, North Dakota, plant will have a 100-million-gallon-per-year capacity, will be coal powered, and will use a combination of corn and barley as feedstock.

	Corn[1]	Non-Malt[2] Barley	Wheat[3]
Current Price/bu	$2.88 (.44 freight)	$1.80	$4.15
10-yr average $/bu	$2.41 (.28 freight)	$2.55	$3.49
Gallons of Etoh/bu	2.75	2.35	2.49
Bushels needed to produce 20 MGY	7,272,727	8,510,638	8,032,128
Total grain inputs (20 MGY) at current prices	$20,945,453	$15,319,148	$33,333,331
Total grain inputs (20 MGY) at the 10-yr average	$17,527,272	$21,702,127	$28,032,126

- **Feeder cattle availability:** Montana's annual calf crop is more than enough to support a feedyard of the size proposed for the complex in Wolf Point; however, of late there has not been a significant cattle-feeding industry in Montana because of the distance to processors. However, these economic risks can be overcome if approached by competent feedyard management. The feedyard could potentially be at a competitive disadvantage because of cattle transportation costs. In addition, the margin between the cost of feeder cattle and fats makes the feedlot unprofitable at today's prices.
  - A question was posed to the study team by GNDC regarding the viability of procuring and feeding calves at different times of the year. Traditionally, calving in Montana is done in March and April. Several cattle experts at Montana State University as well as feedlot professionals in Mead, Nebraska, suggested the following:
    1. Operate a program of slotting or backgrounding the cattle that adjusts their feed ration and thereby delays their arrival in the feedlot.
    2. Own the local herds and be able to dictate the timing of the calving season. Alternately work with local ranchers to adjust the management of some of their herds so as to create a fall calving to balance the spring calving.
    3. Bring in calves from California, Oregon, and Washington. Their calving schedule is the opposite season from Montana.
    4. Depending on future border relations, there is also the possibility of bringing in calves from Canada.
    5. Utilize new feeding technologies and the availability of Block Distiller Grains, as an alternative for winter feeding.
  - Another question posed by GNDC concerned the possibility of the end of the Conservation Reserve Program (CRP) and farmers and ranchers placing additional acres into feeder cattle production. What would be the affect of this possibility for the feedlot component of the ethanol complex? According to Kevin Chappell, Bureau Chief of the Agriculture and Grazing Bureau, State of Montana, Department of Natural

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[1] Columbia Grain Elevators, Great Falls Montana, 8/28/06

[2] Columbia Grain Elevators, Wolf Point, Montana 8/28/06

[3] Harvest States Grain Elevator, Wolf Point, Montana 8/28/06

Resources and Conservation (DNRC), there is a good possibility that the 2007 Farm Bill will still have many of the CRP provisions. Even if the CRP ends, farmers and ranchers will have a variety of options. Some will plant more crops; some may opt for additional grazing land to participate in providing additional cattle to the ethanol/feedlot complex. Mr. Chappell stressed that the whole CRP discussion is ripe for speculation, but impossible to use for prediction.

- **Grain Elevator Availability:** There are two grain elevators within a three-mile radius of the preferred site. The Columbia Grain Elevator is approximately three miles away and has a 110-rail-car spur for loading and unloading grains. Columbia has a 750,000-bushel capacity for wheat, barley, or corn and would have no problem supplying all of the ethanol plant needs for grain. Harvest States Grain Elevators are only a half mile away from the preferred site, and also have a 110-rail-car spur. Harvest States has a capacity of 1.2 million bushels, but utilize their facility only for wheat. Most of their storage is already contracted, but they would be willing to negotiate.

Market Feasibility

The demand and price of ethanol have been significantly affected by action at the Federal level and to a lesser extent at the State level. The establishment of the renewable fuels standard results in a base case of 7.5 billion gallons per year of ethanol demand. The long-range value of ethanol tied to gasoline pricing is the most likely case for the foreseeable future.

- Marketing costs of no more than 20 cents per gallon should be employed. Such a plan could be achieved although the reality is that some ethanol will be marketed at slightly higher transportation costs. If local market opportunities can be developed, that cost could be reduced to an amount closer to 10 cents per gallon, thus increasing the netback.
- Historically, the ten-year average price of ethanol is just under $1.30 per gallon. Chicago Board of Trade (CBOT) is showing July 2006 figures of over $3.75 per gallon, but a nine-month future price of just $2.50 **per** gallon. With the price of a barrel of oil over $70.00 and unrest in oil producing countries creating instability in the energy world, it is truly impossible to predict where the price of ethanol will be next year or in the near future. For financial estimates and other analyses, the average figure of $1.65 netback to the operation was used to base market projections. Reality may show that this price is overly cautious; but even at this conservative figure, the ethanol plant will be profitable.
- If the Steering Committee decides to pursue a stand-alone ethanol plant, attention must be given to the distribution of the plant's wet distillers byproducts (WDB). Including a cattle feedlot component in the **complex** will effectively utilize the entire output of byproducts, eliminating the need to market the WDB. In the 20 million gallon per year (MGY) model, these byproducts could potentially produce revenues of more than six million dollars per year; thus, it is important that this issue be dealt with by experienced professionals. In a stand-alone plant, there are several options for byproduct distribution:
  - The first option is to market the byproducts aggressively to cattle ranches in the surrounding counties. The 660 tons of wet distillers byproducts produced daily would need to be delivered to approximately 40,000 head of cattle daily (depending on cattle age and season). Northeastern Montana has over 360,000 beef cattle and heifers that could be a potential market for these byproducts. Canada and North Dakota would also be potential markets. One disadvantage of this option is that with the cost of

transportation, the distance of delivery of the WDB affects end profits. Clearly, distribution of the 660 tons of WDB daily could pose additional management and administrative problems. Winter weather is another consideration in distribution of the WDB.

- The second option is to partner with a company using innovative technologies that utilize the byproducts to create new products such as Block Distiller Grains. This is a new technology that allows ranchers to stockpile DG to use throughout the winter. However, this option will utilize approximately ten percent of the daily production of WDB.
- A third option is to include a dryer as part of the ethanol plant complex, but this would add significantly to capital costs and energy usage. It would however, give greater flexibility for marketing byproducts.

- Before finalizing a **business** plan, it is recommended that a more detailed and current transportation and marketing study be conducted to refine these amounts.

Management Feasibility

- GNDC and the Steering Committee have little hands-on management experience in the ethanol industry. This lack of direct ethanol development/management experience may be the greatest project risk **identified** in this study. Therefore, it is imperative for the Steering Committee to carefully select an experienced management/development partner early in the development process.
- By combining both the cattle feeding management risk with the ethanol plant management risk the complexity of risk management on the entire the project is increased. Combining both cattle and ethanol elements will increase the difficulty in securing an experienced management/development partner.
- Montana Board of Investment participation in financing the development appears to be a real possibility. The Steering Committee along with GNDC staff should discuss this funding option with the State before selecting an ownership/operating structure. The Steering Committee should adopt an ownership structure that will facilitate financing, not hinder it.
- Financing this venture and retaining local ownership will require utilizing a combination of federal, state, and local financing **tools**. GNDC will want to have experienced accounting, legal and grant writing assistance available at appropriate stages of development.
- Depending on the sizing of the facility, organizational structure and partnering relationships, the Steering Committee may need to raise $500,000 to $1,000,000 for the pre-development effort. Although **this** seems like an insurmountable hurdle, ethanol is hot in the market now. Many government and private partners can be attracted to the table to help. The project needs a team approach to succeed. Building that team quickly and effectively is the key to success.
- An experienced management team should be engaged from the very beginning of the development process. The team should be well versed in the permitting processes that will be requisite to project initiation.

Technical Feasibility

- The Katzen engineering **report** under technical feasibility demonstrates that the 20 MGY plant is technically feasible.
- Ethanol production from small grains is quite common in the industry today. Most production units utilize **corn** as feedstock but a few have also utilized milo, barley, and wheat. All of the mentioned grains require essentially the same conversion chemistry and process, although grain starch content and other inert materials do influence the conversion efficiencies.
- The majority of ethanol plants today range in size from 30 to 100 million gallons per year of production capacity. Ten (10) or twenty (20) MGY are rather small, but are as technically feasible as a larger facility. Naturally the capital cost of the smaller plants is higher per gallon capacity as compared to the larger ones.

Financial Feasibility

- Both the 10 MGY and 20 MGY capacity ethanol plants can be profitable given today's relatively low grain prices and significantly higher than historical fuel prices. However, the smaller ethanol plant is more sensitive to price fluctuations in either the prices of grain or of ethanol. It still yields a positive cash flow even at depressed but rather historical ethanol prices. The price of ethanol would have to drop below $1.00 per gallon or barley would have be rise to $4.00 per bushel for a facility of this size to result in negative cash flows. Nevertheless, fuel prices have been known to reach depressed levels and stay there for prolonged periods of time, particularly during expansion and over-production eras. The grain price is also likely to experience high pricing periods.
- To insulate the business from such low profitability or negative cash flow periods, the typical solution employed is to invest in a substantially larger ethanol production unit. In today's energy **price** environment the optimum size is larger than 20 million gallons per year and typically 40 to 80 million gallons. At the 20-million-gallon size—as can be seen by the sensitivity analysis in Chapter VII—the ethanol plant remains quite profitable even if ethanol dropped to $1.25 per gallon, and barley remained stable at $2.55 or the barley price were to rise above $4.00 per bushel, and ethanol remained stable at $1.65 per gallon. However, in the event that ethanol prices stayed persistently at the historical $1.25 level and barley were to rise to just $3.00 per bushel the facility would barely be able to make its interest payments. If this were to happen with a 10 MGY plant, the business would not be able to service its debt and in fact would be operating at a loss.
- As can also been seen from the proformas on the cattle feedlot, that operation simply cannot be run profitably whether it is a 15,000 or 30,000 head in size. This size range is just too small in today's cattle feeding industry to be built from scratch as a grassroots facility and to be operated as a stand-alone unit. Naturally, certain synergies and efficiencies can be obtained from operating a feedlot side by side with an ethanol plant. The most obvious one would be the ready-made, no-cost outlet for the ethanol byproducts, which are quite valuable as cattle feed. The facilities are sized to consume all the wet cake as well as the evaporated syrup that the ethanol plant would produce on a daily basis. The ethanol financial results are good enough to provide relatively strong financial performance for both business units combined.

Environmental Feasibility

- The site that is eventually chosen must be able to conform to many standards mentioned in Chapter VI below. Water run off, air quality, transportation patterns, solid waste management, infrastructure, and noise are just a few of the factors that must be taken into account in choosing the site.
- Only the **first** site listed ("Old Refinery Site") meets the criteria necessary for a successful plant and feedlot co-location.
- The "Old Refinery Site" is close to major highways, has an existing gas line running to the plant, is **alongside** the Burlington Northern Santa Fe (BNSF) Railroad, which has an existing spur, has more than adequate electricity; and is within 20 feet of a proposed waterline.
- Another **factor** making this site more attractive is that the Roosevelt County Commissioners are willing to donate the land for this project.
- The addition of an anaerobic digester component to the ethanol/feedlot complex would help mitigate **some** of the air and water quality requirement as well as meet most CAFO (concentrated animal feeding operation) regulations. An anaerobic digester sized for this project would cost in the range of $7,000,000.
- The **elimination** of the cattle feedlot component would require a re-working of the basic environmental assumptions used in the analysis.

Study Team Members

Sot Chimonas of Chimonas Enterprises. Mr. Chimonas provides professional services to the ethanol, renewable fuels, and environmental industries. He brings with him a wealth of business experience with over 30 years of professional experience in the agri-business, energy, and environmental industries. He has a BS and an MS in Chemical Engineering. His portfolio includes project development, project management, financial management, business development, and executive management. His project management and business development activities over the last 20 years accounted for more than $100 million in investment capital and associated business revenues of over $350 million annually. From the years of 1975 to 1998 he worked for the J.R. Simplot Company as chemical/environmental engineer and Corporate Director of New Ventures. From 1978 to 1986 he was the Director of Commercial Development for Simplot and developed the Simplot ethanol business from inception, to research, to facilities design, to market development and business operations. In addition, he has a number of years of experience in cattle finishing and has developed several confined feedlots. He is very knowledgeable in feeding wet distillers byproducts to cattle.

Katzen International, Inc., Cincinnati, Ohio. Dr. Raphael Katzen founded Katzen International, Inc. in 1955. The company has applied its proprietary technologies in the design and construction of more than 50 ethanol plants worldwide. Katzen technologies were applied in the largest known integrated ethanol unit and cattle feedlot that has successfully operated for over 20 years. Katzen has recently designed and built a 33,000,000-gallon per year (gpy) barley-fed ethanol plant in Spain that is fully operational. They have access to operating and performance data from this barley-fed ethanol plant. The owners of the Spanish plant have initiated design on a second but larger plant, which will be a 100,000,000-gpy barley-fed ethanol plant also to be built in Spain.

Dale A. Monceaux, Senior Vice President of Katzen International, Inc. Since joining Katzen International, Inc. in 1992, Mr. Monceaux has worked on numerous ethanol projects involving the development, design, and project management phases. His primary responsibilities include fermentation technology research and development, as well as general ethanol process simulation and modeling activities. A degreed biologist, Mr. Monceaux had 15 years of experience in oil refining and molasses and grain based distillery quality control, operations and production management prior to joining Katzen. Since joining Katzen he has worked on the development of an integrated techno-economic model for evaluating ethanol project feasibility. As an officer of Katzen, Mr. Monceaux's activities include technology marketing and project development with a geographic concentration in Central and South America, Europe and former CIS countries.

Doug Durante, Executive Director of CLEAN FUELS DEVELOPMENT COALITION (CFDC), an innovative not-for-profit organization that actively supports the development and production of fuels that can reduce air pollution and lessen dependence on imported oil. For more than a decade, CFDC has been combining the efforts of a variety of interests and is playing a crucial leadership role in the development of a national energy strategy, passage of clean fuel legislation and regulations, and the fostering of new fuel technologies and manufacturing processes. Durante will be doing the ethanol markets research for the GNDC feasibility study. Durante has over twenty-five years national experience in the ethanol industry. Durante has been the prime contractor on several of these studies and has also been a subcontractor and part of a team effort on many others. His particular area of expertise is legislative, regulatory, and market considerations in developing a project, but he has also been involved in feedstock assessment, financing, and transportation issues. Durante was the lead project developer and conducted a feasibility study for NEDAK Ethanol, LLC in Atkinson, Nebraska, utilizing a USDA grant to conduct the study. He managed the entire effort and continues to advise NEDAK.

RCI-Rural Community Innovations is a 501(c)(3) private non-profit agency specializing in economic development and rural community revitalization. RCI Corporation was founded in 1996 to provide technical assistance to a wide variety of rural communities and businesses across America. RCI participates in agricultural and natural resource development projects that are sustainable, ecologically sound, and consistently managed by best practices. RCI also provides active leadership for a wide range of development programs that produce long-term improvement in rural communities. With headquarters in South Dakota and offices in Montana, RCI helps create new wealth and new jobs; and they work to create sustainable development to manage inevitable change in ways that are economically sound, environmentally responsible and culturally acceptable. RCI seeks and supports sustainable agriculture initiatives and alternatives to maintain healthy rural communities and agricultural systems.

Michael Utter, Chief Executive Officer of RCI. He has been in private economic development practice for the past 15 years in Montana as well as co-founding and heading up RCI. Utter graduated Phi Beta Kappa with a B.A. from University of New Mexico and attended UNM graduate school in Public Administration. He managed economic development as Assistant Director of Municipal Development for the City of Albuquerque, New Mexico. Subsequently, he served with the Mayor's office of Economic Development in Los Angeles, California. He has directed more than two dozen feasibility studies for a variety of financial institutions and government organizations during recent years. Several of his completed studies involve large value-added agriculture projects. Utter has either lead or participated on the feasibility study team for five ethanol projects in South Dakota, Montana, and Nebraska in the last six years. Utter has extensive experience working with Indian Tribes including Oglala Sioux Tribe, Navajo Nation, Hopi Tribe, Fort Belknap Indian Community, Wind River Reservation, Cheyenne River Sioux Tribe, and others.

II. Economic Feasibility

Raw Inputs Availability/Storage: Barley, Alfalfa, Corn

1. *Barley Availability*

The available supply and price of barley in Montana and North Dakota within a reasonable traveling distance of the proposed Wolf Point Ethanol Plant was evaluated. (RCI also evaluated a variety of other potential feedstocks. Data on these alternatives is included in the appendix). Various potential plant sites are also near the Canadian border; therefore, Canadian barley supply availability was also investigated.

The Wolf Point Ethanol Plant will require a steady supply of barley to operate without interruption, with an annual requirement of 8.7 million bushels (assuming a barley-based ethanol plant is to be developed with an attached cattle feedlot). For the purposes of this study, feed barley is the barley stock that would be best suited for conversion to ethanol. Feed barley prices and production data used in this study provides insight into the potential of barley production in the region. Historical data exists for this feedstock both from within Montana and from the US Department of Agriculture as well. Producers may also choose to plant hulless varieties of barley, if it is to their economic advantage to do so. The acres available for such production are a key element of this analysis.

Wolf Point is located in the geographic center of the prime barley growing region in North America. In the United States, North Dakota is the largest barley producing state, while Montana ranked 3rd in 2005, a decline from second place prior to the recent drought years. The Canadian Provinces of Alberta, Saskatchewan, and Manitoba are the primary barley growing regions of Canada, with Alberta producing 45 percent of all Canadian barley, Saskatchewan producing 43 percent, and Manitoba producing 5 percent. Fort Peck is located 50 miles south of the Canadian border.

Wolf Point is strategically well located for a barley-based ethanol plant. As will be seen there is more than adequate supply available within the borders of Montana and North Dakota alone. The details of that supply, the price, the competing interests in barley, and the transportation costs are described below.

Barley is a rotation crop. It is grown for feed, processed into food, and is used to produce malted beverages. Barley is a cereal grain, genus Hordeum, family poaceae. It is a hardy plant that adapts itself to a wide variety of climates, and as such is suitable for the dry land farming techniques of Montana and North Dakota producers. Barley is a short-season, early maturing crop, again making it ideal for the region's relatively short growing season.

Barley was discovered growing as a wild grass throughout ancient Asia. It was the first commercially grown crop by the Chinese who appear to be the first to have cultivated it as a food source. Ancient Grecians and Egyptians used barley as a food as well as for a medicine. It is thought to have made its way to North America with Christopher Columbus.

Barley is broadly classified as six-row or two-row, which describes the arrangement of kernels on the plant. Montana primarily grows two-row barley, while the largest producing state in the US, North Dakota, primarily grows six-row barley. Two-row barley tends to have plumper kernels with thinner husks than six-row. As a result, two-row has a greater starch content and, therefore, can yield greater starch extract per bushel of grain.

In addition to food uses, barley is fed to beef cattle, dairy cattle, swine, and poultry. In most cases, the whole barley kernel is rolled, ground, or flaked, prior to being fed. There has been a steady growth in recent years in the use of barley for food and industrial uses. Today 51 percent of barley production is used for food and industry, 8 percent is exported, and 41 percent is used for feed and other residual uses[4].

Barley in the US is also grown for malt. Malt is produced from kiln-dried barely sprouts and is used to produce beer, liqueur and as a flavoring for foods and beverages. Barley malt provides enzymes that help convert protein and starch into sugar, which is then converted into alcohol in the fermentation process.

Montana growers seeded 1 million acres of barley in 2004, down 150,000 acres from 2003. Of the total, over 700,000 acres were seeded to malting type varieties. Maltsters and brewers purchased 19.7 million bushels (40% of all barley varieties grown) of Montana's 2004 barley crop to make malt, up 33 percent from 2003 according to a recent survey from the Montana Agricultural Statistics Service. The survey was requested and funded by the Montana Wheat and Barley Committee. The survey also found that fifty-two percent of all malt barley purchased was grown in north central Montana, compared to 60 percent last year. South central Montana growers produced 18 percent of the total. The barley utilized for malt represented approximately 40 percent of the 2004 total barley crop, compared with 43 and 24 percent in 2003 and 2002, respectively.

The Montana Wheat and Barley Committee survey also found the average protein of the 2004 malting crop was 12.0 percent, which is 0.2 point lower than the average protein of the 2003 crop. In 2004 Montana's harvested barley area was down 20,000 acres from the previous year. However, yield increased by 19 bushels per acre due to rainfall.

In a survey completed by North Dakota State University, on behalf of the North Dakota Barley Council, the average protein content of the 2005 North Dakota crop was 12.8 percent for six-rowed barley and 13.2 percent for two-rowed barley. These figures remain virtually unchanged from 2004 when protein levels were 12.6 percent and 13.2 percent respectively[5].

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[4] US Grains Council, "Barley Commodity Description," Barley, Corn & Sorghum website

[5] North Dakota Barley Council, "2004 Crop Quality Report," North Dakota Barley Council Publications Website

Montana Agricultural Statistics Service reports that North Dakota and Idaho outpaced Montana in barley production in 2005. Montana accounted for 18.5 percent of the nation's barley and ranked third among states with 39,200,000 bushels harvested. This number is substantially lower than the 49 million bushels produced in the previous year and just slightly more than 41 percent of the 1987 harvest, an 18-year high barley harvest year of 94,500,000 bushels. The 39.2 million bushels harvested in 2005 is also 27.6 percent less than the 18-year average of 54,168,333 bushels.

The following data table indicates barley production in bushels in the Montana and North Dakota counties nearest the proposed ethanol plant. In 2005 a total of 20,309,000 bushels were produced in these nearby counties. The 5,714,000 bushels produced in Montana represent or14.6 percent of the state's total crop while the 14,595,000 produced in North Dakota represents 25.5% of that state's total crop.

2005 Barley Acreage, Yield, and Production of Counties Near Proposed Site

Last updated June 6, 2006

County[1]	State	Planted Acres	Harvested Acres	Yield Bushels	Production Bushels
Blaine	MT	23,000	15,700	46	719,000
Phillips	MT	23,000	10,500	49	517,000
Fergus	MT	36,000	25,000	33	820,000
Garfield	MT	17,000	4,400	34	150,000
Valley	MT	12,000	5,300	31	163,000
Mc Cone	MT	21,000	8,800	49	433,000
Daniels/Sheridan	MT	9,300	4,500	42	191,000
Roosevelt	MT	7,700	2,500	66	165,000
Richland	MT	29,000	26,800	63	1,681,000
Dawson	MT	23,000	14,700	52	764,000
Prairie	MT	7,400	1,400	55	77,000
Wibaux	MT	5,500	900	38	34,000
Divide	ND	4,000	3,500	40	140,000
Williams	ND	29,000	28,000	48.6	1,360,000
McKenzie	ND	34,000	24,000	49.6	1,190,000
Golden Valley	ND	4,100	2,800	53.6	150,000
Dunn	ND	23,500	18,600	52.2	970,000
Mountrail	ND	32,000	29,000	55.5	1,610,000
Burke	ND	20,000	19,500	46.7	910,000
Billings	ND	3,900	2,000	55	110,000
Renville	ND	62,000	60,000	58	3,480,000
Ward	ND	48,000	45,000	58.2	2,620,000
Mc Lean	ND	26,000	25,500	61.2	1,560,000
Mercer	ND	17,000	10,300	48.1	495,000
Total			**388,700**		**20,309,000**

North Dakota is consistently the United States' largest producer of barley. The state averaged 81 million bushels during the last five years. In 2005 the North Dakota harvest was lower than the 5-year average, at 57 million bushels, and substantially down 2003's 119 million bushels, a five-year high. It should be noted that barley is a rotation crop that experiences high years followed by low years, so these numbers fall within the range of these rotation-based fluctuations.

In Canada, the provinces of Saskatchewan and Manitoba are large producers of barley. Saskatchewan produced 5,345,100 metric tons or 245,498,305 bushels of barley in 2005. The Canadian province of Manitoba produced an additional 681,500 metric tons or 31,301,022 bushels of barley in 2005.

2. *Wolf Point Area Barley Production Potential*

In summary, the proposed ethanol plant/feedlot requirement of almost 8.7 million bushels per year of barley can be met from regional sources. More than 373 million bushels of barley were grown in the regions of Manitoba, Saskatchewan, Montana, and North Dakota collectively as shown in the following table:

Summary Table of 2005
Regional Barley Production

Region	Barley Production (bushels)
Montana	39,200,000
North Dakota	57,240,000
Saskatchewan	245,498,305
Manitoba	31,301,022
Total	**373,239,327**

The Plant/feedlot requirement of 8.7 million bushels represents approximately 25.5 percent of the barley grown in Montana, 10.3 percent of the crop available from North Dakota and Montana combined, and 2.67 percent of the supply available in the region.

3. *Barley Storage*

The major railroad line traversing northern Montana services grain elevators near Wolf Point within three miles of one of the proposed ethanol plant/feedlot locations. The owner of these elevators, Columbia Grain, a large grain shipping and storage company, will typically store 500,000 to 600,000 bushels at a time. Grain could be purchased from Columbia for the ethanol plant on an as-needed basis. The proposed ethanol plant is also being planned to contain approximately 750,000 bushels of storage on site.

Storage and handling fees are three cents ($.03) per bushel per month; eight cents ($.08) per bushel to receive; and 10 cents ($.10) per bushel to load onto trucks.

In the event additional elevators are required, Scott McIntosh, the General Manager for Columbia Grain's Harlem location (406.353-2924) indicated that the cost of storage is dependent on the price of steel. Currently the cost involved is $4.00 per bushel of storage capacity. One million bushels of storage would therefore cost $4 million to build.

4. Corn Availability

Most commercially viable ethanol plants in the US utilize corn to produce ethanol. The proposed Wolf Point ethanol plant will be located in an area that is more suited to wheat and barley grain production; however Montana and North Dakota producers do grow corn. In fact, in 2005 Montana produced a five-year high 2,516,000 bushels of corn across the state. This represents an increase of 371,000 bushels over the former year and 359,000 bushels more the five-year average. Montana ranks 40th in the nation in corn production.

In 2005 North Dakota also produced a five-year high of 155 million bushels statewide. This represents an increase of 34 million bushels over the previous year and 35 million bushels more than the five-year average. North Dakota ranks 14th in the nation for corn production. It is important to note, however, that the vast majority of the corn in North Dakota is produced in the central and eastern parts of the state. The counties surrounding the proposed ethanol plant produced less than 3.8 million bushels or 2.5 percent of the state's total.

The following table shows the 2005 corn production in Montana and North Dakota by county:

CORN
Acreage, Utilization, and Yield By County, Montana and North Dakota, 2005

County and District	Planted All Purposes[1] Acres	Harvested Acres	GRAIN Yield Bushels	Production Bushels
Montana				
Lake	1,900	600	145	87,000
Other	500	100	110	11,000
Northwest	**2,400**	**700**	**140**	**98,000**
Dawson	3,000	1,700	141	240,000
Richland	7,400	1,300	115	150,000
Other	4,400	1,200	113	136,000
Northeast	**14,800**	**4,200**	**125**	**526,000**
Carbon	5,500	1,600	157	251,000
Stillwater	2,300	700	167	117,000
Treasure	4,700	2,400	169	406,000
Yellowstone	14,300	3,400	153	520,000
Other	1,600	300	150	45,000
South Central	**28,400**	**8,500**	**160**	**1,362,000**
Custer	6,800	1,100	171	171,000
Rosebud	6,500	1,100	165	182,000
Other	3,700	1,300	112	145,000
Southeast	**17,000**	**3,400**	**146**	**498,000**
Other Districts	**2,400**	**200**	**160**	**32,000**
Montana Totals	**65,000**	**17,000**	**148**	**2,516,000**
North Dakota				
Ward	5,400	3,900	95.6	373,000
Williams	2,500	800	90	72,000
Other	4,100	2,800	73.2	205,000
Northwest	**12,000**	**7,500**	**86.7**	**650,000**
Benson	24,000	19,000	96.1	1,835,000
Mc Henry	20,000	11,100	95.5	1,060,000
Pierce	12,500	7,600	89.1	677,000
Other	6,500	5,200	84.2	438,000
North Central	**63,000**	**43,000**	**93.3**	**4,010,000**
Grand Forks	31,000	28,500	110.5	3,150,000
Nelson	10,000	8,400	103.9	873,000
Ramsey	37,500	35,500	105.1	3,730,000
Walsh	10,000	9,000	123.3	1,110,000
Other	13,500	11,600	99.7	1,157,000
NORTHEAST	**102,000**	**93,000**	**107.7**	**10,020,000**
Dunn	15,200	3,800	67.4	256,000
McKenzie	5,600	1,200	96.7	116,000
Mc Lean	10,700	8,100	95.9	777,000
Mercer	6,000	1,300	66.2	86,000
Oliver	11,500	5,100	112.7	575,000
West Central	**49,000**	**19,500**	**92.8**	**1,810,000**
Eddy	9,500	8,500	124.7	1,060,000
Foster	17,000	14,600	115.8	1,690,000
Kidder	15,500	8,800	131.9	1,161,000

County and District	Planted All Purposes[1] Acres	Harvested Acres	GRAIN Yield Bushels	Production Bushels
Sheridan	5,500	3,100	107.1	332,000
Stutsman	62,000	57,500	123.7	7,115,000
Wells	25,500	21,500	115.9	2,492,000
Central	**135,000**	**114,000**	**121.5**	**13,850,000**
Barnes	64,000	60,500	146	8,830,000
Cass	115,000	111,500	144	16,055,000
Griggs	14,500	12,000	135.4	1,625,000
Steele	34,500	33,000	128.2	4,230,000
Traill	82,000	81,000	127.4	10,320,000
East Central	**310,000**	**298,000**	**137.8**	**41,060,000**
Adams	8,800	3,300	53	175,000
Billings	1,500	900	66.7	60,000
Bowman	6,800	2,300	60	138,000
Golden Valley	4,400	3,500	89.7	314,000
Hettinger	7,200	4,500	62.4	281,000
Slope	2,600	1,500	66	99,000
Stark	12,700	4,000	73.3	293,000
South West	**44,000**	**20,000**	**68**	**1,360,000**
Burleigh	21,500	13,500	106.7	1,440,000
Emmons	35,000	28,500	112.6	3,210,000
Morton	31,000	7,500	95.5	716,000
Other	17,500	5,500	80.7	444,000
SOUTH CENTRAL	**105,000**	**55,000**	**105.6**	**5,810,000**
Dickey	105,000	95,000	142.3	13,515,000
La Moure	87,000	82,000	146.6	12,020,000
Logan	16,000	11,700	116.2	1,360,000
McIntosh	16,000	12,800	121.5	1,555,000
Ransom	60,000	56,000	137.5	7,700,000
Richland	220,000	212,000	134.3	28,475,000
Sargent	86,000	80,500	144.2	11,605,000
SOUTHEAST	**590,000**	**550,000**	**138.6**	**76,230,000**
North Dakota Totals	**1,410,000**	**1,200,000**	**129**	**154,800,000**
Regional Totals	**14,750,000**	**1,217,000**		**157,316,000**

[1]Acreage is principally irrigated. Counties are combined when 1) one large producer accounts for more than 60% of the acreage planted or 2) there are fewer than three producers in a county. This is done to avoid disclosure of individual information.

Last updated June 6, 2006

The Katzen designed ethanol plant discussed in this study is capable of processing both barley and corn as feedstocks. While there are short-season corn varieties available, these are dependent on good rainfall to enable the carbohydrate-laden ears to mature. Where rainfall is a limiting factor, such as the northern border of Montana and North Dakota, irrigation systems would be required to assure the quality crop necessary for ethanol production. Such varieties of corn, while theoretically viable, have never been commercially grown in large quantities in Montana.

5. *The Short Season Corn Option*

The proposed ethanol unit is to be designed to convert hulless barley to yield 20 million gallons of ethanol per year, with 24 million gallons per year possible when running optimally. However the ethanol unit can also convert corn into ethanol, a well-known technology, requiring uncomplicated adjustments to the enzymes used in the ethanol unit.

As will be discussed in this section, short season corn can be produced in the Wolf Point area and is available in large quantities from neighboring states. Corn produces ethanol more efficiently than barley does, and therefore the yield of a 20 million gallon per year ethanol unit, sized up for barley utilization, could yield as much as 28 million gallons of ethanol a year if corn is used instead of barley.

Should barley be in short supply, corn is readily available from adjacent states, and from the eastern border region of Montana. Therefore, the decision has been taken to investigate the option of using corn as well as barley (or as part of a crop rotation plan using barley some seasons, and corn other seasons).

Producers in Roosevelt and surrounding counties of both Montana and North Dakota grow rotation crops including barley, wheat, alfalfa, and oats. With advances in agricultural science, it is now possible that short season corn can become a part of the rotation. There are several varieties from major corn seed suppliers that reach full maturity in an 80 to 90 day growing season. Statistical weather information obtained from Montana State University's Northern Agricultural Research Center (NARC) in Havre indicates that the region including Wolf Point has sufficient growing-degree days to consider these earlier maturing corn varieties. The table below contains the historical growing-degree day data collected by NARC.

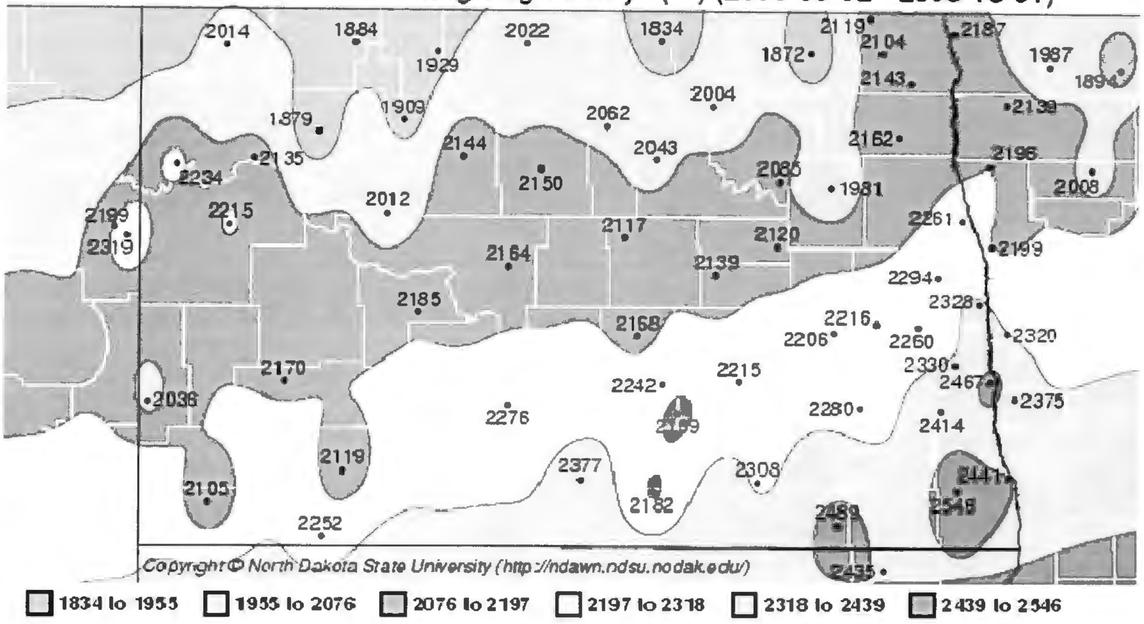
Northern Montana Growing Degree Data
Northern Agricultural Research Center

Period	Growing Degree Days
5/1/05-10/31/05	2271.7
Average (1951-2005)	2383.7

Source: Montana State University; NARC, 2006

North Dakota State University also tracks growing-degree days for various regions in North Dakota. Following is a map showing Growing Degree Days, for regions in relatively close proximity to the Fort Peck Reservation, ranging from 1834-2197. It is important to note that the difference in Growing-Degree Days between Montana and North Dakota is accounted for by the varying length of observation.

Accumulated Corn Growing Degree Days (°F) (2005-05-02 - 2005-10-01)



Source: North Dakota State University Extension Service website

Following is a conversion table, which demonstrates the number of growing degree days necessary for corn hybrids of varying relative maturity:

Comparison of Growing Degree Days and Relative Maturity

GDD (units)	Relative Maturity (days)
1800-2000	70-80
2000-2300	80-90
2300-2500	90-100
2500-2700	100-110
2700-2800	110-120

Source: Michigan State University, 1998

For the Wolf Point region, producer adoption of short season corn holds promise. Wheat producers require a rotation crop and short season corn is a good option for them. Although it is yet to be embraced in the region, the successes in Montana's Yellowstone Valley and along Montana's eastern border provide evidence of the feasibility of the option in the arid elevations typical in Montana and North Dakota.

Consideration of short season corn as a viable substitute for barley for the proposed ethanol plant and as a viable rotation crop for wheat producers makes an analysis of regional wheat acreage an important consideration. Wheat is Montana's biggest crop, with 5.34 million acres of wheat planted by Montana producers in 2005 compared with 900,000 acres of barley, and 90,000 acres of oats.

In Roosevelt County alone, 342,200 acres of wheat were planted in 2005, while 291,300 acres of wheat were planted in Valley County in the same year yielding 9,661,000 bushels and 8,659,000 respectively, for a combined total of more than 18 million bushels of wheat coming from those two counties. The same acreage planted in corn would produce a higher yield since per acre yields for corn can as much as double that of wheat. More discussion on the corn yield potential follows below. But first, the question of how viable short season corn really is for the area is explored.

There are many corn hybrids from several different seed companies that could be used as a rotation crop in the region. Pioneer, DeKalb, Grand Valley, Geertson, and Asgrow and others offer short season corn seed.

Yield data based a on a conventional hybrid 39H84, one of the many short season corn varieties available through Pioneer Hi-Bred International, Inc. indicates that Montana producers could average a yield of 130 bushels per acre. North Dakota producers could average 80 bushels per non-irrigated acre, and 150 bushels per irrigated acre. This hybrid corn variety is used only as an example for the purposes of analysis and is not an endorsement or recommendation of this product. A more complete study of yield data from a broader sample of short season corn varieties, possibly in cooperation with Montana State University Northern Ag Research Center should be pursued before short season corn hybrids are chosen for the region.

The Pioneer yield data is useful because it is derived from Montana and North Dakota test plots presumably grown in similar conditions as found in the Wolf Point region (similar in the number of warm days and annual precipitation, although elevation might differ). The yield data is summarized, and simplified from the original, in the following table:

Pioneer Product	**Yield**
Montana Test Plots	
39H84	140.0
39H84	160.6
39H84	121.9
39H84	104.6
39H84	118.7
39H84	140.7
Montana Average	**130.8**
North Dakota Average	**150.0**

Source: Pioneer's Montana Sales Rep, Steve Church, on June 7, 2006

The table above shows a high of almost 161 bushels per acre and a low of 105 bushels per acre using this Pioneer hybrid corn seed. The analysis that follows will take 130 bushels per acre, slightly lower than Montana's average yield, to project the potential yield of short season corn in the regions surrounding Wolf Point.

It is not unreasonable to project that some regional producers would be interested in growing short season corn in the event of a regional market for potentially 8 million bushels of corn created by the Wolf Point plant. There are agricultural advantages to growing corn in the region as part of the rotation cycle. Corn does not fall prey to the same infestations and diseases as wheat and the nitrogen demand for both crops are close to equivalent, making the inputs approximately the same. Beyond that, corn is a higher-yielding crop per acre than wheat is. The rule of thumb is that a field that can produce 50 bushels of wheat would produce 100 bushels of corn.

From an economic standpoint, 14 percent protein Spring wheat was selling for $4.38 per bushel in Wolf Point, Montana on June 8th, 2006, while corn was selling for $3.64 per bushel the same day at that location. If the bushels of corn per acre doubles yield compared with wheat in any given year, corn would arguably provide a greater profit than Spring wheat for producers in the region. More likely, doubling yield is probably over optimistic and there is no historical corn yield data from the region to draw data from. However, even assuming corn yield increased by only 50 percent above wheat yields, there may be financial incentives for corn production.

While corn is not traditionally grown in the area, there is a national trend that indicates its eventual adoption. Corn rust and infestation has impacted the corn crop pushing it west and south from the Midwest heartland. With short season corn, some Montana producers are embracing it, especially on the eastern Montana border, and in the Yellowstone River Valley (near Montana's largest cattle feedlots).

In the Roosevelt County area, utilizing the current 210,000 acres in wheat production holds the potential at 130 bushels per acre short season corn, to produce 27,300,000 bushels of corn in alternate years. More likely, corn production as part of the rotation would take place over time, and an increase in the percentage of growing acres devoted to growing corn would see a gradual increase. Also, since corn is a rotation crop, as much as half the acreage might remain wheat and or alfalfa, while the other half might be planted in corn seed.

Since the proposed ethanol plant's corn requirement currently exceeds what North Eastern Montana can produce, corn would need to be purchased from outside sources. These outside sources may eventually be regional producers in Montana or North Dakota, but only after a concerted campaign successfully targeting area producers was carried out. Prior to sufficient amounts of corn being produced in Montana and North Dakota, corn is abundantly available from South Dakota, and Western Minnesota. Corn from these areas travels through Wolf Point, Montana, everyday according to Scott McIntosh, General Manager of Columbia Grain International, Inc. in Harlem.

Trains of corn ranging from 60 to 120 cars can be loaded onto trucks at Columbia Grain, and brought to the holding pits adjacent to the ethanol unit of the proposed plant. Local trucking companies are available for hire to deliver the corn (or barley) at reasonable rates. Transportation impacts are more fully explored below.

Should the proposed Wolf Point plant stimulate regional producers to grow corn for the plant, there are sufficient growing acres to meet the demand. At a yield of 130 bushels per acre (Pioneer yield average as described above), growing corn for the plant requires 62,000 acres, or 40 percent of the current wheat acreage in the Wolf Point area.

The following table provides acreage and yield data in the counties nearest to Roosevelt, an area previously defined above for regional barley numbers.

Wheat Acreage, Yield, and Production, by Counties Near Proposed Ethanol Plant Site

	ALL						IRRIGATED			
	Planted	Net Planted	Harvested	Yield	Production		Planted	Harvested	Yield	Production
County, State	Acres	Acres	Acres	Bushels	Bushels	State Rank	Acres	Acres	Bushels	Bushels
Montana										
Blaine, MT	195,000	195,000	193,100	36.4	7,020,000	**11**	5,500	5,400	56.9	307,000
Phillips, MT	129,700	129,700	123,500	35.9	4,429,000	**19**	3,200	3,000	57.0	171,000
Fergus, MT	189,500	189,300	188,100	44.7	8,402,000	**8**	--	--	--	--
Petroleum, MT	20,100	20,100	18,600	34.2	636,000	**38**	1,300	1,300	57.7	75,000
Garfield, MT	96,000	95,800	91,900	35.7	3,278,000	**21**	--	--	--	--
Valley, MT	291,300	291,300	283,900	30.5	8,659,000	**5**	6,400	5,600	51.6	289,000
Mc Cone, MT	236,000	234,600	230,300	33.2	7,651,000	**10**	2,300	2,300	75.7	174,000
Daniels, MT	224,300	224,300	219,200	26.5	5,809,000	**14**	--	--	--	--
Sheridan, MT	327,100	327,100	324,700	26.1	8,483,000	**7**	1,700	1,700	65.3	111,000
Roosevelt, MT	342,200	342,200	340,200	28.4	9,661,000	**3**	5,600	5,600	58.8	329,000
Richland, MT	152,700	152,700	150,900	32.2	4,864,000	**18**	8,500	8,100	67.5	547,000
Dawson, MT	164,400	164,400	162,500	30.6	4,974,000	**17**	2,000	2,000	68.0	136,000
Prairie, MT	35,100	35,100	34,600	33.5	1,160,000	**27**	2,500	2,200	68.6	151,000
Wibaux, MT	36,500	36,500	35,900	27.3	980,000	**32**	--	--	--	--
Montana Regional Total	**2,439,900**	**2,438,100**	**2,397,400**	**32.5**	**76,006,000**		**20,300**	**20,300**	**62.7**	**1,274,000**
North Dakota										
Divide, ND	275,600		274,300	33.1	9,086,000	**7**				
Williams, ND	--		--	--	--					
McKenzie, ND	183,100		181,200	29.7	5,382,000	**18**				
Golden Valley, ND	69,400		68,500	33.9	2,325,000	**37**				
Dunn, ND	171,000		169,400	34.8	5,894,000	**15**				
Mountrail, ND	--		--	--	--					
Burke, ND	211,300		209,300	36.4	7,624,000	**11**				
Billings, ND	--		--	--	--					
Reveille, ND	204,200		199,800	37.9	7,563,000	**12**				
Ward, ND	369,700		362,400	39.5	14,319,000	**2**				
Mc Lean, ND	379,400		378,400	38.6	14,618,000	**1**				
Mercer, ND	95,800		93,500	34.4	3,221,000	**31**				
North Dakota Regional Total	**1,959,500**		**1,936,800**		**70,032,000**					
Regional Totals	**4,399,400**		**4,334,200**		**146,038,000**		**39,000**	**37,200**		**2,290,000**

Source: Montana Agricultural Statistics Service, Last updated June 6, 2006

(North Dakota does not distinguish between whether or not the wheat crop is irrigated. Note that in Montana, however, the average yield doubles when the crop is irrigated)

The table above shows that counties within a reasonable proximity to Wolf Point collectively planted 4.4 million acres of wheat in 2006. In the event that the Wolf Point plant created a corn market, it would require, as mentioned above, 62,000 acres to be planted in short season corn to meet the demand. That is 1.5 percent of the acreage now under wheat cultivation in these counties to satisfy the ethanol plant's corn requirements. It is not at all unreasonable to assume that Montana and North Dakota wheat producers would consider including short season corn in their rotation, and that the acreage to do so is easily adequate. Still, it will require an organized campaign to solicit and gain commitments from producers to make the change and invest in new harvesting corn heads (presumably they do not now have the equipment to harvest corn).

A relatively modest amount of corn for grain is grown in Montana and as the following table shows the acreage planted has remained fairly constant over time.

Montana Corn for Grain 2001-2005

			Area, Yield, Production, Price per Unit, and Value of Production					
			Planted	Harvested	Yield	Production	Price/ Unit	Value of production
Commodity	Yr	ST	Acres - 000s	Acres - 000s	Bushel	1000 bushels	$/bu	1000 dollars
Corn For Grain	2001	MT	65	13	148	1924	1.89	3636
Corn For Grain	2002	MT	65	13	140	1820	2.45	4459
Corn For Grain	2003	MT	68	17	140	2380	2.65	6307
Corn For Grain	2004	MT	70	15	143	2145	2.42	5191
Corn For Grain	2005	MT	65	17	148	2516	2.4	6038

Source: USDA NASS Reports online

As the above table indicates, Montana producers harvested 2,516,000 bushels of corn for grain in 2005, while an additional 1,870,000 bushels of corn were produced for silage in the same year. The South Central counties of Big Horn, Carbon, Stillwater, Treasure, and Yellowstone produced the highest amount of corn in 2005, as the following table demonstrates:

CORN
Acreage, Utilization, and Yield By Counties
Montana and North Dakota 2005[1]

Last updated June 6, 2006

County and District	Planted All Purposes [1]	GRAIN			SILAGE		
		Harvested	Yield	Production	Harvested	Yield	Production
	Acres	Acres	Bushels	Bushels	Acres	Tons	Tons
Montana							
Lake	1,900	600	145	87,000	1,200	21	25,000
Other	500	100	110	11,000	400	25	10,000
North Central	--	--	--	--	**700**	**26**	**18,000**
Northwest	**2,400**	**700**	**140**	**98,000**	**1,600**	**22**	**35,000**
Dawson	3,000	1,700	141	240,000	1,300	20	26,000
Richland	7,400	1,300	115	150,000	5,900	21	121,000
Valley	--	--	--	--	1,100	21	23,600
Other	4,400	1,200	113	136,000	900	18	16,400
Northeast	**14,800**	**4,200**	**125**	**526,000**	**9,200**	**20**	**187,000**
Central	--	--	--	--	500	18	9,000
Gallatin	--	--	--	--	800	23	18,000
Other	--	--	--	--	200	25	5,000
Southwest	--	--	--	--	**1,000**	**23**	**23,000**
Big Horn	--	--	--	--	1,200	27	32,000
Carbon	5,500	1,600	157	251,000	3,900	25	98,000
Stillwater	2,300	700	167	117,000	1,600	26	42,000
Treasure	4,700	2,400	169	406,000	2,100	28	58,000
Yellowstone	14,300	3,400	153	520,000	10,800	28	297,000
Other	1,600	400	170	68,000	--	--	--
South Central	**28,400**	**8,500**	**160**	**1,362,000**	**19,600**	**27**	**527,000**
Custer	6,800	1,000	171	171,000	5,700	23	133,000
Prairie	--	--	--	--	1,800	22	40,000
Rosebud	6,500	1,100	165	182,000	5,300	23	124,000
Other	3,700	1,300	112	145,000	600	13	8,000
Southeast	**17,000**	**3,400**	**146**	**498,000**	**13,400**	**23**	**305,000**
Combined Districts	**2,400**	**200**	**160**	**32,000**	--	--	--
State Totals	**65,000**	**17,000**	**148**	**2,516,000**	**46,000**	**24**	**1,104,000**
North Dakota							
Ward	5,400	3,900	95.6	373,000	1,400	12.7	17,800
Williams	2,500	800	90	72,000	1,600	15	24,000
Other	4,100	2,800	73.2	205,000	1,000	10.2	10,200
Northwest	**12,000**	**7,500**	**86.7**	**650,000**	**4,000**	**13,**	**52,000**
Benson	24,000	19,100	96.1	1,835,000	3,800	9.5	36,200
Mc Henry	20,000	11,100	95.5	1,060,000	7,700	10.9	83,600
Pierce	12,500	7,600	89.1	677,000	4,600	13.4	61,500
Other	6,500	5,200	84.2	438,000	900	10.8	9,700
North Central	**63,000**	**43,000**	**93.3**	**4,010,000**	**17,000**	**11.2**	**191,000**
Grand Forks	31,000	28,500	110.5	3,150,000	1,300	8.5	11,000
Nelson	10,000	8,400	103.9	873,000	1,500	13.9	20,800
Ramsey	37,500	35,500	105.1	3,730,000	500	9.4	4,700
Walsh	10,000	9,000	123.3	1,110,000	800	12.9	10,300

County and District	Planted All Purposes [1]	GRAIN			SILAGE		
		Harvested	Yield	Production	Harvested	Yield	Production
	Acres	Acres	Bushels	Bushels	Acres	Tons	Tons
Other	13,500	11,600	99.7	1,157,000	900	10.2	9,200
Northeast	**102,000**	**93,000**	**107.7**	**10,020,000**	**5,000**	**11.2**	**56,000**
Dunn	15,200	3,800	67.4	256,000	9,500	9.8	92,900
McKenzie	5,600	1,200	96.7	116,000	4,200	11.8	49,500
Mc Lean	10,700	8,100	95.9	777,000	2,300	11.8	27,100
Mercer	6,000	1,300	66.2	86,000	4,100	14.8	60,500
Oliver	11,500	5,100	112.7	575,000	5,900	18.6	110,000
West Central	**49,000**	**19,500**	**92.8**	**1,810,000**	**26,000**	**13.1**	**340,000**
Eddy	9,500	8,500	124.7	1,060,000	700	9.7	6,800
Foster	17,000	14,600	115.8	1,690,000	2,200	10.4	22,900
Kidder	15,500	8,800	131.9	1,161,000	6,400	9.6	61,700
Sheridan	5,500	3,100	107.1	332,000	2,300	9.8	22,500
Stutsman	62,000	57,500	123.7	7,115,000	3,700	12.9	47,700
Wells	25,500	21,500	115.9	2,492,000	2,700	12	32,400
Central	**135,000**	**114,000**	**121.5**	**13,850,000**	**18,000**	**10.8**	**194,000**
Barnes	64,000	60,500	146	8,830,000	3,100	10.1	31,200
Cass	115,000	111,500	144	16,055,000	2,700	15.4	41,500
Griggs	14,500	12,000	135.4	1,625,000	2,300	17.2	39,600
Steele	34,500	33,000	128.2	4,230,000	800	14.9	11,900
Traill	82,000	81,000	127.4	10,320,000	600	13	7,800
East Central	**310,000**	**298,000**	**137.8**	**41,060,000**	**9,500**	**13.9**	**132,000**
Adams	8,800	3,300	53	175,000	5,300	7	37,000
Billings	1,500	900	66.7	60,000	500	11.8	5,900
Bowman	6,800	2,300	60	138,000	4,400	10.8	47,300
Golden Valley	4,400	3,500	89.7	314,000	800	11	8,800
Hettinger	7,200	4,500	62.4	281,000	2,400	9.9	23,800
Slope	2,600	1,500	66	99,000	1,000	13.7	13,700
Stark	12,700	4,000	73.3	293,000	8,600	9.8	84,500
Southwest	**44,000**	**20,000**	**68**	**1,360,000**	**23,000**	**9.6**	**221,000**
Burleigh	21,500	13,500	106.7	1,440,000	7,500	9.3	69,800
Emmons	35,000	28,500	112.6	3,210,000	6,300	10.2	64,400
Morton	31,000	7,500	95.5	716,000	23,300	9.5	221,000
Other	17,500	5,500	80.7	444,000	11,400	8.1	92,800
South Central	**105,000**	**55,000**	**105.6**	**5,810,000**	**48,500**	**9.2**	**448,000**
Dickey	105,000	95,000	142.3	13,515,000	4,400	12.5	55,100
La Moure	87,000	82,000	146.6	12,020,000	2,800	10.9	30,600
Logan	16,000	11,700	116.2	1,360,000	3,700	12.6	46,600
McIntosh	16,000	12,800	121.5	1,555,000	2,600	13.1	34,000
Ransom	60,000	56,000	137.5	7,700,000	2,200	11.9	26,100
Richland	220,000	212,000	134.3	28,475,000	2,000	13.2	26,400
Sargent	86,000	80,500	144.2	11,605,000	1,300	13.2	17,200
Southeast	**590,000**	**550,000**	**138.6**	**76,230,000**	**19,000**	**12.4**	**236,000**
Stat Totals	**1,410,000**	**1,200,000**	**129**	**154,800,000**	**170,000**	**11**	**1,870,000**

[1] Acreage is principally irrigated. Counties are combined when 1) one large producer accounts for more than 60% of the acreage planted; 2) there are fewer than three producers in a county or 3) a county has less than 500 acres planted. This is done to avoid disclosure of individual information.

Source: Montana Agricultural Statistics Service

As mentioned above, there is plenty of corn available in South Dakota and Western Wisconsin to draw from and have shipped in by rail to the Wolf Point elevator and loading facilities. This will be the likely source supply for corn unless or until area producers begin to grow short season corn in the region.

The following tables show corn production for the last five years from South Dakota, Minnesota, and Wisconsin:

South Dakota Corn as a Feedstock

Commodity	Year	State	Area, Yield, Production, Price per Unit, and Value of Production					
			Planted	Harvested	Yield	Production	Price per Unit	Value of production
			Acres - 000s	Acres - 000s	Bushel	1000 bushels	$/bu	1000 dollars
Corn For Grain	2001	SD	3800	3400	109	370600	1.75	648550
Corn For Grain	2002	SD	4450	3250	95	308750	2.17	669988
Corn For Grain	2003	SD	4400	3850	111	427350	2.28	974358
Corn For Grain	2004	SD	4650	4150	130	539500	1.65	890175
Corn For Grain	2005	SD	4450	3950	119	470050	1.7	799085
Corn For Grain	2006	SD	4400					

SOURCE: USDA NASS REPORTS ONLINE

Minnesota Corn as a Feedstock

Commodity	Year	State	Area, Yield, Production, Price per Unit, and Value of Production					
			Planted	Harvested	Yield	Production	Price per Unit	Value of production
			Acres - 000s	Acres - 000s	Bushel	1000 bushels	$/bu	1000 dollars
Corn For Grain	2001	MN	6800	6200	130	806000	1.9	1531400
Corn For Grain	2002	MN	7200	6700	157	1051900	2.15	2261585
Corn For Grain	2003	MN	7200	6650	146	970900	2.35	2281615
Corn For Grain	2004	MN	7500	7050	159	1120950	1.85	2073758
Corn For Grain	2005	MN	7300	6850	174	1191900	1.75	2085825
Corn For Grain	2006	MN	7300					

SOURCE: USDA NASS REPORTS ONLINE

Wisconsin Corn as a Feedstock

Commodity	Year	State	Area, Yield, Production, Price per Unit, and Value of Production					
			Planted	Harvested	Yield	Production	Price per Unit	Value of production
			Acres - 000s	Acres - 000s	Bushel	1000 bushels	$/bu	1000 dollars
Corn For Grain	2001	WI	3400	2600	127	330200	1.97	650494
Corn For Grain	2002	WI	3650	2900	135	391500	2.22	869130
Corn For Grain	2003	WI	3750	2850	129	367650	2.35	863978
Corn For Grain	2004	WI	3600	2600	136	353600	2	707200
Corn For Grain	2005	WI	3800	2900	148	429200	1.85	794020
Corn For Grain	2006	WI	3700					

SOURCE: USDA NASS REPORTS ONLINE

As the above tables indicate, South Dakota produced nearly 470 million bushels of corn, Minnesota produced more than 1.2 billion bushels of corn, and Wisconsin produced 430 million bushels of corn for grain in 2005, bringing the total corn available from these states to more than 2 billion bushels. According to Columbia Grain's Wolf Point Facility Manager, Scott McIntosh, corn is flowing daily through the Wolf Point facility from these states.

According to a calculation provided to RCI by Columbia Grain, the cost to have corn brought in from Western North Dakota, Minnesota, and Wisconsin averages $1.00 to $1.30 per bushel. Assuming the proposed Wolf Points plant's requires 4,200,000 bushels per year to supplement Montana grain, the transportation of corn would amount to between $4.2 million and $5.46 million per year. There will also be a fee for transporting the corn from the Wolf Point rail facility to the plant that has been estimated at $.10 -$.12(10-12 cents) per bushel.

As regional producers begin to use short season corn in their rotations, transportation costs would decrease. Again, short season corn can grow in the region, and there exists ample acreage to produce an abundance of corn in the region. Local producers would probably grow it until the plant creates a local demand for it. Should the regions producers not provide sufficient corn for the plant, corn is abundantly available from other states directly east of Montana.

6. *Alfalfa Availability*

The feed ration that will be fed to the cattle will combine wet distillers byproducts (WDB) mixed with other ingredients, including alfalfa. RCI has investigated the availability of alfalfa in Montana and the region. The hay requirement to feed cattle is estimated at 5,400 tons per year.

The following table shows the most recent production figures available for Alfalfa in Montana and North Dakota by county:

ALFALFA HAY
Acreage, Yield, and Production by Counties and Districts, Montana and North Dakota, 2005

County and District	Alfalfa Hay Harvested Acres	Yield Tons	Production Tons
Montana			
Deer Lodge	4,000	3	12,000
Flathead	15,000	3.2	47,500
Granite	8,000	3.1	24,400
Lake	23,000	2.7	62,900
Lincoln	3,000	2.1	6,200
Mineral	1,000	2.3	2,300
Missoula	9,000	2.8	25,000
Powell	13,000	3.1	40,800
Ravalli	12,000	4.1	49,000
Sanders	10,000	1.4	13,900
Northwest	**68,000**	**2.9**	**284,000**
Blaine	46,000	2.5	114,000
Chouteau	24,000	2.1	50,000
Glacier	26,000	2.2	56,000
Hill	8,000	1.5	12,300
Liberty	10,000	1.7	16,900
Phillips	28,000	1.7	48,000
Pondera	24,000	2.4	57,500
Teton	47,000	2.7	128,500
Toole	15,000	1.5	22,800
North Central	**228,000**	**2.2**	**506,000**
Daniels	10,000	1	10,100
Dawson	15,500	1.9	30,000
Garfield	16,500	1.4	22,700
Mc Cone	10,000	1.9	19,200
Richland	26,000	2.3	58,500
Roosevelt	35,000	1.9	67,500
Sheridan	14,000	1.7	23,500
Valley	61,000	2.6	158,500
Northeast	**188,000**	**2.1**	**390,000**
Broadwater	29,000	4.2	121,000
Cascade	89,000	1.9	171,000
Fergus	170,000	1.4	230,000
Golden Valley	17,500	1.4	24,800
Judith Basin	72,000	1.5	110,900
Lewis and Clark	32,000	2.8	90,000
Meagher	31,000	3	93,000
Musselshell	22,000	1.7	38,000
Petroleum	12,500	1.5	18,500
Wheatland	21,000	1.8	38,800

County and District	Alfalfa Hay		
	Harvested Acres	Yield Tons	Production Tons
Central	**496,000**	**1.9**	**936,000**
Beaverhead	44,000	3.5	152,000
Gallatin	75,000	3.7	277,500
Jefferson	15,000	2.9	43,000
Madison	48,000	2.8	135,500
Silver Bow	5,000	3	15,000
Southwest	**187,000**	**3.3**	**623,000**
Big Horn	52,000	2.5	129,500
Carbon	30,000	2.6	79,000
Park	69,000	2.6	178,000
Stillwater	28,000	1.6	44,500
Sweet Grass	37,000	2.1	79,500
Treasure	11,000	2.9	31,500
Yellowstone	36,000	2.3	84,000
South Central	**263,000**	**2.4**	**626,000**
Carter	41,000	0.9	38,200
Custer	51,000	2.2	114,000
Fallon	40,000	1.3	51,300
Powder River	55,000	1.5	82,000
Prairie	18,000	1.9	34,000
Rosebud	62,000	2.1	128,500
Wibaux	23,000	1.6	37,000
Southeast	**290,000**	**1.7**	**485,000**
Montana Totals	**1,750,000**	**2.2**	**3,850,000**
North Dakota			
Burke	14,000	1.43	20,000
Divide	15,000	1.53	23,000
Mountrail	37,000	1.95	72,000
Renville	8,000	1.88	15,000
Ward	24,000	2.54	61,000
Williams	38,000	1.68	64,000
Northwest	**136,000**	**1.88**	**255,000**
Benson	13,000	1.77	23,000
Bottineau	19,000	1.95	37,000
Mc Henry	50,000	1.8	90,000
Pierce	13,000	2.46	32,000
Rolette	20,000	2.4	48,000
North Central	**115,000**	**2**	**230,000**
Cavalier	4,000	2	8,000
Grand Forks	6,000	2.17	13,000
Nelson	6,500	3.08	20,000
Pembina	6,000	2.17	13,000
Ramsey	5,000	2.8	14,000
Towner	5,000	1.8	9,000
Walsh	6,500	2	13,000

County and District	Alfalfa Hay		
	Harvested Acres	Yield Tons	Production Tons
NORTHEAST	**39,000**	**2.31**	**90,000**
Dunn	110,000	2.06	227,000
McKenzie	53,000	1.7	90,000
Mc Lean	30,000	1.7	51,000
Mercer	59,000	1.85	109,000
Oliver	38,000	2.05	78,000
West Central	**290,000**	**1.91**	**555,000**
Eddy	16,000	2.06	33,000
Foster	7,000	2.43	17,000
Kidder	103,000	1.7	175,000
Sheridan	17,000	1.82	31,000
Stutsman	45,000	2.44	110,000
Wells	12,000	2.83	34,000
Central	**200,000**	**2**	**400,000**
Barnes	11,000	2.36	26,000
Cass	13,000	3.69	48,000
Griggs	13,000	2.69	35,000
Steele	4,500	2.44	11,000
Traill	3,500	2.86	10,000
East Central	**45,000**	**2.89**	**130,000**
Adams	47,000	1.53	72,000
Billings	65,000	1.91	124,000
Bowman	48,000	1.4	67,000
Golden Valley	25,000	1.8	45,000
Hettinger	30,000	1.83	55,000
Slope	33,000	1.85	61,000
Stark	72,000	2.24	161,000
South West	**320,000**	**1.83**	**585,000**
Burleigh	90,000	1.78	16,000
Emmons	53,000	2.28	121,000
Grant	62,000	1.74	108,000
Morton	105,000	1.71	180,000
Sioux	50,000	1.52	76,000
SOUTH CENTRAL	**360,000**	**1.79**	**645,000**
Dickey	26,000	2.81	73,000
La Moure	15,000	3.73	56,000
Logan	37,000	1.97	73,000
McIntosh	36,000	2.67	96,000
Ransom	13,000	3.92	51,000
Richland	10,000	3.6	36,000
Sargent	8,000	3.13	25,000
SOUTHEAST	**145,000**	**2.83**	**410,000**
North Dakota Totals	**1,650,000**	**2**	**3,300,000**
Regional Totals			

Last updated June 6, 2004

Feeder Cattle Sourcing & WDB Feeding

1. *Availability of Feeder Cattle*

Montana is a large beef cattle producing state, ranking twelfth in the nation. In 2005 Montana had a calf crop of 1,480,000 head. However, total cattle inventory in Montana has declined dramatically since the early 1970s. The total number of cattle reached a peak in 1974, but declined through 1991. Although there has been some cyclical variation in cattle inventories, those in Montana have ranged from a low of 2.33 million head in 1991 to a high of 3.38 million in 1974.

Montana Calf Crop 2000-2005			
Year	**State**	**Period**	**1000 Head**
2000	MT	Jan 1 - Dec 31	1620
2001	MT	Jan 1 - Dec 31	1570
2002	MT	Jan 1 - Dec 31	1520
2003	MT	Jan 1 - Dec 31	1540
2004	MT	Jan 1 - Dec 31	1520
2005	MT	Jan 1-Dec 31	1480

Source: USDA National Agriculture Statistics Service, Montana office, 2006

With only 60,000 head of beef cattle on feed of the 1.48-million-calf crop, it is obvious that Montana is a feeder cattle exporter.

The proposed ethanol plant will require access to over 65,000 head per year for the feedlot. Feeder cattle numbers are more than adequate to meet this demand. As the Inventory by Counties table below indicates, there are 668,000 head available in Roosevelt County and the Montana counties closest to it (counties with asterisks in the table below). In addition there are over 160,000 head available in the North Dakota counties closest to the proposed plant, as well as 977,000 head available from Saskatchewan, Canada.

BEEF COWS & HEIFERS THAT HAVE CALVED

Inventory by Counties, January 1, 2006, Montana, USA
North Dakota USA, and Saskatchewan, Canada

County & District	2005	Rank
Deer Lodge	8,900	52
Flathead	11,900	51
Granite	21,300	41
Lake	44,000	21
Lincoln	2,900	55
Mineral	700	56
Missoula	8,700	53
Powell	41000	26
Ravalli	34,000	32
Sanders	17,600	45
Other	--	
NORTHWEST	191,000	--
*Blaine	67,000	11
*Chouteau	34,000	33
*Glacier	43,000	23
*Hill	21,000	42
*Liberty	12,400	50
*Phillips	69,000	10
*Pondera	23,300	38
*Teton	45,000	20
*Toole	13,300	48
Other	--	--
NORTH CENTRAL	328,000	--
*Daniels	14,600	47
*Dawson	39,000	28
*Garfield	61,000	12
*McCone	28,000	35
*Richland	56,000	17
*Roosevelt	31,300	34
*Sheridan	24,100	37
*Valley	86,000	5
Other	--	--
NORTHEAST	340,000	--
Broadwater	16,600	46
Cascade	70,000	9
Fergus	94,000	3
Golden Valley	13,200	49
Judith Basin	58,000	13
Lewis & Clark	40,000	27
Meagher	47,000	19
Musselshell	37,100	29
Petroleum	18,000	44
Wheatland	26,100	36
Other	--	--
CENTRAL	420,000	--

County & District	2005	Rank
Beaverhead	138,000	1
Gallatin	57,000	15
Jefferson	22,300	40
Madison	73,000	8
Silver Bow	5700	54
Other	--	--
SOUTHWEST	296,000	--
Big Horn	90,000	4
Carbon	57,000	16
Park	42,000	24
Stillwater	44,000	22
Sweet Grass	36,000	30
Treasure	23,000	39
Yellowstone	120,000	2
Other	--	--
SOUTH CENTRAL	412,000	--
Carter	53,000	18
Custer	74,000	7
Fallon	42,000	25
Powder River	58,000	14
Prairie	36,000	31
Rosebud	81,000	6
Wibaux	19,000	43
Other	--	--
SOUTHEAST	363,000	--
OTHER DISTRICTS	--	--
MONTANA	**2,350,000**	--
NORTH DAKOTA	**160,300**	--
Williams	30,000	--
McKenzie	61,000	--
Divide	17,000	--
Burke	13,300	--
Mountrail	39,000	--
North West ND Total	**160,300**	--
SOUTHERN SASKATCHEWAN	**977,000**	

[1] Counties with less than 500 head or individual operators having 60 percent or more of the head are combined into "other" counties to avoid disclosure of individual information.

Sources: USDA National Agriculture Statistics Service, Montana office, 2006
USDA National Agriculture Statistics Service, North Dakota office, 2006
Canadian Agriculture, office of John Ross, Director of Red Beef, 2006

2. Feedlots

As mentioned above, only a small percentage of Montana's calf crop is sent to feedlots in the state. Only 70,000 were on feed in 2004 and there were 60,000 on feed in lots in 2005.

CATTLE AND CALVES ON FEED

Total on Feed, January 1, Montana, USA

Year	Total Cattle and Calves on Feed
2005	60,000
2004	70, 000
2003	70, 000
2002	70, 000
2001	60, 000
2000	70,000
1999	70, 000
1998	80, 000
1997	85, 000
1996	105, 000

Source; USDA National Agriculture Statistics Service, Montana office, 2006

3. Cattle Transportation Costs

Slaughter cattle will weigh between 1250 and 1325 pounds at time of shipment to processors. Typically trucks can carry up to 50,000 pounds, so will carry from 34 to 40 head of slaughter cattle per load. Transporting fat cattle will cost $3.15 per loaded mile per head. From Wolf Point to Long Prairie Meat Co. (American Food Groups), in Long Prairie, Minnesota would be about 635 miles. This plant is among the closest plants to the feedlot site. The cost would be $58.83 per head in transportation costs, or $4.00 per hundredweight. For 62,000 head to be moved to Long Prairie, Minnesota, the cost can roughly be estimated at 62,000 times $58.83 totaling close to $3.65 million. Transportation costs are greatly affected by rising fuel costs, and it is not certain when this trend may stabilize. Obviously, the further the processing plant is from Wolf Point, the higher the costs will be. (See table below).

There is a major processor closer to the proposed feedlot. Excel's plant in Moose Jaw, Saskatchewan, Canada, is only 201 miles from the proposed Wolf Point Ethanol Plant. However, border crossings with cattle are subject to the political climate, the occasional health scare (BSE), and to the constantly changing currency exchange rate between Canada and America. At the time of this writing, the Canadian dollar is being exchanged at 1C$=US.90. If the price of fuel keeps rising, the Canadian option must be looked at more closely.

The following table shows the processors that are nearest to the proposed Wolf Point ethanol plant, with an estimate of the transportation costs involved based on current (Spring 2006) fuel costs:

Meat Processors & Distances from Wolf Point

Packer	Location	Miles from Wolf Point	Estimated Transportation Cost ($3.15/mi for truckload of 40 slaughter steers)
Excel/Cargill Meat Packing Plant	Moose Jaw, Sask. Canada	201	633
Tyson Fresh Meat	Brooks, Alberta, Canada	444	1399
Excel/Cargill Meat Packing Plant	High River, Alberta, Canada	521	1641
Smithfield Foods	Gering, Nebraska	768	2419
Miller Blue Ribbon Beef	Hyrum, Utah	834	2627
XL Meat Packing.	Greeley, Colorado	832	2620
Agri-Processors	Gordon, Nebraska	564	1777
Excel/Cargill	Ft. Morgan, Colorado	888	2797
Tyson Fresh Meat	Boise, Idaho	955	3008
Long Prairie Meat Co. (American Food Groups)	Long Prairie, Minnesota	635	2000
XL Meat Packing	Nampa, Idaho	974	3068
Dakota Premium Foods) American Food Groups)	St Paul, Minnesota	741	2334
Cimpl's (American Food Groups)	Yankton, South Dakota	810	2551
Tyson Fresh Meat	Lexington, Nebraska	820	2583
Tyson Fresh Meat	Dakota City, Nebraska	822	2589
Swift and Co.	Grand Island, Nebraska	836	2633
Tyson Fresh Meat	West Point, Nebraska	877	2763
XL Meat Packing	Omaha, Nebraska	912	2873
Tyson Fresh Meat	Joslin, Illinois	1105	3480
Tyson Fresh Meat	Holcomb, Kansas	1158	3648
Excel/Cargill	Dodge City, Kansas	1246	3924
U.S. Premium Beef	Liberal, Kansas	1261	3972
Tyson Fresh Meat	Emporia, Kansas	1196	3767

Source: USDA GIPSA (grain inspectors, packers and stockyard administration) 2006
www.mapquest.com (for mileage figures)

The ability of the feedlot component of the proposed Ethanol plant to contribute to overall profitability is dependent on its ability to compete with other feedyards. A more extensive look at the cattle feeding industry and the trends affecting this segment is contained in the Markets and Policy Issues Feasibility, Chapter IV.

As shown above, several of the Canadian facilities are significantly closer to the proposed complex than the nearest US plants; however, the unfavorable exchange rate results in approximately a 10 percent discount in price received. Despite the lower transportation costs, the more-distant US processor is still more profitable. The following table displays the net cost differences between selling to a Canadian processor and the nearest US processor. Unless fuel costs continue to rise, selling slaughter cattle into Canadian processing plants does not appear to be a feasible alternative.

Canadian vs. US Slaughter Cattle Sales Comparison
Wolf Point Indian Community Ethanol Plant

Processor	Distance from Wolf Point	Price Received (USD Equivalent)	Shipping Cost	Net Price Received
Excel Meat Processors (Moose Jaw, Saskatchewan, Canada)	201	$77.15/CWT	$1.31/CWT	$75.84/CWT
Miller Blue Ribbon Meat Plant (Gering, Nebraska)	769	$85.00/CWT	$5.04/CWT	$79.96/CWT

4. Adjustment for Cattle Transportation Costs

The feedyard proposed as an element of the ethanol plant will be caught at a competitive disadvantage because of cattle transportation costs. However, because the feedyard would be an integral component of the complex, there are internal costs and allocations that could be used as a means to cost support the cattle owner for feeding in the feedyard. Because the material flows to and from each component of the plant (WDG from ethanol plant to feedyard) and as some of the costs are managed internally, there appears to be potential cost sharing opportunities. For the purposes of this study, a value of $5.70 per ton (dry matter basis) will be deducted from feed ration markup to compensate for higher transportation costs and will make this feedyard competitive in the regional marketplace.

Concluding Comments and Recommendation

This study has determined that a Wolf Point ethanol plant/feedlot complex is economically feasible; however, there are certain risks that need to be managed. The availability of grain feed stocks and a steady supply of feeder cattle need to be planned and managed very professionally. Experienced, qualified grain merchants or buyers need to be employed that understand the volatility of grain markets in the region and can execute purchases and sales of products based on a sound risk management plan. The choice of feedstocks and transportation costs of cattle to processing will affect profitability of the complex.

1. *Feed Stocks Availability*

Grain prices are affected by a number of factors including, weather, imports, national reserves, domestic consumption, government policy, and changing consumer demands among others. The Wolf Point complex also has to deal with the added risk of transportation costs of grain to the plant. If insufficient grain feedstocks are available in Montana, feedstocks may need to be imported from the Midwest, the northern plains, or Canada. As will be shown in the financial chapter, transportation and handling costs of approximately $1.00 per bushel of No. 2 yellow corn imported from the northern plains can be sustained by the proposed plant. Short season corn is a viable option for feedstocks, but it will require significant time for framers to adopt this grain as a rotation crop. Clearly, the northern tier of counties in Montana can grow substantial amounts of barley.

2. *Feeder Cattle Availability*

Montana's annual calf crop is more than enough to support a feedyard of the size proposed ethanol complex in Wolf Point; however, there has never been a significant cattle-feeding industry in Montana because of the distance to processors. This economic risk can be overcome if approached by competent feedyard management. The feedyard could potentially be at a competitive disadvantage because of cattle transportation costs. Because the feedyard is an integral component of the complex, and material flows are managed internally, there appears to be a potential cost sharing opportunity for cattle owners.

The feasibility of maintaining optimum feedlot capacity relies upon the effective management of the facility as a custom feedyard. Historically, calves raised in the western US are transported east to the High Plains region (CO, NE, KS, OK, TX) to custom feedyards for finishing, whose location is strategically adjacent to the nation's beef processing centers. It is typically more cost effective to transport lightweight feeder cattle longer distances than to haul slaughter weight steers and heifers from remote locations to the processor. In the proposed complex, cattle transportation costs place it in a competitive disadvantage when compared to the feedyards in the central region of the US. In order for the proposed feedyard to be competitive and maintain optimum capacity, the complex needs to be managed in a manner that will offer freight subsidies to cattle feeding customers to attract their business. As well, feedyard management may need to consider alternative channels for securing enough cattle flow through the yard. Niche or specialty beef companies with specific feeding and management regimens would be able to manage the feeding phases efficiently if feedyard management was able to develop program-specific practices for them. Also, the non-beef (dairy) segment of the industry may be an additional solution to the capacity issue. Several western states have significant numbers of dairy cattle; all of the male calves and a portion of the female calves end up being fed for slaughter. The proposed feedyard is well suited for dairy-type steers and heifers and their unique management requirements.

3. *Grain Elevator Availability*

There are two grain elevators within a three-mile radius of the preferred site. Columbia Grain Elevator is approximately three miles away and has a 110-rail car spur for loading and unloading grains. Columbia has a 750,000-bushel capacity for wheat, barley, or corn and would have no problem supplying all of the ethanol plant needs for grain. Harvest States Grain Elevators are only a half mile away from the preferred site, and also have a 110 rail car spur. Harvest States has a capacity of 1.2 million bushels, but utilize their facility only for wheat. Most of their storage is already contracted, but they would be willing to negotiate if the price is right.

III. Market Feasibility

Ethanol Markets
by Durante Associates, Inc.

Summary

- There is a solid and growing demand for ethanol as it has become a mature and accepted motor fuel additive. It is being used successfully in clean air programs across the country and has also seen demand as a result of the elimination of MTBE at the state level.
- There are no technical, environmental, or market obstacles to the continued growth of ethanol over the next decade.
- The establishment of a federal renewable fuel standard assumes market growth for the next five to seven years. This has occurred at the same time that world crude oil prices have skyrocketed, thereby increasing the value of fuel ethanol.
- The partial federal excise tax exemption was extended in 2004 through the year 2010 and provides the economic base for ethanol to be sold in the fuel market. The industry has expanded significantly over the last several years, resulting in a solid base of political support. It is recognized as an important economic development measure as well as being an important element of energy and environmental programs.
- The demand and price of ethanol have been significantly affected by federal legislative action and even in low growth scenarios; we believe ethanol can successfully be marketed from a Montana facility with a netback to the plant of $1.65.
- A variety of scenarios could unfold that would substantially increase ethanol value. In 2004 ethanol prices increased by more than 40 cents over the previous year, last year it increased another 17 cents, and is unlikely to fall below levels discussed in the report.
- This project will be located in a region that has higher than average ethanol and gasoline prices.
- Preliminary discussions have been held with an established marketer who has indicated high interest in taking the product.
- A successful marketing strategy, achieving the maximum net back to the plant, is critical to its success.

General Overview of the US Ethanol Industry

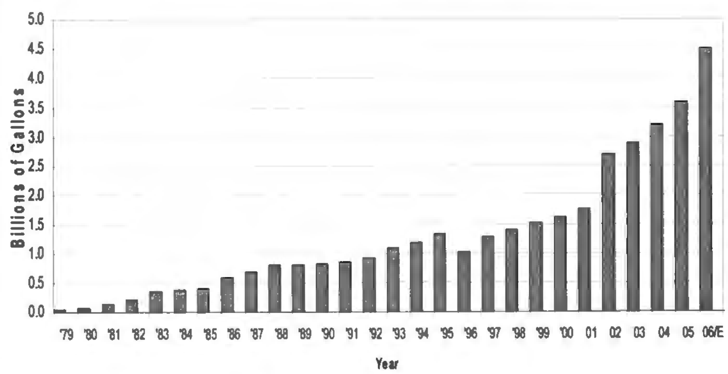
A. Background

Montana has passed legislation providing a producer payment and also established an in-state use requirement that could be of immense value to this project.

Ethanol has been used in motor fuels in the United States for the last century, but for all practical purposes had not been used commercially until 1978. At that time a deliberate public policy objective to create a fuel-grade ethanol industry was established by Congress when they created an excise tax exemption in order to incentivize the production of ethanol from renewable resources. The industry has grown from virtually zero production at that time to a current annual production level of approximately 4.5 billion gallons (see Figure B-1) with approximately another two billion gallons coming on line over the next two years. Although initially a Midwest phenomena, ethanol use is now extending to both coasts with virtually every state having used at least some amount of ethanol during that time, and many eastern states getting into the production of ethanol.

A combination of several factors such as the establishment of federal renewable fuel requirements, high crude oil & gasoline prices, the elimination of MTBE from the market, and a groundswell of public and political support has resulted in an explosion in growth over the past year. Montana was a classic example of a state that was often challenged to go forward with an ethanol facility until the public policy driving ethanol demand was clarified. This has occurred with the passage of national energy legislation last year, and should pave the way for a successful entry into the U.S. motor fuel market.

Figure B-1. U.S. Fuel Ethanol Production 1979-2006



Source: Clean Fuels Development Coalition

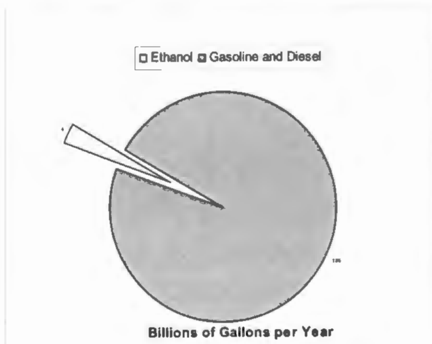
In addition to the above noted factors it is also important to recognize the key role of the federal incentive, which makes it possible for ethanol to be competitive with gasoline. It is extremely unlikely fuel ethanol production would continue without the tax exemption, certainly not at the levels we are currently witnessing. It is not a certainty that the tax exemption would be extended beyond its current expiration date of 2011, at least not in its current form. This section discusses some of the major influencing factors, how that has and will continue to shape the national market and what affect it has on regional markets.

B. National Ethanol Sales and Supply

Ethanol has been used primarily as an octane enhancer due to the fact that 10 percent ethanol blends (the legal limit for blending in conventional automobiles) adds 3 points of octane. It is also used as a gasoline extender in that it is added in 10 percent volume blends to stretch supply. While in the context of a national energy debate the fact that ethanol extends gasoline supplies is positive, it also displaces gasoline which is not always in the interest of the petroleum industry. The product has often been discounted or sold at prices under its value, particularly with respect to the octane, in order to entice the petroleum industry to purchase it. Therefore, ethanol historically has created its own market more so than meeting a market demand. Recent developments such as the renewable fuels standard and the elimination of MTBE have for the first time resulted in a true market demand, but that demand will be met in time and ethanol will once again have to be competitively priced under gasoline in some regions.

The national market for gasoline in the US is approximately 135 billion gallons per year. It has not been difficult for a market of that size to absorb an additive that represents less than three percent (see Figure B-2).

Figure B-2. Ethanol Represents Small Sliver of U.S. Petroleum Pie



C. Clean Air Requirements

Clean air programs have provided both the single biggest catalyst for ethanol production in its history, and at the same time modifications to those programs have resulted even more dramatic changes, such as we are seeing today.

Provisions in the Clean Air Act Amendments of 1990 (CAA) resulted in the establishment of two fuel formulations that changed the entire marketing outlook for ethanol. The first of these is designed to combat carbon monoxide and requires that wintertime fuels in certain areas contain an oxygen content that could only be met by ethanol or a methanol-based ether (MTBE). Rather than ethanol scrambling to find a home, it now became a valuable and often required component of gasoline. This has been an effective program with many of the cities experiencing carbon monoxide exceedances now coming into compliance.

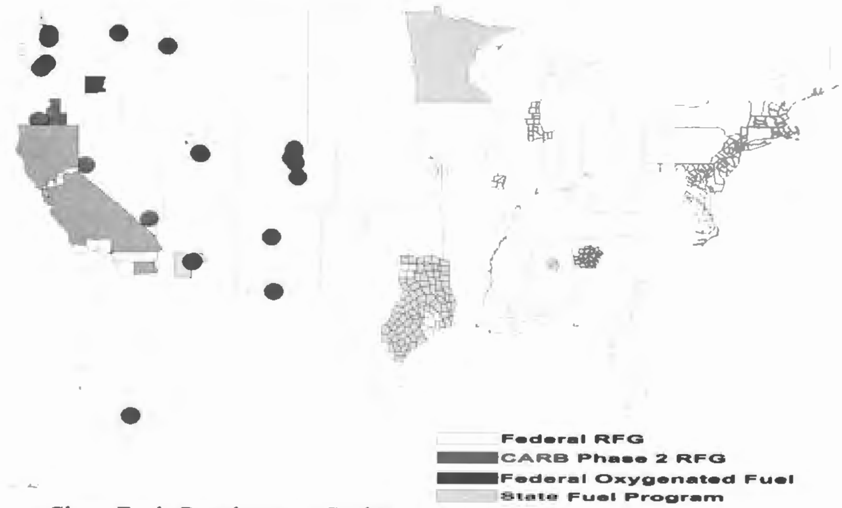
The second key program utilizing oxygenates deals with ozone, or summertime smog, and is the Federal Reformulated Gasoline (RFG) Program. Nine US cities, by law, and more than a dozen others have elected to use the RFG recipe for gasoline that controls a number of fuel properties such as vapor pressure and toxic content. Until May of this year (2006) this formulation also required a minimum oxygen content, which can be met by 5.7 percent volume ethanol. This program has been extremely effective as well although ethanol had not been used in this program in any significant quantities outside of the Chicago region until 2004. *A complete list of areas affected by the two clean fuel programs is below in the Appendix to this chapter. See page 70)*

The breakdown of ethanol use historically has been approximately 40 percent used in conventional gasoline, 35 percent used in oxygenated fuel programs during the winter months, and the remaining 25 percent in reformulated gasoline. With MTBE bans taking effect throughout the US over the past several years, that situation changed drastically as evidenced by an increase in RFG share to more than 60 percent in 2003 to nearly 100% until May of 2006, when the requirement for oxygen was repealed. The Reformulated Gasoline Program currently affects 1/3 of the Nation's gasoline.

There continues to be significant demand for ethanol as a clean additive in RFG, even though it is no longer required. The petroleum industry argued for years that they could meet emission standards without having to add oxygenates like ethanol but as it turns out they do not have many options and the demand for ethanol in these programs remains strong—to a point. This will be discussed in greater detail in the demand section.

Most of the clean fuel programs are required in the highly populated coastal areas, as illustrated by the map in Figure B-3. Despite the fact that ethanol had enjoyed significant growth as a result of the oxygen requirement in the above discussed clean fuel programs the nationwide demand created by the oxygen requirement was primarily met by the methanol-based ether MTBE. As much as 85 percent of the oxygen market was at times captured by MTBE. This was due to a number of technical advantages MTBE had with respect to vapor pressure, transportation, and at times, cost. Simply put, MTBE was a more easily utilized additive than ethanol for refiners and became the oxygenate of choice. The original establishment of the oxygen requirement was in part intended to spur development of ethanol in the US and policymakers did not foresee the advantages MTBE would have. Therefore, as a pure catalyst for ethanol development, the oxygen program had fallen short.

Figure B-3. U.S. Clean Fuel Requirements



Source: Clean Fuels Development Coalition

Despite the effectiveness of MTBE in reducing harmful auto emissions, in nearly every area of the country where it was being used it became evident that even small amounts of MTBE can contaminate large amounts of water. There had been a steady stream of efforts to eliminate MTBE in the US Congress for the last several years and many refiners have completely stopped using MTBE. MTBE has necessitated the closing of public drinking water wells throughout California and has been an extremely controversial issue in that state. After several delays, the state has enacted a complete ban of MTBE, which took effect in January 2004. Acting on the lead of California, the huge east coast market of New York and Connecticut also enacted a complete ban. Twenty states have acted to ban MTBE or are considering various types of legislation to ban, control, or otherwise limit its use, including Montana, but it is unlikely to have a significant effect on ethanol demand since little MTBE was being used in the state.

The entire Reformulated Gasoline Program came under scrutiny because the oxygen content was such a fundamental part of the formula. A powerful movement developed calling for the repeal of the oxygen standard. Clearly, repealing the oxygen standard would reduce the amount of MTBE used in gasoline since most of it was used to meet this standard. The option of ethanol taking over the entire market raised a number of issues concerning supply, cost, environmental, and public health effects of ethanol, subsidy levels, and many other issues. Although that transition took place without any major difficulties in the California and New York markets, referencing the previously described issues handing over the RFG market to ethanol was not a popular idea. Due to the likelihood that refiners would use ethanol at minimum levels to meet oxygen requirements, it is a limited market. In addition, cleaner conventional gasoline through lower sulfur levels have somewhat reduced the value of oxygenates -- although not as much as had been thought and not as evident in the short term -- and newer vehicles have continued to reduce emissions utilizing conventional gasoline. The petroleum industry remained steadfastly opposed to ethanol use when ethanol would be the only oxygenate in a clean fuel program. They obviously have considerable influence in this arena and weakened political support for the oxygen component of the RFG Program.

Despite the problems of MTBE, it provided refiners with an accessible and easily handled product, which many believe ethanol is not.

D. Renewable Fuels Standard (RFS)

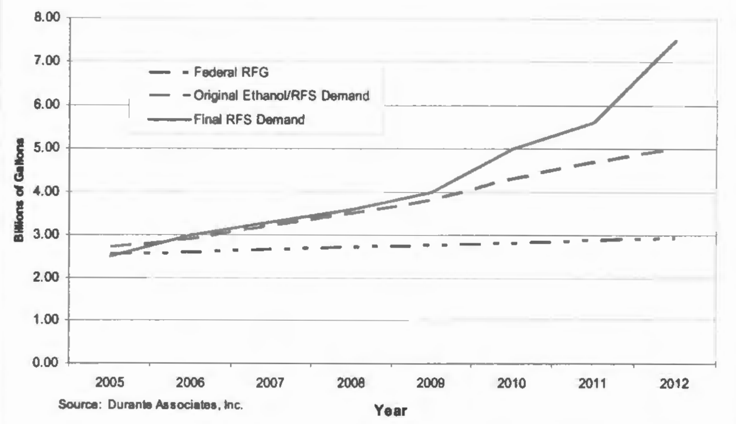
Despite the fact that MTBE captured the majority of the oxygen demand resulting from the RFG program, much of the ethanol production during the mid to late 1990's was in direct response to the oxygen demand. Therefore, simply repealing the oxygen demand was argued by the ethanol industry as leaving them without much of the market they had hoped to supply.

These problems with the reformulated gasoline program led many supporters of ethanol in Congress to devise a new strategy to provide the market assurance ethanol needs for the industry to grow. This strategy is embodied in a concept to require that all motor fuels have a renewable content, which in all practicality can only be met by ethanol. This concept is modeled after efforts in the utility industry to establish a renewable portfolio standard under which utilities would be required to generate some small portion of their electricity using renewable resources. In the case of a renewable fuel standard, this approach would, for the first time, create true "demand" and establish a gradual increase in usage over the next decade necessitating a steady and regular increase in production. This is an extremely important program for a Montana project and could be a determining factor in the decision to build a facility.

Since the time of the initial introduction of this idea, the renewable fuels standard (RFS) had been included in several legislative vehicles and was a very popular proposal. The US Senate adopted the RFS in both energy and environmental legislation and on three separate occasions overwhelmingly voted for such a program. From 2000 to 2005 the RFS was the key element of efforts to pass national energy legislation in that it was something all parties agreed to. Other, more controversial issues like Alaska oil exploration and fuel economy standards kept stalling the bill. In hindsight this turned out to help the ethanol industry because as years went by and the debate continued, the amount of ethanol that would be required kept inching up. Passage of the RFS in some of its earlier versions would have resulted in a substantially lower demand than we are now seeing (see Figure B-4). In addition to the US Senate where the RFS had its origins, the RFS picked up a groundswell of support, including the Bush Administration, the overwhelming majority of the nation's Governors, environmental and health groups, virtually all of American agriculture, and even the American Petroleum Institute. Quite simply, the RFS was seen as an effective way to increase ethanol production, reduce MTBE, and provide flexibility in clean fuel requirements for the petroleum industry (thus explaining their support).

The final version of the legislation far surpasses earlier versions (see figure B-4). In addition, the RFS demand is significantly better than the RFG demand, even if MTBE market share is completely captured.

Figure B-4. Ethanol Demand From Renewable Fuel Standard vs Federal Reformulated Gasoline



Previous studies concerning the feasibility of a Montana project highlighted the importance of establishing this RFS, and until August of 2005, when the National Energy Policy Act was signed by the President, it had been mired in a political entanglement that made the future demand for ethanol uncertain.

The RFS clearly defines the market now. Retention of the oxygen requirement in reformulated gasoline was a limited growth market. From a national perspective a Montana project would have been challenged to compete with mature facilities currently serving the previously discussed California and New York markets. Conversely, a national requirement for ethanol creates significantly higher and more overall demand, easily absorbing the level of production being contemplated by a Montana plant. It is important to keep in mind that since it does not rely on pollution controls, the RFS can be met anywhere and ethanol does not need to be transported to metropolitan areas.

Finally, and this will be discussed in more detail again in the demand and pricing section, ethanol can still be used in the reformulated gasoline program, it simply is not required. A demand will still exist in those programs.

E. Regional Programs

In addition to the federal programs described above, some areas of the country have adopted their own programs in order to stimulate ethanol use. This was quite common in the 1980s when many areas experiencing carbon monoxide problems adopted their own programs. This was the case in Phoenix, Arizona; Denver, Colorado; Boise, Idaho; Albuquerque, New Mexico; and several other areas. Several of those areas continue to have customized requirements that result in some ethanol demand, but most have become part of the nationwide programs established in the Clean Air Act. Despite the major change in the RFG program, the carbon monoxide program at the federal level remains in place and these regional requirements are used to stay in compliance with these clean air standards.

Two regional programs that would benefit the Montana project are in Phoenix Arizona and Las Vegas (Clark County), Nevada. Both those areas rely on ethanol for all or part of the year and would be potential markets.

The single largest market not reliant on federal policy is the State of Minnesota, which took the bold step of requiring an oxygen content in all gasoline sold in the state. Having banned MTBE, this resulted in a de facto ethanol mandate. They later converted the program to a 10 percent ethanol requirement. The demand in the state is met almost entirely by Minnesota ethanol production, which also benefited from an aggressive producer incentive program that resulted in nearly 20 production facilities being built over a five-year period. With all of their gasoline using ten percent ethanol blends Minnesota has now adopted a requirement for 20 percent, although that program can be met with increased use of E85 rather than necessarily having all cars run on 20 percent blends. In short it requires the equivalent amount of ethanol to be used in the state if all gasoline was 20 percent ethanol. The requirement does not take effect until 2010 and by then there could be significant changes in the availability of E85. While the Minnesota program helps absorb national levels of ethanol, it is unlikely a Montana project would supply ethanol to Minnesota.

The prospect of more states adopting a local requirement that either directly or indirectly requires ethanol is uncertain. A popular idea at one time, it has been replaced to some degree with incentives that emphasize production. These incentives are generally viewed as providing more benefit back to the state. However, given the recent explosion in growth of production, states are rethinking the usage incentives as a complimentary program. Montana's 10 percent ethanol requirement could be a significant factor in building a plant in Montana, although the design of the legislation is somewhat questionable. The bill takes effect as in-state production becomes available, but there is no assurance that supply wouldn't be met by production from another state. That legislation may need to be tweaked in the future.

F. E-85

Much of the discussion surrounding ethanol relates to its use in reformulated gasoline, and with good reason. The RFG Program, or its potential substitute RFS, will create significant, high value demand. However, the use of ethanol in much higher concentrations of 85 percent is a small, but growing market.

Alternative, non-petroleum fuels are generally thought of as those that displace large quantities of fuels. Natural gas, electricity, propane, and methanol have successfully been used as transportation fuels. There are some Energy Policy Act and Clean Air Act requirements aimed at fleets, since they are usually centrally refueled, that requires them to operate on these alternatives. Ethanol is the only non-petroleum fuel that can be easily mixed with gasoline so there was little incentive to become a player in the alternative fuel arena when its value was often greater as a blending additive.

The shortcomings of these other fuels, and the fact that conventional vehicles can be easily modified to operate on E-85, have changed that. All three US automakers now manufacture E-85 automobiles and the market is growing. Fleets, usually defined as groups of a dozen or more vehicles, are still subject to requirements that they utilize alternative, non-petroleum fuels, and E-85 is gaining in popularity. The use of E-85 results in significant reductions of

CO2, a so called "greenhouse gas" that has been linked to concerns of global warming. This may continue to spark interest in E-85 and result in new demand. Currently, E-85 accounts for less than two percent (2%) of ethanol sales, but is expected to grow over the next decade and may offer new market opportunities for ethanol.

There have been numerous bills introduced in the U.S. Congress since the passage of the Energy Bill last year specifically aimed at E85. Targeted tax incentives for refueling infrastructure (pumps, tanks, etc) have been a popular idea. Requirements that petroleum distributors make E85 pumps available as well as mandates that require automakers to make more flexible fuel vehicles available could combine to push this sector to the point where it represents a much larger demand than previously thought. And, it is important to the ethanol industry to develop this demand. It may be much more practical than previously believed to produce enough ethanol for all the gasoline in the U.S. to contain ten percent blends. While impressive, in the context of reducing our dependence on oil it might represent only 10% displacement. E85 and Flexible fuel vehicles would be critical to moving beyond that limitation.

Factors Affecting Ethanol Demand

A. Overview & Background

One of the most difficult components of an ethanol project to quantify is demand for the ethanol itself. Historically the industry has been able to sell every gallon it produces, so in some respects there is a constant demand. Over the years the issue has been price more than demand. The foundation of the ethanol industry has been the fact that it receives a lower tax rate by way of a partial excise tax exemption when blended with gasoline. For many years during the early evolution of the industry demand was set by price and ethanol historically sold at or just under wholesale gasoline prices. **The demand would vary depending on the ability of refiners to meet octane requirements through other means.** (This is a very important point we will come back to when discussing the current high price of ethanol.) And, in order for them to choose ethanol, it had to be priced below gasoline. There is no interest on the part of refiners to replace their own product with another product unless there are attractive margins.

B. Clean Fuel Programs:

a) Carbon Monoxide/Wintertime Oxy Fuel

The situation regarding demand changed drastically as a result of "clean fuel" programs at both the state and federal levels discussed in the preceding section (see Figure C-1). Consequently, ethanol was integrated into the gasoline pool and this created the first true "demand" for the product based on reasons other than price, although demand was seasonal. Often referred to as the "oxy fuel" or CO (carbon monoxide) program, this provision was adopted at the federal level and was initially required in approximately 40 cities across the US. Ethanol has been a very effective component of this program and remains so today.

The long-range demand created by this program is unclear, however, since cities that eventually come into compliance for carbon monoxide standards no longer are required to use the fuel. From time to time compliance is achieved and demand fluctuates slightly. Generally, however, carbon monoxide is a somewhat constant problem and this program should represent somewhere between 750 million and one billion gallons per year of true ethanol demand in the near term.

Figure C-1. Key Clean Gasoline Programs

- **Carbon Monoxide Control**
  - 39 Cities in violation of standard.
  - Required to use gasoline containing 2.7% (wt) oxygen during winter months -- (7.7% ethanol/15% MTBE)
  - Extremely effective -- nearly 2/3 have come into compliance, 20-30% reduction.
  - Created instant demand of 500 million+ gallons

- **Ozone -- Reformulated Gasoline**
  - 9 U.S. cities by law -- a dozen more by choice
  - Vapor pressure controls and oxygen -- 2% (wt) -- (5.7% ethanol/11% MTBE)
  - Key emission categories affected:
    - VOCs (exhaust and evaps); Toxics (benzene); NOx; CO
  - Created another 500 million+ gallons demand

MTBE captured majority of demand

Source: Clean Fuels Development Coalition

b) *Reformulated Gasoline (RFG)*

The other program established in the Clean Air Act Amendments of 1990 that required oxygenates and discussed in the previous section was the federal Reformulated Gasoline Program (RFG). Nine cities are identified in the Act as being in noncompliance with ozone standards and consequently were required to adopt a fuel formula that affected a number of emission properties. One of the elements to achieve these emission reductions was the addition of oxygenates. Unlike the Carbon Monoxide Program, RFG was a year-round requirement thus stabilizing the demand for oxygen and creating more sustainable opportunities. Unfortunately, the one competitor to ethanol in terms of providing that oxygen content was the methanol based ether MTBE. Because MTBE is a petroleum-based additive, it was preferred by refiners and captured an overwhelming majority of the year-round oxygen market. A direct demand for ethanol from that program was approximately 500 million gallons, less than 20% of the oxygen market. Due to supply and price issues, the use of ethanol in RFG was limited to Chicago, Milwaukee, and a few other isolated areas. Major reformulated gasoline markets in California, Texas, and the Northeast all used MTBE. From 1992 to 1998 ethanol grew at a very modest rate as its demand was limited to the wintertime oxygen program and as a source of octane. That situation has literally reversed itself as ethanol demand has gone up at the same time MTBE use has gone down. With the federal oxygen requirement now eliminated, refiners have the option of using ethanol and for each refiner the decision-making process to do that or not will be different. Therefore, this clean fuel program also represents an undefined demand. Oxygenates were required to ensure reduction of carbon monoxide in the RFG recipe, but they also allowed refiners to meet restrictions on the aromatic content of gasoline which usually increased as they refined a higher octane gasoline. Ethanol served a double duty and it may retain that value, even without being required.

C. Future Trends

It is important to keep in mind that the ethanol agenda in Washington is completely driven by politics, and right now the politics have all aligned themselves in support of ethanol.

The ethanol demand is for the most part set in stone in the form of the RFS, and if changed would only increase. There is a tax exemption in place through the year 2010 that could be modified but will most likely remain intact until then. World crude oil prices are expected to continue to surpass all historical levels and even if they recede to a $40 and $50 per barrel range, (from the current $60 and $70 range) an ethanol plant should still be competitive. Regardless of price, the public and their elected representatives at the federal state and local levels all seem to have grasped the dangers of U.S. dependence on imported petroleum and it is a movement that would be hard to reverse. Therefore, programs will continue to be developed that stimulate ethanol production and use. The two key factors driving demand are the RFS and the elimination of MTBE from the market.

a) Renewable Fuel Standard (RFS):

One cannot over state the significance of the renewable fuel standard. Over the 20-year history of ethanol the tax exemption has been extended a half-dozen times through a variety of legislative vehicles, ensuring its ability at least to remain competitive with gasoline. However, this did not stimulate actual demand for ethanol the way the RFS has. The explosion in growth we have witnessed over the last six years and the continuing development of ethanol capacity is due to factors related to market demand, which was anticipated—and realized—through the RFS.

The additional scenario of Montana having adopted a 10 percent blend requirement is extremely attractive in terms of this project. The opportunity to sell ethanol in the immediate area of the plant increases the profitability by reducing transport costs.

The RFS requires 7.5 billion gallons per year of renewable fuel to be used by 2012, which is primarily going to be met with ethanol due to limitations in both the diesel market and the volume of biodiesel available. There are prescribed amounts in the years leading up to that "final" figure of 7.5. The excitement that the RFS has generated has resulted in the rate of U.S. ethanol production being well ahead of the schedule established in the energy legislation and it is possible there would be enough ethanol produced in the U.S. by mid 2008 to meet the 2012 requirement. (The RFS requirement is for consumption, not production, so supply can be and is being augmented by imports.)

There has already been new legislation introduced to increase the amount of renewable fuel required by extending and expanding the program. With investment capital available and the entire country focused on ways to reduce petroleum consumption, expanding the RFS would not be a difficult political achievement. A 12 Billion gallon RFS would not be inconceivable in today's political market. The amount would be just short of the amount needed to have all the gasoline in the U.S. contain 10% blends. In addition it is generally regarded as an amount that might be at the edge of what could be produced from corn before it would significantly affect corn prices.

Therefore, the low range of demand is 7.5 billion gallons of ethanol per year and a potential of 12 billion gallons over the next 5 to 7 years.

One provision of the energy bill designed to stimulate the production of ethanol from feedstocks other than grain could actually have the effect of reducing demand on the total amount of ethanol needed. Ethanol produced from eligible feedstocks (see Figure C-2) is

Figure C-2. Credits as a Tool to Help Cellulose to Ethanol

- 2.5 to 1 value.
- Cellulosic biomass ethanol is defined as that which is produced from:
  - Dedicated energy crops and trees;
  - Wood and wood residues;
  - Plants and grasses;
  - Agricultural residues;
  - Fibers;
  - Animal wastes and other waste materials;
  - Municipal solid waste.

Source: Clean Fuels Development Coalition

considered biomass ethanol. The renewable fuels standard has a credits and trading provision that allows refiners to meet their RFS requirements by purchasing credits from another refiner or blender that has exceeded his base requirement and accumulated these credits. This was put in the bill to provide maximum flexibility for a refiner who couldn't or simply wouldn't blend ethanol and it gives them a way to still meet their requirement. Under this system one gallon equals one credit. The cellulosic provision allows ethanol meeting the eligibility requirement to count as 2.5 credits. The logic was that the credits will be worth something and the additional cost associated with the production of cellulosic ethanol could possibly be offset with this additional value.

The credit and trading system is still being developed by the Environmental Protection Agency but there is so much ethanol available the credits are not expected to be much of a factor in the short term. However, if a major facility were to come on line, such as the IOGEN facility in Idaho or Canada, it could have an impact. Because of that extra credit, for every 10 gallons a refiner needs to meet his requirement, he would only need 4 gallons of cellulosic ethanol, thus reducing the overall demand. That program is in effect until 2013 when the extra credit goes away in favor of a separate cellulosic RFS of 250 million gallons per year. Given the likelihood of changes in the overall program before then, it is equally likely the subject of cellulosic ethanol gets revisited as well. Therefore, the credits and trading program should ease overall compliance with respect to individuals meeting their RFS requirements but should not impact overall demand.

b) Removal of MTBE from the Marketplace:

As noted, the aforementioned federal reformulated gasoline program's oxygen content requirement was primarily met with MTBE. Although it was an effective tool in reducing emissions, MTBE began leaking from underground storage tanks and quickly contaminated groundwater. California in particular experienced serious water pollution incidents and banned MTBE. Even without consideration for the federal oxygen requirement, replacing just the volume of MTBE used in California alone created new ethanol demand of nearly one billion gallons. In fact, one-third of the nation's gasoline was subject to this federal requirement. The overall oxygen demand, depending on the level of ethanol used above the minimum required, was approximately 4 billion gallons. Additives like MTBE and ethanol did three things: extend volume, meet octane needs, and meet oxygen requirements. With the federal oxygen requirement now removed, the other two values—particularly octane—remained. What was unanticipated was the rapid abandonment of MTBE by the petroleum industry in 2006 due to liability concerns.

Oil Companies, refiners, distributors, and others in the fuel chain were being sued at all levels due to water contamination. Several cases in California resulted in substantial awards to plaintiffs, and the petroleum industry attempted to obtain liability protection in the energy bill. They were unsuccessful and even though the legislation provided a ten-year phase out leading to a ban, they began an immediate removal of MTBE from the fuel system in 2006.

What became evident as this elimination of MTBE began was how much the petroleum industry relied on it for octane. Even as the oxygen content was officially eliminated in May of 2006, demand for ethanol skyrocketed. It clearly demonstrated that the 4 billion gallons of MTBE being used in the US market was indeed providing the double duty of oxygenate and octane enhancer. When ethanol took over for MTBE in California, the same situation developed. The oxygen requirement in California had been eliminated immediately upon the President's signing of the energy bill in August of 2005, yet there was no significant change in the amount of ethanol being used in the state.

An analysis of the 4 billion gallons of MTBE that had been used is that all of it had octane value, whether it was being used as an oxygenate or not (approximately 2 billion of that had already been replaced with ethanol in recent years as the New York and California bans took effect). Ethanol in California and New York had taken on that role, so it is assumed of the 4 billion gallons of ethanol in the marketplace, 2 billion had been meeting octane and oxygen demand, and the other 2 billion had been meeting just octane demand. With the last 2 billion gallons of MTBE leaving the pool, a <u>new</u> octane demand of 2 billion gallons developed, thus creating the extremely high value and demand for ethanol at the present time.

The question an ethanol developer must ask is can this strong demand be sustained?

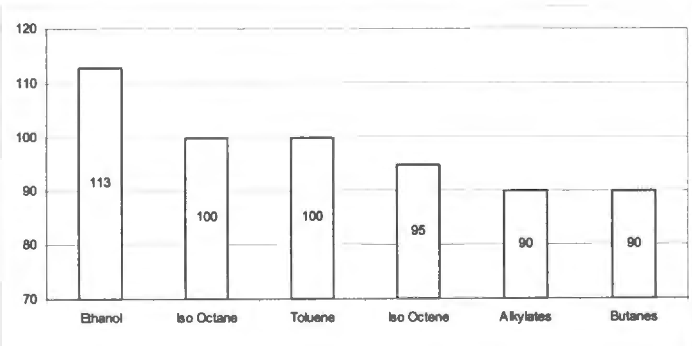
Unfortunately the petroleum industry has other options to meet octane needs. They simply have not developed them yet and until they do they are dependent on ethanol. Alkylates and Iso-Octane/Octene are potential competitors to ethanol, although all have lower blending octane value and consequently would be required in greater volume to achieve the same results. Other octane additives exist but tend to violate emission requirements in many instances. It will become an issue of economics, discussed further in the pricing section.

D. Demand - Conclusion

Several refining experts were interviewed with regard to this question for this study, and the consensus is that a new volume of ethanol to meet octane and clean fuel requirements is approximately 2.2 billion gallons, supporting Durante Associates' own assessment. That is a number that could be a bell curve if other, more inexpensive additives become available.

This is why the RFS is so important, it provides a safety net or backstop in the event the petroleum industry will not, for reasons of principle or economics, use ethanol. Given the above explanation of the current -- and perhaps short term -- demand for ethanol, the RFS is arguably not even a factor in demand but it will be in the future.

Figure C-3. Octane Value of Competing Additives



Source: Durante Associates, Inc.

Ethanol Price

A. Overview and Background

Understanding ethanol pricing is even less exact than calculating demand. As noted previously, in an effort to promote development of ethanol Congress established a partial excise tax exemption for ethanol-blended fuels beginning in 1978. That amount has decreased significantly as a percentage of the overall tax in the course of the last 20 years. The original excise tax exemption was 4 cents out of a federal tax of 6 cents and currently is 5.1 cents of the total of 18.1 cents. A gallon of blended fuel (E-10 or the old "gasohol") is one-tenth of a gallon of ethanol, so the 5.1 cents equates to 51 cents for the full ethanol gallon.

Ethanol prices have traditionally been based on the formula of adding the value of the excise tax exemption to the wholesale gasoline price. In an effort to provide margins for blenders to use the product, it then had to be discounted. Therefore, the historical value of ethanol has generally averaged 2 cents below the price of regular unleaded gasoline. That average, however, is achieved for an extended period of time (i.e., 10 years or more) and does not reflect significant spreads in any given year where ethanol might sell under gasoline at a substantially greater amount. As noted in the previous section, the demand for octane and the occasional value associated with simply extending supply kept ethanol in the market and the industry has been able to sell all it can produce. As explained above, the octane market has always been a significant element in the overall ethanol portfolio, and for now is perhaps *the* single most important economic barometer. Adding 10 percent ethanol to regular unleaded gasoline increases the octane rating by 3 numbers thereby allowing it to be sold as a mid-grade or higher, which often commands 10 to 15 cents more per gallon. Therefore, the ethanol was priced off regular unleaded when in fact it had a value of mid-grade or premium. Often referred to as the "octane giveaway" this was simply a price ethanol had to pay to compete in the petroleum industry.

B. Future Trends

As noted in the previous sections, the required use of ethanol in clean air programs changed the equation significantly. As a required element of gasoline, ethanol was not discounted and in fact commanded a premium in some markets. Ethanol is currently enjoying an incredible price benefit as of late given that the MTBE ban/exodus is taking place at the same time as major increases in world crude prices, and until recently, the oxygen requirement was still in place. It is, for the first time in its history, enjoying the values of oxygen, octane, and fuel volume extension. **Ethanol prices are currently (June 2006) running at $1.00 or more above regular unleaded gasoline**, but many of the aforementioned factors discussed in the demand section will not be factors forever. In addition, all of this is taking place as the U.S. enters into the summer driving season where gasoline is at its peak demand. Refinery capacity is still not completely back to pre Hurricane Katrina levels, and there have been some transportation problems that have also pinched supplies.

With historical ethanol pricing hovering at 2 cents above or below wholesale gasoline (when the tax exemption is netted out), the current situation is unprecedented. However, prices are expected to ease and futures contracts being offered by the Chicago Board of Trade (CBOT) reflect that sentiment. While they could be completely off, CBOT is offering contracts that reflect a sharp decline in prices over the next nine months leveling off at $2.50 per gallon.

Chicago Board of Trade
Ethanol Futures Contract
Closing Prices June 8, 2006

	Price $/gal
June 06	$3.725
July 06	$3.460
Aug 60	$3.050
Sept 06	$2.800
Oct 06	$2.690
Nov 06	$2.650
Dec 06	$2.575
Jan 07	$2.474
Feb 07	$2.500
March 07	$2.500

Contract Size: 29,000 U.S. gallons
Source: Chicago Board of Trade

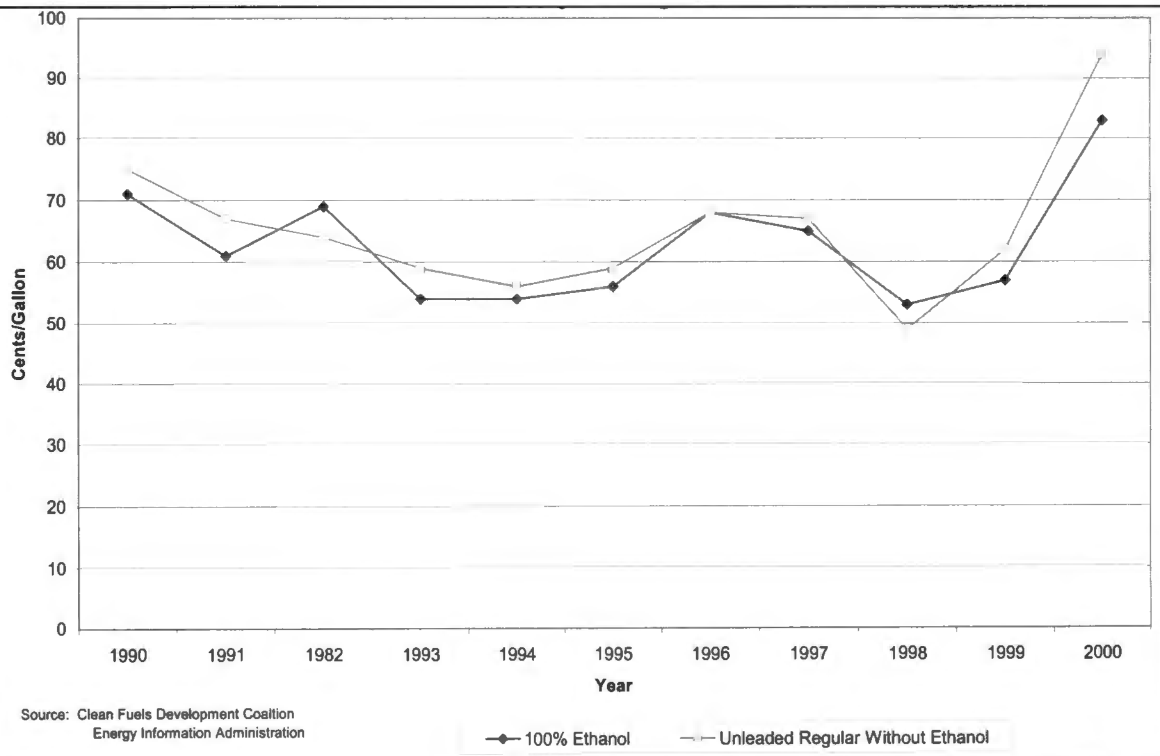
Ethanol prices can confidently be tied to future gasoline prices, albeit with some discounting. It is unlikely that deep discounts the industry has historically had to concede will be repeated in the near term. Ethanol is worth more than gasoline, and should never be discounted the way it has in the past. The question is can it hold that value, particularly if supply exceeds demand, which will be defined as the amount needed for the RFS and octane markets. Using the CBOT number of $2.50 as an example, if ethanol does sell at that level it would mean wholesale gasoline would have to drop to $2.00 from its current level of $2.30, which is entirely possible. The net cost to a blender of ethanol under this example is just $2.00 because they receive a tax rebate of 50 cents. Ethanol's theoretical value should be wholesale gasoline plus the tax exemption, as noted previously. In times of tight supply that figure is achieved, in other times it was not nearly achieved. If CBOT is correct in their ethanol number but wholesale gasoline does *not* drop from today's level of $2.30, ethanol would be giving away 30 cents per gallon because a blender would be taking out a gallon of $2.30 gasoline and replacing it with a gallon of $2.00 (net after tax rebate) gallon of ethanol, and pocketing the difference.

History has not supported this "theoretical value," because as soon as true demand was met, i.e. that amount required under state or federal programs, the remaining amount of ethanol used in the market place was optional, and for the petroleum industry to choose that option it had to be discounted.

This theory is supported by the fact that there is little relationship between corn prices and ethanol as Figure D-1 illustrates. If corn prices went up and ethanol producers tried to pass that through to oil companies they simply would not accept it—unless they were forced to use the ethanol. Twenty years of looking at corn and ethanol side by side reveal little correlation. In 2005 all records for ethanol price were shattered as the nationwide average was over $2.00, yet corn prices were at the low end of their price averages. But, as Figure D-2 illustrates through a snapshot of one decade, ethanol has always been at or near gasoline.

Figure D-1. Ethanol and Corn (in Dollars)		
Year	Ethanol (Gallon)	Corn (Bushel)
1984	1.55	3.20
1985	1.49	2.71
1986	1.05	2.10
1987	1.08	1.73
1988	1.07	2.41
1989	1.14	2.54
1990	1.22	2.54
1991	1.14	2.52
1992	1.24	2.38
1993	1.08	2.42
1994	1.18	2.54
1995	1.16	2.81
1996	1.39	3.92
1997	1.21	2.71
1998	1.09	2.30
1999	1.03	1.95
2000	1.34	1.96
2001	1.54	1.95
2002	1.16	2.23
2003	1.27	2.44
2004	1.70	2.26
2005	1.87	2.05

Figure D-2. Rack/Wholesale Regular Gasoline vs.
Net Ethanol, US City Average



Keeping in mind that the project in question would not be producing for nearly another two years, predicting price becomes even more difficult. If the RFS is not adjusted or extended, the supply of ethanol could dramatically outpace requirements, putting the industry back into the historical pattern of giving away value.

Without regard to how demand scenarios might be affected by changing the RFS, the baseline for ethanol price should be gasoline, as discussed previously, but the Montana project should not anticipate premium pricing like we are currently seeing; i.e., $.70 to $1.20 over gasoline. As explained, that octane premium and demand will be met by the time this project comes online. Historical relationships to gasoline should be the assumption but even modest or low growth in gasoline prices will keep ethanol prices high. The Energy Information Administration predicts long-term oil prices to be $54 per barrel (*US EIA, Energy Outlook 2006*) for the period of 2010 to 2020. We believe that figure to be low given the increase in world demand but even at those prices, gasoline prices would likely remain at levels of $2.50 or more, making ethanol worth a range of $1.50 to $2.00 in the future.

Given the fact that these prices are significantly above historical levels, and that lending institutions rely on such historical prices, we project three scenarios of ethanol prices in 2008 in constant dollars of $1.50 (low), $1.75 (mid), and $2.00 (high). Under these scenarios we believe a reasonable ethanol ***netback price*** for a Montana plant is $1.50. The netback is an important figure to understand. It is essentially the price of ethanol after freight/transportation, or any additional costs such as off-loading, second stage trucking, etc. It is ***the*** critical number to look at in calculating returns to a plant.

If, for example, ethanol price in Boise is $1.70 (the 2004 annual average) and freight and fees to the Boise terminal is 15 cents (typical of such costs), the netback to the plant is $1.55. If the Los Angeles market was commanding a higher figure such as $1.80, but the truck to rail freight combination was 30 cents, the netback would be only $1.50. That five cents, on a 20 million gallon per year plant, represents $1,000,000 on an annual basis. Therefore, the right marketing strategy is critical. No matter where the ethanol is ultimately marketed, a Montana plant would have some significant transportation costs. Even very local markets might command a high cost to transport by truck. Higher costs will be incurred in getting to premium markets like Boise or Denver.

The $1.75 ethanol price, and the resulting netback amount is based on analyses of both crude oil and gasoline we have reviewed and conducted, as well as predictions by the Energy Information Administration, the International Energy Agency, and others. The netback is arrived at by assuming transportation and marketing cost of 25 cents per gallon. This is the high scenario for the transport cost and marketing fees, and it could be as low as 12-15 cents, **making a net back cost to the plant of 1.65 a modest and defensible number.** For the purposes of estimating returns to the plant it is the project developers' decision whether to use the high, low or the mid-range scenario. We do not recommend considering the high range of $2.00 ethanol. Any detailed pro forma or sensitivity analysis can calculate those figures, but the range of netback for the mid scenario should be the $1.50 to $1.65 range.

It is difficult to accurately predict future prices (also revealed by looking at Figure D-1) and the effect demand has on price. As a required element of gasoline, as long as production is within the total volume needed, it should retain its high value. The issue is to understand what happens once production gets beyond the required volume regardless of what that amount is. At that point it could be argued supply exceeds demand thereby driving down prices overall. But we believe the floor will always be gasoline, and that gasoline prices will never come back to levels we have seen in the past.

C. The X Factor: The Idaho Market and the Potential for the Montana Mandate

The proposed Montana project is in a location where it really should not focus on the California market. So doing would increase transportation costs and affects the overall profitability of the plant. However, it would be well positioned to reach Denver, Phoenix, and Las Vegas and as such would be insulated against any change in the RFG program because these cities will be using ethanol under almost any circumstances due to carbon monoxide control strategies adopted by local jurisdictions. To the extent the California market draws product from other plants, a Montana facility could benefit by filling that void.

It needs to be understood that the Montana project is going to be faced with high transportation costs under any circumstances. In fact these costs may exceed the industry norm by 10 or more cents per gallon, which is why a high end 25 cents per gallon cost was noted.

While this report is by no means a finished marketing strategy, it can serve as a preliminary plan, and as such the focus should be on markets that provide the highest netback, regardless of where they are.

Idaho

If the Boise market, as noted earlier, requires a transportation cost of 15 cents but provides the greatest net, then that should be the focus. A bank review of a marketing plan that has such high transportation cost might initially be negative, but the logic behind it should become clear.

Idaho has a lower tax rate for ethanol-blended fuel that translates to approximately 20 cent per gallon margin. Marketers can charge some amount below that as a premium over what ethanol might be selling in another market, thus raising the ethanol price.

The Boise market has averaged a full 8 cents over the national average for the past several years. That differential is disappearing as the octane need has created higher value on both coasts.

Preliminary surveying of marketing firms indicate that price in Boise could be achieved with a 15 cent transportation cost, thus putting the net to the plant well above our projected $1.35. Similarly, the Denver and Phoenix markets were at the same price. If a professional marketing firm is engaged, the developers of this project will have little, if anything, to do with where the ethanol is marketed. These are decisions that will be made by the marketing firm. The project owners will certainly want to familiarize themselves with marketing procedures and practices in order to engage a good firm. At that point in the process of selling ethanol is turned over to them.

Montana

The fact that Montana adopted a requirement that all gasoline in the state contain 10% ethanol should make a Montana project nearly foolproof. However, the legislation inexplicably requires 40 million gallons of production to be in place before the requirement takes place, the prospects of which are uncertain.

It would only take 50-55 million gallons of ethanol to meet the 10 percent requirement, and once the gasoline all contains 10 percent blends, there would be no where else to put it other than in E85. Hopefully the legislation can be modified to phase the requirement in so that it serves to attract new plants, rather than assuming the plants will build on the hope that others join them. The legislation as it now is designed appears seriously flawed.

However, the opportunity to blend ethanol in Montana gasoline without the requirement exists, and there is no reason it cannot happen.

There are twelve regional fuel terminals (see Figure D-4) and bulk facilities throughout the state, all of which could be reached by truck at a transport cost of 10 cents. In fact the 5 – 10 cent cost radius should be the target market for the plant, working outward from there. With rail reasonably close, this provides a wide range of options. The more detailed site study would look at the various truck-to-rail combinations and transportation options. While ethanol prices may be lower in Montana than in some of the higher price markets noted above, it again becomes a question of netback.

Figure D-4. Regional Fuel Terminals and Bulk Facilities

IDAHO

Terminals	Location	City	Zip
Boise Idaho Terminal - Amoco	321 North Curtis Road	Boise	83707
Northwest Terminaling – Boise	321 North Curtis Road	Boise	83704
Flying J Boise – Idaho	70 North Philipi Road	Boise	83706
Amoco Oil Burley	421 East Hwy 81	Burley	83318
Burley Products Terminal	425 E. Hwy 81 PO Box 233	Burley	83318
Chevron Pipeline – Pocatello	Rowland Road Route One	Pocatello	83201

MONTANA

Terminals	Location	City	Zip
Conoco – Billings	23rd & Fourth Ave South	Billings	59107
Conoco – Bozeman	316 West Griffin Drive	Bozeman	59715
Conoco – Great Falls	1401 52nd North	Great Falls	59405
Conoco – Helena	3180 Hwy 12 East	Helena	59601
Conoco – Missoula	3330 Raser Drive	Missoula	59802
Cenex – Laurel	PO Box 909	Laurel	59044
Cenex – Glendive	PO Box 240	Glendive	59330
Exxon USA – Billings	Lockwood Frontage Road	Billings	59701
Exxon USA – Bozeman	220 West Griffin Drive	Bozeman	59715
Exxon USA – Helena	3120 Hwy 12 East	Helena	59601
Exxon USA – Missoula	3350 Raser Drive	Missoula	59801
Montana Refining – Great Falls	1900 10th Street	Great Falls	59403

D. Marketing Strategy to Achieve Best Net Back

A small ethanol plant has the advantage of being small enough that placing product in the market will not be difficult. Modern ethanol facilities are being built every day at 40, 60, and even 100 million gallons per year, which presents a significant challenge in terms of product placement.

There are two options to consider in marketing the ethanol from the plant. The first would be to have a full time person handling this task. The other option is to work with an outside marketer and/or contract the work out.

The netback numbers used for illustration purpose in this report assume either a percentage fee or a cent per gallon fee for a marketer. The percentage fee is often achieved after the marketer places the product. The per gallon fee is more like having a marketer purchase the product directly from the plant. The industry norm is approximately a penny per gallon, slightly higher on smaller plants. Most plants use a hybrid of contract pricing and spot market. Bringing on a savvy professional with experience in this type of marketing might be difficult. However, even with a well above average salary package, such an individual could save the company hundreds of thousands of dollars annually. Conversely, trying to do it with existing staff, or someone without the necessary experience, could result in a significant revenue loss. The larger the plant capacity the more the need for experienced marketers.

The answer for a new plant in Montana would seem to be to take advantage of the fact that one of the most experienced marketers in the industry is an individual with Renova Energy in Boise, Idaho. He is quite familiar with the Montana market, as well as all the previously mentioned western markets. As the plant goes forward it would be wise to request a marketing proposal and utilize such professional services. **However, for the purposes of this report and to aid in this stage of planning, under any circumstances we would stand by our projection of $1.65 netback to the plant.**

This project would be positioned to take advantage of the historical higher than average gasoline prices, in the western/mountain states (see Figure D-5) and thus compensate for higher than average transportation cost. This map is the most current, although there will be an update at the end of 2006.

Figure D-5. Motor Gasoline Prices at Retail Outlets, 2004
Average Regular Grade, by Region
(dollars per gallon, including taxes)

Source: Energy Information Administration, Weekly Motor Gasoline Price Survey, 2004.

E. Conclusion

The demand and price of ethanol have been significantly affected by action at the federal level, and to a lesser extent at the state level. The establishment of the renewable fuels scenario results in a base case scenario of 7.5 billion gallons per year of ethanol demand. The long-range value of ethanol tied to gasoline is the most certain, albeit lowest, case to look at.

A marketing strategy to incur no more than 20 cents per gallon should be employed, and such a plan could be achieved, although the reality is that some ethanol will be marketed at slightly higher transportation costs. If local market opportunities can be developed, that cost could be reduced to an amount closer to 10 cents per gallon, thus increasing the netback.

Before going with a final business plan it is recommended that a more detailed and current transportation and marketing study be conducted to get these amounts as tight as possible.

End of Durante Report

Cattle Markets

Feedyard Component of Wolf Point Complex

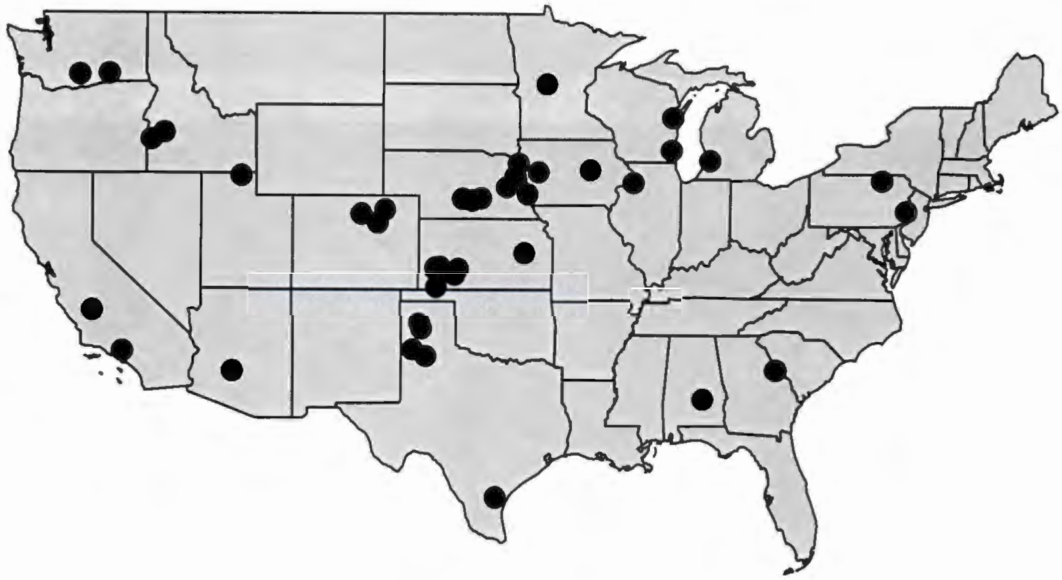
The feedyard component plays a critical role in the overall feasibility and potential success of the proposed Wolf Point Ethanol Plant. Cattle fed in the facility have the ability to utilize distillers' by-products from the ethanol plant. These byproducts do not have to be dried or transported, thus providing significant savings as compared to stand-alone ethanol facilities. This economic advantage is possible only if the feedyard can maintain occupancy throughout the year. Therefore, an essential part of market feasibility includes an investigation of the cattle feeding industry and how local, regional, and national competition affects the feasibility of cattle feeding at an ethanol plant located in northern Montana.

A. US Cattle Feeding Industry

The cattle feeding industry has undergone significant change over the past several decades. Much of this change is linked to changes in market dynamics of the entire industry, especially the feeding and packing segments. The cattle-feeding segment grew rapidly as the nation's beef cattle inventory grew, starting in the 1950's. For nearly another thirty years, the US cattle industry has continued to experience this growth. It is estimated that cattle numbers grew by more than 20 percent, from 109 million head in 1965 to a record 132 million head in 1975.[6] The growing numbers of beef cattle were fed in the Corn Belt states, mostly by farmer-feeders.

[6] D. Weaber and M. Miller, "An Evolving Industry," *BEEF Magazine* Online, September 1, 2004. PRIMEDIA Business Magazines and Media Inc. p. 1.

2005 United States Packers >1,000 Head



Source: Cattle-Fax, 2006

However, by 1975, the growth period of the industry ended and the feeding and packing businesses focused more on operating costs in an effort to become more efficient amid a downsizing industry. This industry dynamic led to many firms expanding to take advantage of economies of scale and lower operational costs.[7] There was also a movement away from the terminal markets as the predominant point of sale for slaughter cattle. Terminal market locations such as Chicago, St. Paul, Sioux Falls, Omaha, and Kansas City were once the conduits through which the nation's packers purchased beef cattle. In the same period, irrigation in Kansas and Texas allowed corn production to flourish in those states. Cattle feeders moved to these "high plains" areas where mud and other weather and cattle performance related deterrents were less prevalent. Mergers and acquisitions, coupled with increased emphasis on production efficiency, compelled packinghouses to bid on cattle for delivery directly to their plants. The packers, then too, began building facilities away from the terminal market cities—citing them in the high plains where the cattle are. This change in market dynamics in turn moved cattle feedyards even closer to the packers' facilities in order to further reduce operational costs.

In the United States, the majority of commercial beef feedyards are located in the Plains region, from Nebraska extending southward to Texas. The graphic above illustrates the location of the larger commercial yards. Not surprisingly, the US beef-processing segment of the industry is located in much the same regions of the country. The following map illustrates this proximity:

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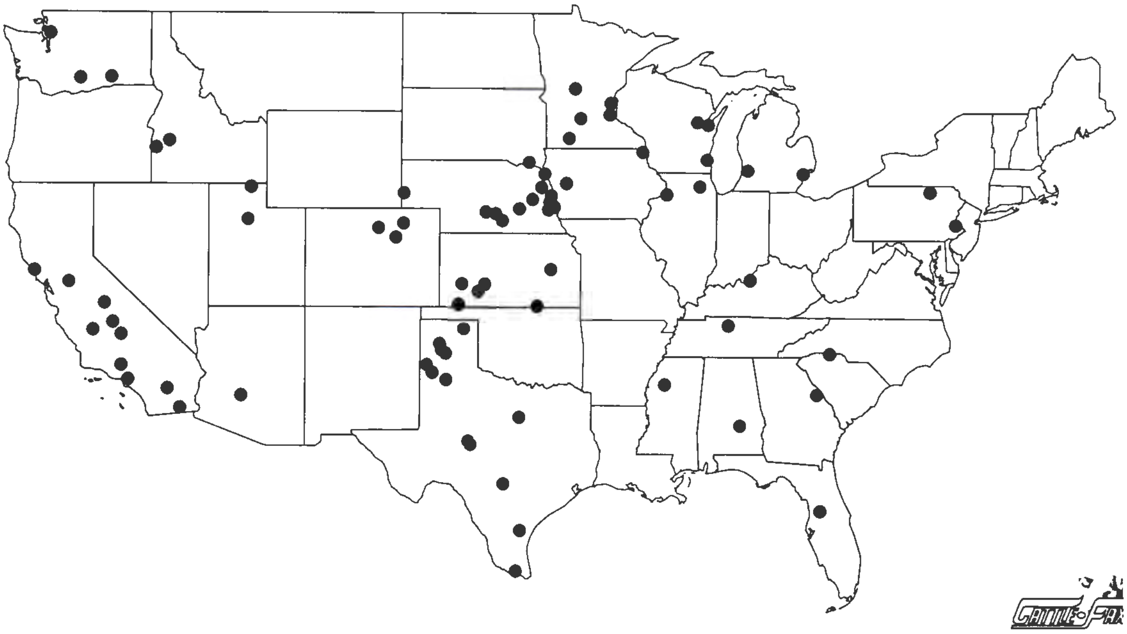
[7] Ibid p. 2.

2005 United States Packers >200 Head



Source: Cattle-Fax, 2006

Statistically, the greatest concentration of cattle being fed in the US is within the four states of the Great Plains. The top ten feeding states are listed in the following table:

January 1, 2005 Cattle Inventory by Size of Feedlot (Top Ten States)

State	1000+ hd	1-999 hd	16,000-31,999	32,000+ hd
Texas	2,920,000		540,000	2,100,000
Kansas	2,500,000		590,000	1,370,000
Nebraska	2,430,000	170,000	590,000	425,000
Colorado	1,080,000		270,000	553,000
California	550,000		114,000	417,000
Iowa	510,000	410,000		
Oklahoma	370,000		68,000	246,000
Idaho	275,000			
Arizona	334,000			306,000
Washington	152,000			45,000

Source: USDA National Ag Statistics Service, 2006

Texas, Kansas, Nebraska, and Colorado clearly dominate the rest of the US in terms of feedyard capacity. Their temperate climates and available feed supplies put them in a strong competitive position when compared to other feedyards in other regions of the country.

In order to quantify the data displayed on the maps on the preceding page, statistical data was compiled for these same states regarding commercial beef slaughter volume. For the purposes of this study, commercial slaughter includes both non-federally inspected and federally inspected plants. The following chart lists the commercial slaughter volume for each of the ten states above, as well as the volume of cattle slaughtered under federal inspection.

Total Cattle Slaughter, Commercial and Federal Inspection: 2005

State	Commercial (Non-Federally Inspected + Federally Inspected)	Federally Inspected
Kansas	7,321,400	7,287,600
Nebraska	7,028,900	7,003,800
Texas	6,238,200	6,217,900
Colorado	2,086,700	2,079,700
California	1,362,400	1,355,800
Iowa	0	0
Washington	786,100	785,500
Idaho	376,000	366,200
Arizona	0	0
Oklahoma	26,100	700

Source: USDA National Ag Statistics Service, 2006

Again, the top four states in commercial beef slaughter volume are Kansas, Nebraska, Texas, and Colorado. It is no coincidence that these same states also occupy the top slots in feedyard capacity. As described earlier, one of the major market changes in the 1970's was the shift towards direct purchase from feedyards by the packers. As the industry continued to focus on reducing operating costs and economies of scale, feedyards and packinghouses continued to locate ever closer to one another.

The Montana Agricultural Statistics Service reports that there were approximately 60,000 cattle on feed in the state as of January 1, 2005. The proposed feedyard included in the ethanol plant complex would increase the size of the cattle feeding industry in Montana by more than 100 percent. In the Economic Feasibility section of this study, it has been demonstrated that Montana's annual calf crop (1.48 million feeder cattle) is much larger than what is fed in the state's feedyards. And while calves originating from the region have gained a reputation for their quality, the available supply has not prompted any growth in the state's feeding industry. Likewise, the beef-processing segment of the industry is relatively small compared to other parts of the country. Data collected from the Montana USDA Office of the Agricultural Statistics Service regarding commercial slaughter volume indicates that only 20,700 head were processed in Montana in 2005. Clearly, there is a huge gap between the number of calves produced in Montana (1.5 MM) and the volume that is processed into beef (20,700).

A 2003 report compiled by the USDA Economic Research Service identifies three economic features that affect patterns of livestock movement. The first is the relative costs of transporting animals versus feed/forage. In summary, it is cheaper to transport feeder calves to the sources of corn, forages and other feedstuffs needed to feed them to slaughter weight, than to ship all of the ration ingredients out to where the cattle originated.

The second feature affecting cattle movements is industry structure. As discussed earlier, the cattle industry has undergone significant structural change, whereby the feedyards and processors have grown larger in an effort to capture more market efficiencies. Also, they have located in regions that offer more advantages in climate, proximity to feed resources, and each other, as discussed above. The third feature affecting cattle movement is geographic differences in forage availability and prices, which are affected primarily by climate, season, and production technology. Traditionally, cattle originating from the region that includes Montana are moved between rangelands and pastures as forage availability changes with the season. Shortly after weaning, calves are shipped south and/or east to be placed in back grounding lots or to graze on cultivated grasses prior to being placed in a feedyard for finishing. Many of these cattle are marketed through auction barns as they move out of one area and into another.[8]

Due to these effects, it appears that states in the Mountain region like Montana have settled into a traditional pattern of commerce in the cattle industry. A vast majority of Montana's calves are marketed after weaning and move out of the region to enter back grounding yards or additional grazing periods prior to moving to feedyards for finishing. Because cattle feeding is not a significant segment of the cattle industry in the state of Montana, the key issue that needs to be discussed is whether the proposed cattle feedyard can compete with feedyards in other regions to ensure maximum occupancy while striving for economic efficiency. Less than optimum feedyard occupancy rates will negatively impact the performance of the other components of the ethanol plant complex. A lack of economic efficiency in a highly competitive marketplace will cause cattle feeding customers to do business elsewhere.

Proper feedyard management as discussed in the Management Feasibility chapter will calculate an "all costs" charged on a hundredweight basis, which will be the costs billed to the cattle owner for feed ration, yardage and processing fees, medicines administered and interest. Additionally, the cattle owner may incur finance charges if they have entered into a financing arrangement with the feedyard. The "all costs" approach is the preferred methods of doing business by most cattle owners, because they can compare charges from a feedyard in one region to those of a feedyard in another and be able to compare competing services accurately.

The inclusion of WDG as a ration ingredient gives the feedyard a competitive advantage because its cost is determined internally between the ethanol plant and the feedyard. Also, lower protein and energy feedstuffs can be utilized in the ration due to the high levels of nutrients contained in WDB. As discussed previously, lower ration costs utilizing WDB is expected and is not detrimental to the feedyard ability to compete effectively.

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[8] Dennis A. Shields, Kenneth H. Mathews, Jr., *Interstate Livestock Movements*, Electronic Outlook Report from the Economic Research Service (United States Department of Agriculture, Washington, D.C. June 2003) p. 6.

The physical structure of the feedyard itself provides advantages, not only to the ethanol plant complex, but also to cattle health and performance. Typically, cattle-producing states such as Montana do not engage in cattle feeding due to colder winter temperatures and increased winter precipitation. These two environmental factors can negatively impact cattle health and feeding performance because of the stresses placed on the animal. However, the structural design of the cattle feeding barns greatly minimizes the negative effects that winter climates can have on cattle fed in the Northern Plains. The enclosed design practically eliminates any problems with wet or snow-covered cattle. As well, the monoslope roof design is engineered to take advantage of the sun's radiant energy during the winter months and provide shade and protection during the summer. As described in specific sections of this study, this design tends to offset the negative effects of the colder climate and gives the feedyard the ability to compete in this northern latitude.

B. Transportation Costs

Transportation costs for cattle owners represent one of the most challenging obstacles for the proposed feedyard. All feedyards are dependent on inbound and outbound transportation to deliver feeder cattle to the facility and ship finished cattle to the processing plants. The location of the feedyard plays a big part in determining its competitive position with other feedyards, as cattle owners evaluate the total cost of the cattle purchase transaction.

For illustrative purposes, the following scenarios will be used. For Scenario 1, a rancher in Glasgow, Valley County, Montana, is retaining ownership on 200 steers to be fed in the proposed facility as part of the Wolf Point Ethanol complex. The steers have been forward contracted for delivery to a processor in Greeley, Colorado, the closest fed cattle processor. These steers will enter the feedyard weighing 750 pounds and will be sold at a target weight of 1250 pounds, based on previous closeout data for the rancher's cattle. In Scenario 2, the rancher is going to ship the feeder steers to the closest competitor, a feedyard near Hot Springs, South Dakota and deliver them to Fort Morgan, Colorado for slaughter, as it is the closest fed cattle processing plant to the Hot Springs feedyard. Assuming that all facility costs are the same for both feedyards, these calculations will serve as the basis for determining a feed ration price reduction as a method of offsetting transportation costs.

The following table illustrates the difference in transportation costs for each scenario. A rate of $3.15 per loaded mile was used as the mileage rate in the calculations.

	Number of Miles	Total Weight of Shipment	Cost/CWT	Shipping Cost
Scenario 1				
Shipping 200 steers to Wolf Point	49	150,000	$0.31	$463.00
Shipping 200 slaughter steers to Greeley, CO.	800.8	250,000	$5.04	$12,612
Total Transportation Cost:				**$13,076**

	Number of Miles	Total Weight of Shipment	Cost/CWT	Shipping Cost
Scenario 2				
Shipping 200 feeder steers to Hot Springs, SD	510	150,000	$3.21	$4,819.00
Shipping 200 slaughter steers to Fort Morgan, CO.	274	250,000	$1.72	$4,315.00
Total Transportation Cost:				**$9,134.00**

As shown in these two scenarios, transportation costs could potentially affect feedyard ability to attract and/or maintain feeding customers because of its distance from processing plants. One alternative that should be considered in light of these costs is to support customers of the feedyard by offsetting higher transportation costs. This offset economically plays much the same role as it would to pay the transportation cost of importing ethanol feed stocks to meet a local grain shortage.

In the scenarios displayed above, the feedyard support would take the form of reduced feed costs. The transportation cost difference between Scenario 1 and 2 is $3,942.00. This transportation cost difference could be referred to as the *opportunity cost* of feeding in the proposed feedyard versus the feedyard in Hot Springs. On the 250,000 pounds of slaughter cattle shipped, that total would translate into $.63/cwt. Converting this to a per head basis ($.68/cwt x 12.5) gives us a cost support of $7.92 per head.

Converting this value into a form related to feed costs requires that we calculate the amount of weight gained while at the feedyard and the pounds of feed required for every pound of gain. It is estimated that the cattle will gain 500 pounds per head from the time they enter to the time they leave the feedyard. Therefore, $7.92 divided by 500 pounds gives us $0.0158 per pound of gain.

Assuming that it takes six pounds of feed to achieve one pound of animal gain, $0.0158 divided by six gives us $0.0026 per pound of ration on a dry matter basis. Multiplying this by 2000 pounds yields the subsidization cost of $5.28 per ton (dm basis).

C. Sales to Canadian Packing Plants

Recently, several plant expansions or additions have been announced in Alberta and other Canadian provinces in an effort to boost processing capacity after the closure of the US-Canadian border in 2003. Several of these facilities are significantly closer to the proposed complex than the nearest US plants, as indicated in the table in the Economic Feasibility chapter. Since the border reopened for trade of live cattle, it may appear at first to make sense to market cattle from the proposed feedyard to packers (some of them US companies) in Canada. However, the US to Canadian dollar exchange rate is not favorable to US firms selling products in Canada. As of June 8, 2006, one US dollar was equivalent to $.9134 in Canadian dollars. In other words, US cattle sold to Canadian packing plants would be discounted by about 10 percent because of the exchange rate issue. The following table displays the net cost differences between selling to a Canadian processor and the nearest US processor.

Canadian vs. US Slaughter Cattle Sales Comparison
Wolf Point Ethanol Plant Complex

Processor	Distance from Wolf Point	Price Received (USD Equivalent)	Shipping Cost	Net Price Received
Tyson-Brooks, AB	201	$77.15/CWT	$1.31/CWT	$75.84/CWT
Smithfield-Gering, NE	769	$85.00/CWT	$5.04/CWT	$79.96/CWT

Now that the US – Canadian border has opened and unrestricted trade occurs, it still does not appear that this strategy offers any advantage because of the offsetting negative effects of currency exchange rates. It seems unlikely that the current relationship between the US and Canadian dollar will change to offer an exchange advantage. Selling slaughter cattle into Canadian processing plants does not appear to be a feasible alternative at this time. In the event that the two countries can eventually work out a future trade or currency agreement, this option will have to be reassessed.

D. Alternative uses of Wet Distillers Grains

If the final decision is to build a stand alone ethanol plant, then the question of what to do with the resultant WDG comes into play. Today's ethanol plants have access to some very new and innovative technologies One of the newer technologies being developed would allow the WDG to be put into feed blocks that could be preserved for extended periods of time. These blocks are convenient for ranchers as they can be stacked like bales of hay, and they can be customized for any stage cattle growth. This option could possibly make use of part of the WDB, but there would still be a significant portion to be marketed to other sources.

The primary focus would have to be on finding markets among the many cattle feedlots in the local area, adjoining states, and finally looking to feedlots across the border in Canada. The holding time for WDG is only approximately 10 to 14 days, so the marketing effort would have to be very well organized to utilize this by-product effectively. With over 380 tons of WDG and 280 tons of syrup (660 WDB) produced daily, a breakdown in this marketing area could potentially cost the Ethanol plant several million dollars.

E. Cattle Markets Summary

The feedyard proposed as a component of the Wolf Point complex will be caught at a competitive disadvantage because of cattle transportation costs. Because the feedyard is an integral component of the complex, there are internal costs and allocations that could be used as a means to cost support the cattle owner for feeding in the feedyard. It is imperative that some alternatives be employed to entice cattle owners to place cattle; the ethanol facility depends on the feedyard to utilize the WDB.

If the Steering Committee decides to pursue a stand-alone ethanol plant, attention must be given to the distribution of the plant's wet distillers byproducts (WDB). Including a cattle feedlot component in the complex will effectively utilize the entire output of byproducts, eliminating the need to market the WDB. In the 20 MGY model, these byproducts could potentially produce revenues of more than six million extra dollars per year; thus, it is important that this issue be dealt with by experienced professionals. In a stand-alone plant, there are several options for byproduct distribution:

- The first option is to market the byproducts aggressively to cattle ranches in the surrounding counties. The 660 tons of wet distillers byproducts produced daily would need to be delivered to approximately 40,000 cows daily (depending on cattle age and season). Northeastern Montana has over 360,000 beef cattle and heifers that could be a potential market for these byproducts. Canada and North Dakota would also be potential markets. One disadvantage of this option is that with the cost of transportation, the distance of delivery of the WDB affects end profits. Clearly, distribution of the 660 tons of WDB daily could pose additional management and administrative problems. Winter weather is another consideration in distribution of the WDB.
- The second option is to partner with a company using innovative technologies that utilize the byproducts to create new products such as Block Distiller Grains. This is a new technology that allows ranchers to stockpile DG to use throughout the winter. However, this option will utilize approximately ten percent of the daily production of WDB.
- A third option is to include a dryer as part of the ethanol plant complex, but this would add significantly to capital costs and energy usage. It would also give greater flexibility for the marketing byproducts.

Appendix to Chapter III (Ethanol Markets)

Areas of The United States Using Reformulated Gasoline

Under the Clean Air Act Amendments of 1990 (CAAA) Congress required the areas of the country with the most severe ground-level ozone (smog) pollution to sell only RFG year-round after January 1, 1995. As of June, 2006, areas required to use RFG are:

Clean Air Act Required Areas: (as of June 2006)	
California	
El Dorado County (partial)	Sacramento County [1]
Fresno County [2]	San Bernardino County (partial)
Kent County (partial)	San Diego County
Kings County	San Joaquin
Los Angeles County	Solano County (partial)
Madera County	Stanislaus County
Merced County	Sutter County (partial)
Orange County	Tulare County
Placer County (partial)	Ventura County
Riverside County (partial)	Yolo County [1]
[1] Sacramento, CA area was reclassified from Serious to Severe ozone nonattainment effective June 1, 1995. RFG was required as of June 1, 1996. [2] San Joaquin Valley, CA area (excluding East Kern County) was reclassified as Severe ozone nonattainment effective December 10, 2001. RFG was required as of December 10, 2002.	
Connecticut	
Fairfield County	New Haven County (partial)
Hartford County (partial)	New London County (partial)
Litchfield County (partial)	Tolland County (partial)
Middlesex County (partial)	
Delaware	
New Castle County	
Kent County	
District of Columbia	
Entire District of Columbia	
Georgia [3]	
Cherokee County	Forsyth County
Clayton County	Fulton County
Cobb County	Gwinnett County
Coweta County	Henry County
DeKalb County	Paulding County
Douglas County	Rockdale County
Fayette County	
[3] Atlanta, GA area was reclassified to Severe ozone nonattainment effective January 1, 2004. RFG program is stayed pending litigation.	

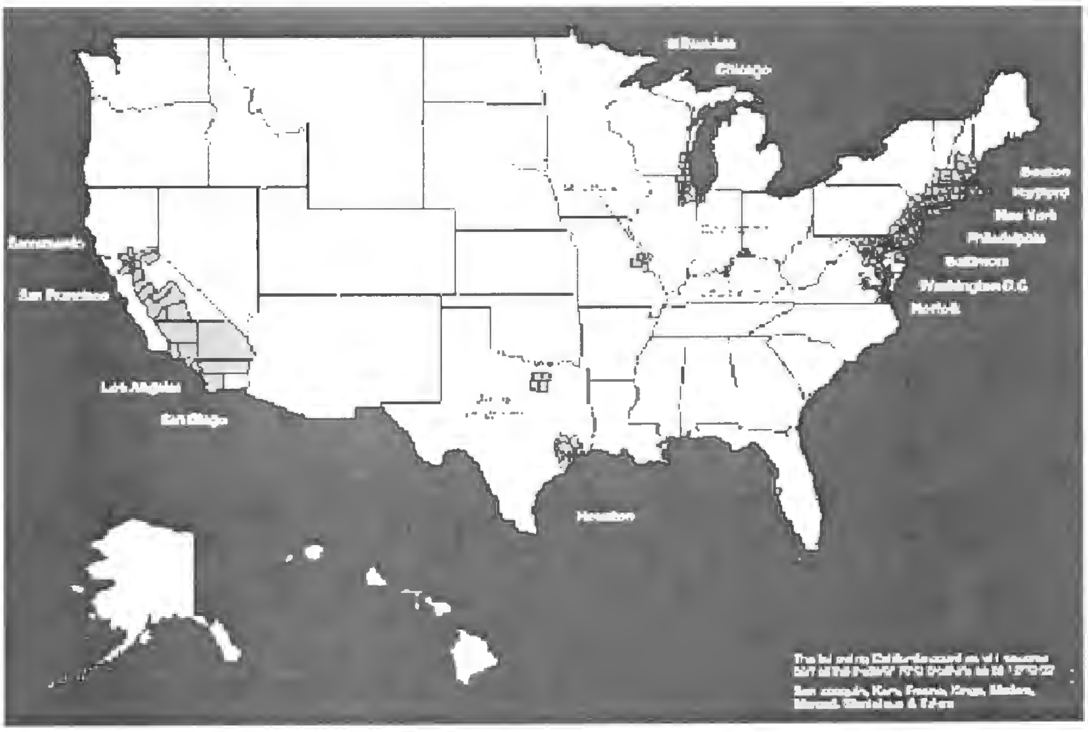
Clean Air Act Required Areas: (as of June 2006)	
Illinois	
Cook County Du Page County Grundy County (partial) Kane County	Kendall County (partial) Lake County McHenry County Will County
Indiana	
Lake County Porter County	
Louisiana [4]	
Ascenscion Parish East Baton Rouge Parish Iberville Parish	Livingston Parish West Baton Rouge Parish
Baton Rouge, LA area was reclassified to Severe ozone nonattainment effective June 23, 2003. RFG program is stayed pending remand decision by EPA.	
Maryland	
Anne Arundel County Baltimore County Calvert County Carroll County Charles County Cecil County	Frederick County Harford County Howard County Montgomery County Prince George's County The City of Baltimore
New Jersey	
Bergen County Burlington County Camden County Cumberland County Essex County Gloucester County Hudson County Hunterdon County Mercer County	Middlesex County Monmouth County Morris County Ocean County Passaic County Salem County Somerset County Sussex County Union County
New York	
Bronx County Kings County Nassau County New York County Orange County Putnam	Queens County Richmond County Rockland County Suffolk County Westchester County
Pennsylvania	
Bucks County Chester County Delaware County	Montgomery County Philadelphia County
Texas	
Brazoria County	Harris County

Clean Air Act Required Areas: (as of June 2006)	
Chambers County Fort Bend County Galveston County	Liberty County Montgomery County Waller County
Virginia	
Alexandria Arlington County Fairfax Fairfax County Falls Church	Loudoun County Manassas Manassas Park Prince William County Stafford County
Wisconsin	
Kenosha County Milwaukee County Ozaukee County	Racine County Washington County Waukesha County

"Opt-In" Areas (Voluntary):	
Connecticut (Entire State)	
Litchfield County (partial) Hartford County (partial) Middlesex County (partial)	New London County (partial) Tolland County (partial) Windham County New Haven (partial)
Delaware (Entire State)	
Sussex nonattainment area Sussex County	
Kentucky	
Boone County Bullitt County (partial) Campbell County	Jefferson County Kenton County Oldham County (partial)
Maryland	
Kent County	Queen Anne's County
Massachusetts	
Barnstable County Berkshire County Bristol County Dukes County Essex County Franklin County Hampden County	Hampshire County Middlesex County Nantucket County Norfolk County Plymouth County Suffolk County Worcester County
Missouri (Effective Opt-In Date is June 1, 1999)	
St. Louis County St Louis (city) Franklin County	Jefferson County St. Charles County
New Hampshire	
Hillsborough County Rockingham County	Merrimack County Strafford County
New Jersey	
Atlantic County Cape May County Warren County	
New York	
Dutchess County Essex County (partial)	
Rhode Island	
Bristol County Kent County Newport County	Providence County Washington County
Texas	
Collin County	Denton County

"Opt-In" Areas (Voluntary):	
Dallas County	Tarrant County
Virginia	
Charles City County	Newport News
Chesapeake	Norfolk
Chesterfield County	Poquoson
Colonial Heights	Portsmouth
Hampton	Richmond
Hanover County	Suffolk
Henrico County	Virginia Beach
Hopewell	Williamsburg
James City County	York County

Source: United States Environmental Protection Agency, Information Resources 6/2006



Source: U.S. EPA, Information Resources, June 2006 Inc

IV. Technical Feasibility

Prepared by
Katzen International, Inc.
Cincinnati, Ohio
Twenty Million Gallon Per Year Barley
Dry Mill Ethanol Fuel Plant

1.0 General

1.1 Background

This report presents the results of a preliminary technical evaluation for a facility to produce Motor Fuel Grade Ethanol (MFGE) from barley using a dry milling process which includes milling, mashing, fermentation, distillation, dehydration and stillage processing. The project is integrated with cattle feeding operations which allow for the direct use of the Wet Distiller's Grains (WDG – aka "wet cake").

The proposed 20 million gallons per year (MM GPY) ethanol facility, to be located near Wolf Point, Montana, will be designed to convert barley feedstock into denatured MFGE using proprietary technology from KATZEN International, Inc. (KATZEN).

For the purpose of this report all equipment and budgetary cost estimates are based upon U.S. codes and regulations. All monetary values are reported in $US.

1.2 Design Basis

The plant will be designed to produce approximately 57,200 gallons per day of MFGE while processing 24,700 "distiller's bushels" (56 lbs. per bushel basis) of barley as feedstock. Corn and wheat can also be utilized in the plant. Barley has a lower starch content than corn. Therefore, for comparison purposes, if the feedstock to the ethanol plant was, instead, corn, the ethanol production capacity would be about 17% greater. Similarly, wheat has a higher starch content than barley. For comparison purposes, if the feedstock to the ethanol plant was instead wheat, then the ethanol production capacity would be about six percent (6%) greater. The plant is expected to operate 24 hours per day for 350 days per year, providing a total production of 20MM GPY of denatured MFGE product using typical barley feedstock. In addition, the plant will produce approximately 380 tons per day of barley WDG and approximately 280 tons per day of Condensed Distiller's Solubles (CDS – aka "syrup").

2.0 Summary

2.1 General

The plant will be designed to produce approximately 57,200 gallons per day of denatured MFGE from 24,700 distiller's bushels per day of barley. Approximately 380 tons per day of WDG and 280 tons per day of CDS will be produced for direct feeding to livestock. Waste streams will be limited to blow-downs from the boiler and cooling tower.

2.2 Equipment Cost

Equipment cost estimates are based on budget pricing submitted by vendors and KATZEN in-house databases.

All equipment pricing is based upon new equipment. It has been KATZEN's experience that select items of process equipment can be procured occasionally on the used-equipment market. This can result in savings. KATZEN has not attempted to estimate the number of equipment items that could be procured on the used market nor attempted to factor in any related savings.

2.3 Budgetary Cost Summary

The Budgetary Cost Summary is presented in Table 2.1 following. The factored cost estimate is based upon new equipment. KATZEN used the following estimating technique to achieve what is generally accepted as an accuracy level of 25%. The cost of materials, labor and fees are estimates based upon typical multipliers applied to the cost of new equipment. The pricing of new equipment was determined by soliciting equipment vendors and fabricators as well as KATZEN in-house databases for equipment pricing. The budgetary cost summary was prepared by applying typical factors to the cost of new equipment. Where judged appropriate, standard multipliers were adjusted to yield costs consistent with KATZEN's experience and with the overall design strategy for this specific plant.

Table 2.1 – Budgetary Cost Summary

	Material ($ U.S.)		Labor ($ U.S.)	
Equipment	$12,544,000		$0	
Equipment Setting	$366,000		$568,000	
Instruments and Computer	$746,000		$583,000	
Piping	$2,223,000		$1,243,000	
Insulation	$394,000		$650,000	
Electrical	$773,000		$669,000	
Foundations	$766,000		$531,000	
Buildings/Structures	$504,000		$519,000	
Total Materials	$18,316,000	Total Labor	$4,763,000	
Tax on Materials	0.0%			0
Labor Markup	0.0%			0
Contractor Indirects	4.0%			$923,000
Installed Cost				$24,002,000
Project Management/Construction Management			$790,000	
Detail Engineering Design Fee			$1,258,000	
Design Fee (Including License)			$1,234,000	
Total Fees				$3,282,000
Freight				$380,000
Startup and Commissioning				$330,000
Spares, Laboratory, Plant Equipment				$570,000
Subtotal				$28,564,000
Contingency		15% of Installed Cost		$3,600,000
Estimated Total				$32,164,000

3.0 Design Basis

The factors used to establish the design basis for the ethanol facility to be located near Wolf Point, Montana are outlined in the following table.

Table 3.1 – Process Parameters

Ethanol Production	57,200 gallons/day (denatured) (Note 1.)
Wet Cake	380 tons/day
Syrup	280 tons/day
Raw Material	Feed Barley
Raw Material Utilization	24,700 "distiller's bushels" per day (Note 2.)
Ethanol Yield	2.21 gallons (absolute) per "distiller's bushel" of barley
Steam	150 psig saturated
Operating Days	350 (8,400 hours)

Note: 1. Based on maximum allowable denaturant according to ASTM D-4806.

Note: 2. "Distiller's bushel" is defined as 56 lbs. and 15.5% moisture.

4.0 Process Description

4.1 General

The ethanol facility is designed to produce 20MM GPY of denatured MFGE using milled barley as feedstock. In addition, the plant will produce wet distillers grains and thin stillage. Plant operations are continuous with regard to input and output. All unit operations are continuous except fermentation. Fermentation involves four batch process vessels that are sequenced to simulate a continuous process. Fermentation is a simultaneous saccharification and fermentation operation.

The plant has been divided into twelve distinct process sections, which are described as follows:

Section Number	Description
100	Grain Receiving And Storage
200	Milling
300	Mashing, Cooking And Liquefaction
400	Fermentation And CIP System
500	Distillation And Dehydration
600	Centrifugation And WDG Production
700	Evaporation and CDS Production
800	Product Blending
1200	Process And Well Water
1400	Cooling Tower System
1500	Fire Water
1600	Plant Air

4.2 Grain Receiving and Storage

Grain, received by truck, is weighed and then unloaded into grain storage silos. Trucks are unloaded by discharging grain into a dump pit from which the grain is transferred to whole-grain silos by conveyors and elevators.

4.3 Milling

Conveyors move whole grain from the silos to a grain cleaner that removes oversized material. The whole grain falls from the cleaner into a surge bin. The surge bin provides surge capacity to the milling system and all subsequent continuous operations to minimize interruptions by the grain-transfer operation.

A weigh feeder controls the flow rate of whole grain from the surge bin, into a hammer mill. The hammer mill produces a grain meal that is conveyed to the mashing area.

4.4 Mashing, Cooking and Liquefaction

The meal is transferred by conveyor to a mixer called the mash mingler. Inside the mingler, the meal is mixed with water and recycled process solutions to form meal slurry. The meal slurry is then discharged by gravity from the mash mingler to a mash mix tank.

The mash mix tank provides surge capacity in the cooking system, allows for pre-liquefaction of the starch, and enables viscosity control of the mash. Also, caustic or anhydrous ammonia may be added to the mash mix tank for pH control, if required.

Mash from the mash mix tank is pumped by a cooker feed pump into a jet cooker, where steam is injected into the mash. Injection of steam provides sterilizing of the mash and gelatinization of starch. The mash is cooled by flashing into a liquefaction tank. The flash vapor is recovered as the source of energy for stillage evaporation.

Liquefying enzyme is added to the mash in the liquefaction tank to begin the hydrolysis of the previously gelatinized starch. After liquefaction, recycled thin stillage (backset) is added to dilute the mash to a target solids concentration and to lower the pH.

Mash cooler pumps transfer the mash from the liquefaction tank through a set of heat exchangers known as "mash coolers". Cooling-tower water provides for primary cooling to reduce the mash temperature.

4.5 Fermentation and CIP System

The cooled mash flows to one of four fermenters. Previously hydrated and actively growing yeast, as well as saccharifying enzymes, nutrients and industrial antibiotics are added to the mash in the fermenter during filling. In the fermenters, enzymes and yeast convert fermentable carbohydrates in the cooked mash into an ethanolic intermediate called beer and carbon dioxide. Fermenter pumps circulate the contents of the fermenters through coolers to remove heat generated by fermentation. The carbon dioxide generated during fermentation is vented through the ethanol absorber to recover ethanol. When fermentation is complete, the fermenter pumps transfer the beer to the beerwell.

Efficient fermentation requires sanitary equipment. Cleaning and sterilizing the fermenters, fermenter coolers, mash coolers and related process piping is accomplished by an automated clean-in-place (CIP) system.

4.6 Distillation and Dehydration

The beerwell serves as a surge tank connecting the SSF (fermentation) system with distillation. The beerwell is agitated by circulation pumps.

The beer, which consists of approximately 10 %(w/w) ethanol, is pumped by the distillation beer feed pump through the beer preheaters to a beer stripper. The beer stripper uses heat to separate an ethanol/water mixture from the residual grain solids solution. The residual grain solids solution, known as stillage, is sent to the whole stillage tank. This stillage is further processed and will be discussed in the Centrifugation section.

Hot vapor from the beer stripper is used to pre-heat the incoming beer. The dilute ethanol from the beer stripper is further concentrated to about 92%(w/w) ethanol in a rectification process. Uncondensed vapors from the distillation process are vented to the ethanol absorber for recovery of residual ethanol.

Concentrated ethanol vapor from the rectification process is superheated by steam as it flows into the molecular sieve units for a process known as dehydration. The dehydration process is used to increase the ethanol concentration from approximately 92 to 99.3%(w/w).

The molecular sieve units are cycled so that one is regenerating while the other is absorbing water from the vapor stream. The regeneration is accomplished by applying a vacuum to the bed undergoing regeneration, which causes water to desorb from the molecular sieve material. Simultaneously, a portion of the anhydrous ethanol vapor stream is directed through the bed as a carrier gas stream to remove the water from the molecular sieve units. From the molecular sieve units the anhydrous ethanol product flows through a cooler and into the product shift tanks.

4.7 Centrifugation and WDG Production

Stillage is pumped from the whole stillage tank to the stillage centrifuges. The stillage centrifuges split the stillage into two streams called wet cake and centrate. The wet cake consists of approximately 30 to 35 percent (w/w) solids (mostly suspended solids) and 65 to 70 percent (w/w) water. The centrifuge is positioned to discharge the wet cake onto a conveyor that transfers the wet cake directly to the WDG bunker, to be used for cattle feed.

The centrate, also known as "thin stillage", contains approximately 8 to 10 percent (w/w) total solids. The majority of these solids are dissolved solids. The thin stillage fraction flows from the centrifuges by gravity to the centrate receiver. The backset pump circulates part of the thin stillage back to the process for use in final dilution and pH adjustment of the liquefied mash.

4.8 Evaporation and CDS Production

The balance of the thin stillage flows from the centrate receiver to a quadruple-effect evaporator where it is evaporated and condensed to a 35%(w/w) solids (CDS). The CDS is stored in a storage vessel and subsequently incorporated in to the cattle feed ration. The condensate circulates back to the process for use in mashing, final dilution and pH adjustment of the final mash.

4.9 Product Blending

The ethanol product is transferred from the product coolers, into one of two product shift tanks. When a shift tank becomes full, it is checked for quality before being released to storage. Denaturant is added to the product as it is transferred to storage.

In the event the product is "off-spec", it is directed to a recycle product tank. Off-spec product is gradually pumped back to the process for recovery of ethanol.

4.10 Process and Well Water

The process water supply is from well water. Well water is used as-received for cold-water users, and it is combined with the bottoms from the stripper/rectifier for warm-water users.

4.11 Cooling Tower System

Cooling water is cooled in the cooling tower system and supplied to various process users and returned to the towers for re-cooling by evaporation.

4.12 Fire Water

The fire water system will be defined in the detailed design portion of the project.

4.13 Plant Air

The compressed air system provides for the instrument air needs of the plant. There are no process users of compressed air.

4.14 Steam Distribution

High Pressure (150 PSIG) steam is delivered to the process by the boiler. A pressure let-down station is located in the process area to reduce the pressure of some of the steam to 50 PSIG for low-pressure steam users (if required).

5.0 Plant Operations

5.1 Chemicals

The chemicals used in the plant are necessary nutrients, vitamins, minerals and micronutrients required for yeast cell growth and metabolism. In addition, sterilants for equipment sanitizing, industrial antibiotics and water-treatment chemicals are required. The usage of these chemicals is determined by the necessary CIP cycles and local ground-water quality. The composition and usage of the minerals and micronutrient packages are proprietary KATZEN technology. Though the composition and usage are not detailed in this report, the estimated cost is included in Table 6.1.

5.2 Utilities

5.2.1 Steam

Total steam required for normal production of 57,200 gallons per day of denatured MFGE is approximately 45,600 pounds per hour. Of this steam demand, most is 150 psig with the balance at 50 psig or lower pressure. Since the ethanol plant uses 150 psig, as well as lower pressure steam, multiple steam headers and let-down stations are installed. The boiler is fueled predominately by natural gas.

5.2.2 Electric Power

The total process connected load is approximately 3,800 horsepower (hp). The non-process electrical requirements are estimated at 10% of the process users; therefore, the total connected load will be approximately 4,200 hp. This corresponds to an operating load of approximately 3,400 hp, or 2400 kW.

5.2.3 *Cooling Water*

The estimated cooling water flow is 5,600 gpm, based on 15°F temperature differential. During peak summer months the cooling water supply temperature is expected to range from 72°F to 75°F.

5.2.4 *Chilled Water*

Given the estimated cooling water temperature of 72°F to 75°F for the plant located in northern Montana, a chiller is not required for the summer months.

5.2.5 *Compressed Air*

The instrument air requirement is projected to be 200 standard cubic feet per minute (SCFM) at a supply pressure of 100 psig.

5.2.6 *Water*

Fresh water is required for the boiler, cooling tower, fusel oil wash, and scrubber make-up. The total estimated fresh water requirement is 280 gpm.

5.3 Effluent

The effluent streams are summarized in Table 5.1

Table 5.1 – Effluent Streams

Stream Description	Flow (gpm)
Cooling Tower Blowdown	24
Boiler Blowdown	9

The cooling tower and boiler blowdown is required for dissolved solids control.

5.4 Labor

Estimated personnel requirements for the plant are listed in Table 5.2. A brief discussion of the responsibilities of the process operations personnel is included in this section.

Table 5.2 – Personnel Requirements

Description	Number of Positions
Manager of Operations	1
Technical/Lab Manager	1
Maintenance Manager	0.5
Process Field Operators	8
Mechanical Technicians	1
Instrument/Electrical Technicians	1
General Labor	2
Clerical	1
Total Staff	15.5

Table 5.3 – Personnel Descriptions by Area of Responsibility

PROCESS FIELD OPERATORS - (24 Hour Coverage)

Fermentation and Distillation area duties include:

- Monitor fermentation systems status.
- Collect fermentation area samples and perform basic analysis.
- Monitor fermenter cleaning steps, including draining fermenter cooler and pump, rinsing and caustic washing fermenters, verifying the vessels are clean, circulating caustic through the coolers, and steaming, if required.
- Prepare and replenish CIP solutions as necessary.
- Monitor distillation systems status.
- Monitor ethanol loadout activities (daytime hours only).
- Collect ethanol product samples and perform basic analysis.

Utility area duties include:

- Monitor boiler, cooling tower and chiller systems status.
- Perform checks, as requested by fermentation or distillation operator.

SUPPORT PERSONNEL - (8 Hour Coverage)

TECHNICAL / LAB MANAGER - (8 Hour Coverage)

Duties include:

- **Supervise quality control and quality assurance activities.**
- **Maintain active cultures of the fermenting organism.**
- **Monitor the seed tank and culture viability.**
- **Monitor fermentation efficiency.**
- **Optimize fermentation nutrient application.**

MECHANICAL AND INSTRUMENT/ELECTRICAL TECHNICIANS - (8 Hour Coverage)

Technician duties include:

- **Perform system preventative maintenance such as oiling and greasing of rotating equipment.**
- **Perform system preventative maintenance such as calibration of process instrumentation.**
- **Repair and replace equipment.**

6.0 Production Cost Summary

Production Cost Summary Table 6.1 provides the anticipated itemized values for the major fixed and variable costs associated with the production of the MFGE. Unit values for fixed and variable costs and product sale pricing reflect recent data but are subject to change. Fuel, electrical, and labor-related charges reflect local rates as provided by local agencies.

An average hourly salary of $17.50 per hour was used for operations and maintenance personnel. Annualized salaries were applied for management staff and clerical positions. Officers' salaries were not factored into the Production Cost Summary table. The combined payroll of the facility's management and clerical personnel, including overhead, is estimated to be $1,183,000 U.S. per year. An overhead charge, equivalent to 40% of each employee's salary, was applied to cover the cost of employment taxes, health insurance, and other costs and benefits.

Table 6.1 – Production Cost Summary

	Quantity			Unit Price	Units	Annual	Per gallon	% of Total
PRODUCTION REVENUE								
Motor Fuel Grade Ethanol	[illegible]	gallons	per year at	[illegible]	per gallons	[illegible]	[illegible]	[illegible]
Carbon Dioxide	0	tons	per year at	[illegible]	per ton at	[illegible]	[illegible]	[illegible]
WDG	[illegible]	tons	per year at	[illegible]	per wet ton at	[illegible]	[illegible]	[illegible]
TOTAL PRODUCTION REVENUE						[illegible]	[illegible]	[illegible]
CONSUMPTION COST								
VARIABLE COST								
Barley	[illegible]	bushe	per ANHYDROUS gallons of a	process of Ethanol at	[illegible] per bushel	[illegible]	[illegible]	[illegible]
Chemicals	[illegible]	$	per ANHYDROUS gallons of a	process of Ethanol		[illegible]	[illegible]	[illegible]
Yeast	[illegible]	[illegible]	per ANHYDROUS gallons of a	process of Ethanol at	[illegible] per lb	[illegible]	[illegible]	[illegible]
Enzymes	[illegible]	$	per ANHYDROUS gallons of a	process of Ethanol		[illegible]	[illegible]	[illegible]
Denaturant	[illegible]	gallons	per ANHYDROUS gallons of a	process of Ethanol at	[illegible] per gallon	[illegible]	[illegible]	[illegible]
Steam	[illegible]	lbs	per ANHYDROUS gallons of a	process of Ethanol at	[illegible] per 1,000 lbs	[illegible]	[illegible]	14.2%
Natural Gas (dryer fuel)	[illegible]	MM Btus	per wet ton of WDG at		[illegible] per MM Btus	[illegible]	[illegible]	[illegible]
Electricity	[illegible]	kwh	per ANHYDROUS gallons of a	process of Ethanol at	[illegible] per kwh	[illegible]	[illegible]	[illegible]
TOTAL VARIABLE COST						[illegible]	[illegible]	[illegible]
FIXED COST								
Payroll & Burden						[illegible]	[illegible]	[illegible]
Maintenance						[illegible]	[illegible]	[illegible]
Insurance						[illegible]	[illegible]	[illegible]
Contract Labor & Services						[illegible]	[illegible]	[illegible]
G & A Costs						[illegible]	[illegible]	[illegible]
Miscellaneous						[illegible]	[illegible]	[illegible]
TOTAL FIXED COST						[illegible]	[illegible]	[illegible]
TOTAL FIXED AND VARIABLE COSTS						[illegible]	[illegible]	100.0%

[illegible] debt service and depreciation

V. Management Feasibility

Choosing a Business Model for the GNDC Sponsored Ethanol Plant

There are several factors for the Steering Committee to evaluate before deciding what type of legal entity should be formed to own and operate the proposed ethanol/feedlot plant. Decision factors include operating control of facility, federal grant eligibility, financing options to allow local ownership and control, tax implications, and risk management. Each form of legal entity has advantages and disadvantages. The two most frequently used entities to develop ethanol plants today are discussed below:

- Developing the plant as a **farmer owned cooperative** is a structure that allows for local control of the project and participation of ranchers as well as the farm community. The potential cooperative would benefit from a large number of local community members pooling their equity to leverage State, Federal and conventional financing. Generally, cooperative members must commit 50 percent of the equity in a typical ethanol project. Conventional or government lenders then provide 50 percent of construction and development costs in the form of long-term debt. The cooperative format is well suited to borrow from Cooperative banks, which have specific charters requirements that make them willing partners. Using the cooperative structure, the plant would be owned by the members of the cooperative, based on a formula of member investment. This formula is typically set forth in the cooperatives organizational documents. One limitation of this development structure is the amount of time and effort required to organize such a cooperative. Six months to a year is the minimum time required for this effort. Strongly committed farmer/rancher leadership must lead the effort. This leadership must be prepared to invest a tremendous amount of personal time and energy to the cooperative organizational effort. A group of initial co-op investors must step up to the plate early in the process and assume greater risk by making early contributions to the development effort. However, if such a committed core of leadership exists, it is one method to raise an early round of predevelopment funding. In the 20 million gallon plant with feedlot scenario, cooperative members might need to raise as much as $25,000,000 from members. This is a hard nut to crack, but after construction, profits from operations are guaranteed to remain in the local community. In the Corn Belt, where ethanol is a proven market driver for feedstock production, many farmer cooperatives have been successfully organized. It is not clear such an effort can be organized on the highline where ethanol production is perceived as a high-risk endeavor.
- Another frequently used organizational option is to create a **Limited Liability Company (LLC)** as the development vehicle. An LLC is a business structure that has the limited liability of a corporation, along with the single layer tax advantages of a partnership. One advantage of an LLC structure is that it allows investors other than farmer/ranchers to participate by contributing equity to the venture. An LLC structure allows greater flexibility in the distribution of tax benefits to members. An LLC structure might prove to be of greater utility in accessing certain sources of State and local financing. By organizing as

an LLC potential experienced management partners might more easily participate in the project. An experienced ethanol development/management partner might trade part of their development costs and fees for an ownership stake in the company, thus reducing up front project development costs. By allowing investors other than agricultural producers to become owners, the Steering Committee might shorten the time frame to raise pre-development funds as well as partnering with proven expertise.

Since the Steering Committee has expressed an interest in keeping local control of the project, either of these two options could help facilitate that choice. Having a cattle feedlot directly linked to the development may prove to be an added complication. Very few firms in the ethanol industry have experience simultaneously managing a large cattle feedlot. To simplify the risk profile of the project, the Steering Committee may wish to reconsider combining both an ethanol plant and a feedlot.

Management Team Alternatives

According to a study done by Douglass G. Tiffany for the University of Minnesota, one of the key factors associated in the success of an ethanol plant, is the quality of the team managing the plant.[9] In today's world, the management team must be well versed not only in normal plant operations and products marketing, but also they must be experienced in the intricacies of risk management in the commodity markets, equity tools, and government financing and reporting requirements. As stated above co-locating an ethanol plant and a cattle-feeding operation multiplies the risk in managing the complex.

Selecting a professional plant development/management firm early in the development process is an issue that should be addressed by the Steering Committee as one of its first priorities, should the Steering Committee chose to proceed after studying this feasibility analysis. Unless someone within the Steering Committee or within the local community has adequate industrial plant development experience to run a project of this size and complexity, recruitment of an outside management partner early in the process becomes an absolute necessity. The following examples illustrate a few common development/management options:

- A new model that has been used successfully by several farmer-owned ethanol plants is referred to as **Turnkey Management**. In this model, an experienced ethanol development/management firm is hired to package the project from design to ongoing operations. Turnkey Management firms have experience in all the areas of plant design and management that can reduce the risk of project failure for an independent farmer-owned venture. (Few firms also have experience in feedlot development and management). A high degree of experience in the management team can avoid errors that cause delays and reduce mistakes that end up costing time and money. The right firm can provide a management team that can hit the ground running. Most management teams are hired on a contractual basis, and some will also negotiate a share of stockholders profit. Finding a management partners with available staff capacity during this boom time in the ethanol industry may prove to be a challenge. The Steering Committee must find a firm where the "personal chemistry" works for all parties. There are many of these firms who attend the

[9] Factors Associated with Success of Fuel Ethanol Producers, Douglas G. Tiffany, Department of Applied Economics, College of Agricultural, Food, and Environmental Sciences, University of Minnesota.

Annual Ethanol Producers and Consumers (EPAC) conference. Leadership within EPAC can facilitate initial interviews with a number of qualified firms.

- Another option is for the Great Northern Development Corporation (GNDC) to investigate **hiring various specialized members of a design/finance/construction team**. This process would begin by hiring a project design team to take on the project after approval of the feasibility study, through final stages of construction, but stops short of plant operations. Usually, these teams will develop and help structure the operating organization as a legal entity, create the business plan worthy of being funded, work with financing and equity alternatives, complete the engineering design, and apply for and follow up with all environmental permits. Most firms in the ethanol industry that perform this service work strictly on a fee basis. GNDC might have to apply for funding during a particular federal grant cycle, wait for funding, and then secure the project design/finance team. This process typically takes one year. A separate operating team would be hired after construction. The design/construction team would stay in place until an initial shakedown operating period is completed.
- One after-construction alternative is to have either a professional management team or a Turnkey firm run the plant for a set period (say five years) while at the same time, training a local management team to eventually take over all facets of operation.

Funding Options

1. Montana In-State Loan/Bond Programs

a) Business Loan Participation Funded from the Permanent Coal Tax Trust

- Fixed rate financing up to 25-years (current interest rates are posted weekly) are available from the Montana Board of Investments.
- Maximum participation amount of approximately $69 million (10% of the Trust). This loan size works well with the contemplated size of project evaluated in this feasibility study.
- Maximum Board participation is 80 percent if Board loan participation is less than 6 percent of the Trust.
- Maximum Board participation is 70 percent if Board loan participation is more than 6 percent of the Trust.
- For each qualified job created, the interest rate will be decreased 5 basis points to a maximum of 2.5 percent from current market loan rates.
- Full credit review will be waived if the loan is guaranteed (BIA, DOE, USDA).

b) *Value-Added Business Loan Program funded from the Permanent Coal Tax Trust.*

- Maximum 15-year loan term.
- 10-14 jobs created/retained qualify for a loan rate at 4 percent for 5 years.
- 15 or more jobs created/retained qualify for a loan rate at 2 percent for 5 years.
- Interest rate will be at the posted interest rate until the required jobs are created or retained.
- The interest rate will be set at the lowest rate for the first 5 years, 6 percent for the second 5 years, and the posted rate for the third 5 years.
- Jobs created/retained must be by a business adding value to material/products.
- Board participates with lender in 75 percent of the funding, risk, collateral, and other security.
- Minimum loan size $250,000.00, and the maximum loan size is approximately $6.9 million (1% of the Trust). Due to loan size this tool is not a preferred option, although discussion of this option will occur. Therefore, RCI has included this brief description of the Value-Added Business Loan program.
- Full credit review is waived for guaranteed loans (BIA, DOE, USDA).

c) *Infrastructure Loan Program Funded from The Permanent Coal Tax Trust*

- Loans to local governments for infrastructure improvement used by basic sector businesses.
- Business for which infrastructure is provided must create at least 15 full-time jobs.
- Loan sized at number of jobs times $16,666.00. The minimum loan size is $250,000.00.
- Business pays local government use fee, which is assigned to Board for repayment.
- Use fee can be totally credited against Montana income taxes paid by business.
- Total amount available for this program is $50 million.
- There may need to be some infrastructure improvements needs to support this project depending upon the development site selected.

d) *Montana Board of Investments Tax-Exempt Bond Program*

- **Qualified Exempt Small Issue Bonds** - Industrial Development Bonds (IDB). These are bonds issued at the county level of government to help bring industry and jobs to their county. The bonds are paid off by increased tax revenues generated by an industrial project located in a particular county financed in part by the bond issue. These bonds might be used to acquire the needed equity to leverage conventional bank financing or a Board of Development Business Loan. This would also allow the local community to keep control of the project, and restrict outside investors to minority ownership. Paring this IDB tool with the Business Loan from the Coal Tax Trust fund might be a good option. However, in addition to this ethanol feasibility study now being completed, funds would need to be raised for other steps in the predevelopment process. RCI believes that a group of local investors needs to be at risk in the project to engender the proper motivation and long-term commitment to the development. Financing the project without farmer/rancher risk may prove to be risky in the long run. Use of Tax-Exempt Bond option will require close cooperation with the County Commissioners.

2. *New Market Tax Credits (NMTC)*

- The New Market Tax Credit provides individuals and corporations with an incentive to invest in a community development entity (CDE). The qualifying CDE in this case would be the Great Northern Development Corporation. To receive NMTCs from the Department of Treasury, the CDE must provide capital and financial advisory services to low-income communities. The CDE "sells" a qualifying investor a credit against their Federal tax liability equal to a percentage of the amount invested in the CDE. The credit can be taken for up to 7 years. The credit will be available for up to $15 billion in investments in CDEs designated by the U.S. Treasury Department over the 2001-2007 period. In a typical transaction, an investor would make a 30 percent investment in the project and use the tax credit to "write it off" over the seven year period. The NMTC investment in effect becomes equity in the project that reverts to the project owners over the seven-year stand still period. As attractive as this financing option sounds, NMTCs are complicated transactions that require experienced attorneys and other experienced professionals. These professionals are expensive. A first class business plan or private placement memorandum must be completed; an experienced management team must be fully in place, and; the balance of financing must be pre-committed.

3. *Department of Energy Loan Guarantee Program under Title 9 of the Energy Policy Act of 2005*

- This is a program that offers loan guarantees for projects that employ Innovative Technologies for alternative energy production.
- Loan guarantees can be made on an individual project up to $100 million.
- Applicants must pre-apply by the beginning of November 2006. After a pre-application is accepted, the DOE will respond with either an offer to participate by sending a full application, or will advise that the project is ineligible under DOE guidelines.
- If able to secure, this guarantee would work together well with the Montana Board of Investment Business Loan program.

4. *United States Department of Agriculture Programs*

a) *USDA Business and Industry Loan Guarantee Program (B&I)*

- The B&I Guaranteed Loan Program helps create jobs and stimulate rural economies by providing financial backing for rural business.
- Provides guarantees up to 80 percent of a loan made by a commercial lender.
- Program represents a partnership between the public and private sectors.
- Assistance under the B&I program is available to virtually any legally organized entity.
- The maximum aggregate B&I Guaranteed Loan amount that can be offered to any one borrower under this program is $25 million.
- A maximum of 10 percent of program funding is available to value-added cooperative organizations for loans above $25 million to a maximum aggregate of $40 million.
- The B&I guarantee is not sought by the project developer, but by the financing partner. However, the project developer must be prepared to offer substantial support during the application process.
- As with all federal funding, a full environmental assessment must be completed and Finding of NO Significant Environmental Impact (FONSI) published before release of the guarantee.
- This guarantee would work together well with the Montana Board of Investment Business Loan program.

b) *USDA Rural Business Opportunity Grants (RBOG)*

- The purpose of these grants is to promote sustainable economic development in rural communities that can demonstrate exceptional needs. These grants can be used to pay for economic planning for rural communities, technical assistance to rural businesses, or training for rural entrepreneurs or economic development officials.
- Eligible applicants include: public bodies, Indian Tribes, nonprofit corporation, or cooperative with a majority of the members primarily rural residents.
- Most single state grants are for $50,000.00 or less. These funds could be used for pre-development planning costs. One limitation of these funds is that they are available only during an open completive period from March 1st to about August 15th each year. Funds will not be available again until FY 2007.

c) *USDA Value Added Producer Grant (VAPG)*

- Value-added is defined as the incremental value that is realized by the producer from an agricultural commodity or product as the result of a change in the physical state (e.g., wheat/barley into ethanol).

- Eligible applicants include independent producers, Rancher/farmer cooperatives, agriculture producer groups, and majority controlled producer-based business ventures.
- Funds can be used for planning activities such as business plans, and feasibility studies, or for working capital
- Maximum amount for a 2006 working capital grants is $300,000.00, and for planning activities is $100,000. GNDC would be eligible to apply for $100,000 next fiscal year depending on the structure of the organizing entity for the development. In this matter, the Rural Development State Office in Bozeman should be carefully consulted prior to the application.

5. *Federally Designated Enterprise Zone/Enterprise Community Grants and Loans*

- The first priority of an enterprise zone/enterprise community in revitalizing distressed communities is to create economic opportunities (jobs and work) for community residents. The creation of jobs, both within the community and throughout the region, provides the foundation on which residents will become economically self-sufficient and communities can revitalize themselves. Opportunities for entrepreneurial initiatives, small business expansion, and training for jobs that offer upward mobility are other key elements for providing economic opportunity and direction. Obviously, the Fort Peck Assiniboine and Sioux Tribe Enterprise Community hold such a designation.
- The Enterprise Community can provide both grants or loans, tax credit programs and potentially bond financing to foster a holistic, participatory approach that requires community stakeholders to work together to develop and implement comprehensive strategic plans for revitalization. EC might be used to support pre-development activities for the project.
- There are additional EC related grants available that can be used to fund a Brownfield site clean up if needed.
- Communities that are federally designated Enterprise Communities can use that designation to compete aggressively for specific grants from an assortment of local, state, and federal agencies and departments. Usually a special completive advantage is awarded to EC designated projects.
- In order for a project to be eligible to receive EC funding or EC competitive advantage, it must be listed as a benchmark (project) in the federal USDA On-line Benchmark Management System. The local EC Board of Directors must accept and post this benchmark. GNDC would need to work with the EC to have them accept the ethanol plant/feedlot as a project. Selection of a site in or immediately adjacent to the EZ may be required.

6. *Indian Tribal Energy Development and Self Determination Act of 2005*

If the GNDC sponsored Ethanol Plant Steering Committee wanted to include members of the Fort Peck Indian Community in their deliberations, and as possible partners, the new Indian Tribal Energy Development and Self Determination Act of 2005 might help finance the plant. Final implementing regulations have not yet been written, however, some provisions of the act will appear as follows.

- Up to $150 million per year in loan guarantees will be made available for majority owned (51 percent or more) alternative energy projects including ethanol plants.
- The new act will authorize Indian Tribes to enter into leases and agreements and issue right-of-way for energy development projects without first obtaining approval of the Secretary of the Interior.
- The new Act instructs the Secretaries of the Interior Department and the Department of Energy to develop an Indian resource development program that will provide grants and low-interest loans to tribes for development and utilization of energy resources. Some pre-development costs may be financed using other regularly funded programs.
- Loan guarantees under this program may be used in conjunction with other guarantee programs, although final regulations are just now being drafted.
- No appropriations have so far been included in the FY 2007 budget because final regulations have not yet been approved.

Management and Financing Conclusions

- GNDC and the Steering Committee have little hands-on management experience in the ethanol industry. This lack of direct ethanol development/management experience of the Steering Committee may be the greatest project risk identified in this feasibility study. Therefore, it is imperative for the Steering Committee to carefully select an experienced management/development partner early in the development process.
- By combining both the cattle feeding management risk with the ethanol plant management risk the complexity of risk management on the entire the project is increased. Combining both cattle and ethanol elements will increase the difficulty in securing an experienced management/development partner.
- Montana Board of Investment participation in financing the development appears to be a real possibility. The Steering Committee along with GNDC staff should discuss this funding option with the State before selecting an ownership/operating structure. The Steering Committee should adopt an ownership structure that will facilitate financing, not hinder it.
- Financing this venture and retaining local ownership will require utilizing a combination of federal, state and local financing tools. GNDC will want to have experienced accounting, legal and grant writing assistance available at appropriate stages of development.
- Depending on the sizing of the facility, organizational structure and partnering relationships, the Steering Committee may need to raise $500,000 to $1,000,000 for the pre-development effort. Although this seems like an insurmountable hurdle, ethanol is hot in the market now. Many government and private partners can be attracted to the table to help. The project needs a team approach to succeed. Building that team quickly and effectively is the key to success.

VI. Environmental Feasibility

Affected land uses of the Proposed Great Northern Ethanol Plant

The proposed ethanol/feedlot facility is an industrial scale value-added agriculture project. Property uses at the site will create new and unusual impact patterns on the land that may affect environmental quality. This report seeks to gather and explain baseline information as to those potential impacts. The alternatives to those impacts and the measures employed to avoid or mitigate any adverse environmental impacts associated with the project.

1. *Residential Impacts*

Since the first choice location for the ethanol plant complex is located about 1 mile from any residences and on fallow grazing land, there will be almost no impact due to increased traffic to the project site by trucks and passenger vehicles. All traffic will be routed to the site on U.S. Highway 2 and Montana Highway 13.

2. *Watershed Impacts*

The proposed ethanol plant complex is approximately two (2) miles from the Missouri River. Potential impacts from the Ethanol Plant complex facility include potential nutrient release into the watershed, increased truck traffic on Roosevelt and Valley County roads crossing over the river, and potential odors escaping from the site. Each of these potential impacts will be discussed in greater detail below, however, each potential impact appears to be minimal, and measures employed to avoid or mitigate those impacts are discussed.

3. *Transportation Impacts*

The ethanol plant complex is expected to create approximately 10,675 inbound semi-truck loads of raw materials annually. This includes 8,700,000 bushels of grain, 62,500 head of feeder cattle (1,450 loads), 725 loads of feed ingredients, 100 loads of gasoline denaturant and 75 loads of chemicals and other operating supplies. Most of the inbound trucks will exit the project site empty. Out bound truckload shipments will include 1,450 loads of fat cattle, 2,500 loads of fuel ethanol, and 50 loads of wet distillers feed products. Total outbound truck shipments should be approximately 4,375 loads annually. In addition, small vehicle traffic for employees, service and maintenance vehicles, public service providers and guests are expected, totaling approximately 50 vehicles per day. This small vehicle traffic will exceed 15,000 vehicles per year; however, the overall industrial transportation and traffic plan will have to accommodate approximately 30,000 vehicle trips annually.

4. *Wetlands Impacts*

There are no wetland areas within the Wolf Point Site. Construction plans will be developed to mitigate runoff from the construction site. Most importantly, the ethanol plant complex will develop a professional Nutrient Management Plan (NMP) to avoid excessive nutrient contamination of the lands surrounding the complex. Such an NMP for the ethanol plant would result in zero nutrient discharge into the Missouri River. The NMP mitigation measures will control the application and runoff of nitrogen, phosphorus, and potassium. These and other measures are discussed in a variety of sections below, but particularly in Section (VIII) Water Quality.

5. *Wildlife Impact*

Wildlife does use the area surrounding the Wolf Point Site as grazing habitat. Ungulate animals such as deer may utilize the site. However, sufficient adjacent grazing makes this impact very minor. Several species of waterfowl and birds migrate through the immediate area and utilize the cropland as feeding ground. Likewise, removing the approximate 50 acres from their potential use is a very minor impact. Nearby, several species of fish inhabit the waters of the Missouri River, which receives drainage water from the surrounding farmland. Excessive phosphate contamination is a risk that must be evaluated since it has potential to affect fish in the Missouri River.

6. *Air Quality Impact*

A variety of air emissions will be released from the Ethanol plant complex. These emissions are discussed in Section (VII) Air Quality below. Although these emissions are discussed in "tons" of emissions per year, the Montana Department of Natural Recourses considers the amount of plant emissions to be small in light of Federal emissions standards and the clean baseline air quality in Roosevelt/Valley Counties. Also discussed below in that section are the measures being employed to avoid or mitigate any adverse environmental impacts associated with those air emissions.

7. *Solid Waste Management*

The Ethanol plant complex will produce a variety of solid and moist materials in its value added production processes. The ethanol unit will produce approximately 237,000 tons/year of wet distillers byproducts (WDB). The cattle feedlot will produce approximately 340,000 tons/year of manure. Additional information is provided throughout the document as to those potential impacts, the alternatives considered and the measures employed to avoid or mitigate any adverse environmental impacts associated with the project.

8. *Available Energy Supplies*

Montana Dakota Utilities (MDU) will provide natural gas at the Wolf Point Site. A 2" pipe already exists that can be converted to a 3" pipe that can carry sufficient natural gas to the ethanol plant complex site to provide up to 775,000 decatherms per year. Both MDU and Northern Electric Cooperative are able to provide three-phase power to the Ethanol plant complex site as well.

Air Quality

1. Data from Monitoring Stations

According to the Montana Department of Natural Resources, Air Quality Program, there is no local air quality monitoring data available from either Roosevelt or Valley Counties. The closest air quality monitoring station to the project area is approximately 50 miles away in Glasgow, Montana. Sampling results at locations around the state show the air quality in-general is some of the cleanest in the nation. Recorded concentrations for particulate matter are less than 50 percent of the EPA standards and ozone concentrations are less than 75 percent of the EPA standard. With the mitigation measures discussed below the ethanol plant complex will not exceed the National Ambient Air Quality Standards (NAAQS) as established by the US Environmental Protection Agency (EPA). No mitigation measures will be required.

2. Air Emissions to Be Produced

Ethanol Unit Boiler

The boiler to be used to produce steam in the ethanol production process will be a natural gas fired boiler powered by gas piped to the site. The maximum design capacity of the boiler is 61.2 MM BTU per hour of heat input. The boiler will consume approximately 21,183 tons/year of gas operating 8,760 hours per year.

With standard emission controls equipment as provided by the manufacturer, the boiler will produce an estimated 4.55 tons/year of particulate emissions, 97.17 tons/year sulfur dioxide (SO2), 14.07-tons/year nitrogen oxide (NOx), 84.65 tons/year of volatile organic compounds (VOC), and 40.21 tons/year of carbon monoxide (CO). All these emissions except sulfur dioxide, which hovers close to the 100 tons/year limit, are well within EPA operating standards as are all air emissions listed below. Again, it should be repeated that the Wolf Point Site is approximately 1 mile from any residence. (Sulfur dioxide scrubbers can mitigate this output).

Grain Receiving

Grain will be brought to the facility by truck and will be emptied into a surge bin with approximately 2,800 bushels of storage. From the surge bin, the grain will be transferred to the hammer mill for processing. In addition to the surge bin, there will be a larger storage bin as well. The ethanol plant has the ability to store a total of 164,059 bushels of grain at any time.

The grain receiving process is anticipated to release approximately 17.67 tons/year of particulate matter into the air.

Grain Milling

Grain is fed into the process by a grain transfer conveyor from the grain storage silos, which moves it from the adjacent grain feed elevator. The scalped grain passes into a surge bin that has an operating capacity of approximately 4 hours. The flow is controlled out of the surge bin by a weight feeder that moves the grain by a magnetic separator to the hammer mill where it is ground to a consistent particle size. Any dust produced in the milling operation is collected and recycled back into the process using the hammer mill baghouse that functions as a dust collection system.

The hammer mill with baghouse is anticipated to release approximately 1.18 tons/year of particulate matter into the air.

Mashing, Cooking, Liquefaction

The meal conveyor, under flow ratio control, transfers the milled grain to the mash mingler where it is mixed with process water and heated mashing water from a hot well. The flow rates of process water and the backset fraction of heated mashing water are also under flow ratio control. The meal slurry is then discharged by gravity from the mash mingler to a mash mix tank.

The primary purpose of the mash mix tank is to provide surge capacity in the cooking system and to allow for pre-liquefaction of the starch and, if necessary, for viscosity control. Caustic or anhydrous ammonia is added for pH control, if necessary.

Air emissions anticipated from this process are included as a component of emissions under the heading "fugitive emissions" that in aggregate are estimated at 24.34 tons/year.

Fermentation and CIP System

The cooled mash flows to one of a battery of four fermenters. Previously hydrated and actively growing yeast as well as saccharifying enzymes, nutrients, and industrial antibiotics are added to the fermenters during filling. Fermenter pumps re-circulate the contents through fermenter coolers to remove heat generated by fermentation. The carbon dioxide generated during fermentation is vented to the ethanol absorber. When fermentation is complete, the beer is transferred to the beer well via the fermenter pumps. Cleaning and sterilizing the fermenters, fermenter coolers, mash coolers, and related process piping is accomplished by the automated CIP system.

Air emissions anticipated from this process are included as a component of emissions under the heading "fugitive emissions" that in aggregate are estimated at 24.34 tons/year.

Distillation

The beer well serves as a surge tank connecting the simultaneous saccharification and fermentation system with distillation. The contents of the beer well are kept circulated by the beer well agitator. The beer, which consists of approximately 10.0 percent w/w ethanol, is pumped by the distillation beer feed pump through the beer preheat train. Condensation of vapor from the beer stripper is used to heat the beer in these heat exchangers. The stillage containing the residual grain solids is sent to the whole stillage tank. There is a second distillation bottoms stream that is free of solids and is used as process water makeup. Air emissions anticipated from the distillation process are anticipated to include 31.97 tons/year of VOC.

Dehydration

Hydrous ethanol vapor from distillation is drawn and superheated in the mol sieve superheater using steam. The superheated ethanol vapor flows to the mol sieve units for dehydration. The vapor passes up through one bed of molecular sieve beads, which is under pressure control. Incoming water is adsorbed on the molecular sieve material. Ethanol vapor at a minimum concentration of 99.3-weight percent ethanol exits the mol sieve units.

The mol sieve units are cycled so that one is regenerating under vacuum while the other is absorbing water under pressure from the hydrous ethanol vapor steam. The regenerating stream is sent back to distillation for reprocessing. The anhydrous ethanol product flows through the mol sieve cooler to the product shift tanks.

Air emissions anticipated from this process are included as a component of emissions under the heading "fugitive emissions" that in aggregate are estimated at 24.34 tons/year.

Centrifugation

Solids containing stillage is pumped to the stillage centrifuge that splits the feed into two flows: the cake and the centrate. The cake consists of approximately 33-35 wt. percent solids (mostly suspended solids) and 65-67 wt. percent water. The centrifuge is positioned to discharge the cake into a conveyor carrying the wet cake to the cattle feed storage.

Centrate, consisting of approximately 8.0 wt. percent total solids is collected in a centrate surge tank to provide surge capacity near the centrifuge units.

Air emissions anticipated from this process are included as a component of emissions under the heading "fugitive emissions" that in aggregate are estimated at 24.34 tons/year.

Tanks, Storage and Rollout

There are two product shift tanks, a recycle product tank, a denaturant tank, and a final product storage tank. They are identified as:

Identification	Liquid Stored	Size
TK-801A	Ethyl Alcohol	20,000 gallons
TK-801B	Ethyl Alcohol	20,000 gallons
TK-803	Ethyl Alcohol	20,000 gallons
TK-805	Gasoline	20,000 gallons
TK-807	Denatured Ethanol	30,000 gallons

It was determined that storage tanks would emit 19.56 tons/year of VOC and that the rack loading and product loadout would release an additional 6.85 tons/year of VOC.

Topographical Hindrances

There are no apparent topographical or meteorological conditions that will hinder the dispersal of the air emissions identified in this report.

Air Emissions Control Measures

The complex is being designed by its management partners to minimize or eliminate most air pollutant sources and to comply with both federal and state air pollution control legislation. Staying in compliance with the air quality permit is not expected to be a problem. Facility engineering is focused on limiting air pollutants through all of the following measures.

3. *Quality Engineering and well-managed facility*

The study team recommends assembling a management and engineering team such as Katzen International and Chimonas Enterprises. They have focused on designing the optimal facility. The simplest and most effective means to assure compliance with air quality standards is to have a well-managed facility with a regular maintenance schedule. Day-to-day operations of the ethanol plant will be managed to incorporate best management practices where appropriate and applicable regarding air emissions.

Employee training

The ethanol plant complex will follow best management practices and good housekeeping procedures. Well-trained employees will visually monitor equipment daily around the facility to assure all equipment is functioning properly with no major emission problems.

Analytic equipment

The entire ethanol plant complex is built to include state-of-the-art analytic monitoring instruments.

Dust controlled feed mill

The enclosed feed mill will contain a cyclonic vacuum and fabric filter in the baghouse. The hammer mill, weight feeder and meal conveyers are all dust controlled using this vacuum system.

Efficient boilers

The ethanol complex will install fuel efficient, low emissions boilers.

Vapor scrubbing

The ethanol unit will contain a carbon dioxide scrubber for air emission control of organic volatile compounds.

Vapor recovery

Valves, connections, and open-ended lines will all contain appropriate vapor recovery systems.

4. *Ethanol plant*

Ethanol production consists of the physical grinding of grains containing starch and mixing that grind with water to form a mash. The mash is heated and mixed with enzymes to extract and liquefy the starch component, and then ferment that starch into sugars. Yeast is then added to convert the sugars into ethanol and carbon dioxide. This fermentation process creates a mixture known as "beer" which contains approximately 10 percent ethanol and 90 percent water. The "beer" then is processed through a distillation column to separate the components, resulting in an ethanol product that is 90 to 95 percent pure. A dehydration process is utilized to increase the alcohol content to at least 99 percent, and finally, a certified denaturant (unleaded gasoline) is mixed into the ethanol to make it impotable and commercially saleable.

This is a standard description of ethanol production process that occurs at ethanol plants all across the nation today. The proposed ethanol plant is designed to capture the process water in the distillation and dehydration phases of ethanol production. Barley, one of the primary feedstock for this ethanol plant (the other is short season corn), contains about eight percent of its weight as water. In this facility, approximately 15,000 gallons of water will be extracted from this volume of barley each day. A significant portion of water will be retained in one of the byproducts of ethanol production, known as Wet Distiller's Grains (WDG), and evaporated syrup. This WDG will be transferred to the feedlot as a major component of a complete cattle ration. The remainder of the water is captured from various phases of production, including the condensation of steam, and recycled through the ethanol plant.

Sources of Noise

The Wolf Point Ethanol Plant complex will produce what are believed to be minor sources of noise pollution as follows:

Vehicle Operations

The inbound and outbound trucks and passenger vehicles will cause the greatest noise impact of the project. The truck and passenger trip numbers are detailed in Transportation immediately above.

Feedmill Operations

The loaders, conveyer belts, and hull removal machines will all cause a moderate amount of noise. However, the feedmill will be located in a fully enclose building with a sound insulation blanket installed.

Ethanol Plant

The electric pumps and other mechanical systems of the ethanol plant will only produce a modest hum and will be fully enclosed in the ethanol plant.

Feedlot

Cattle noises from the feedlot will occur but will be reduced by enclosure due to the design of the feedlot described in greater detail elsewhere in this study. Also, the feedlot is located five miles from any substantial number of residences.

Impacts of Noise on Land Use

The very reason that the ethanol plant complex is being located in a rural area is to minimize the negative impacts of such a large value-added agriculture facility on any urban, highly populated area. The Wolf Point site is approximately one mile from the Wolf Point residential buildings. Therefore, the impacts of noise from plant operations on existing agricultural communities should be minimal.

Project Environmental Permits

The ethanol unit design may require a number of permits including: 1.) Ground Water Discharge Permit; 2.) Surface Water Discharge Permit; 3.) Temporary De-Watering Permit. Ethanol plant complex management will, of course, comply quickly with any requests for permits from the agencies involved.

Status of Each Permit

No permits have yet been applied for. The appropriate time to apply for them is after a go-ahead decision by The Great Northern Development Corporation. Permitting requests are appropriate during the final engineering stage.

US Geologic Survey Maps

US Geological Survey 7½" topographical maps are included below which delineate the location of the site choices for the Ethanol Plant complex.

Environmental Conclusions & Recommendations

- The site that is eventually chosen must be able to conform to the various standards mentioned above. Water run off, air quality, traffic patterns solid waste management, and noise are just a few of the factors that must be taken into account in choosing the site.
- An experienced management team should be engaged from the very beginning of the development process to ensure that the site meets these standards. The team should also be well versed in getting permits applied for and approved before actual construction begins.
- The addition of an anaerobic digester component to the ethanol plant would help mitigate some of the air and water quality permits, as well as meet most CAFO Rules.
- The subtraction of the cattle feedlot component would also require a re-working of the basic environmental assumptions.

Potential Sites Evaluated

RCI went up to GNDC in Wolf Point on June 29th to attend the community meeting and to look at some pre selected sites provided by the Steering Committee and the Roosevelt and Valley County Commissioners. Four sites were looked at, and one site was added later after calls from the Roosevelt County Assessors office. As you will read below, each site had certain advantages and disadvantages.

1. (Preferred Site Location) Old Refinery Site T27N, R48E, sections 3 and 10

Location:

The first parcel, located in Wolf Point, Roosevelt County in the Southwest corner of section 3, and the Northwest corner of section 10 in Wolf Point, Roosevelt County, Montana. All Parcels surrounding these two parcels are controlled by the Fort Peck Indian Tribe. These two forty-acre parcels are currently owned by Hot Wheels Roller Rink, The owner bought them from the old refinery. His plan was to salvage the machinery and tanks on the site. At the current time, he owes several years of back taxes, as well as having a potential problem with the EPA concerning left over diesel in underground pools. He has agreed to deed the property over to the County, in exchange for his tax bill being forgiven. The County has agreed to donate the land to the proposed Ethanol plant.

Land status:

These two parcels are currently not being used, and are abandoned. There is still an abandoned diesel tank, as well as several small structures that will have to be removed.

Access to Site:

The site is alongside State Highway 13, and ½ mile from U.S. Highway 2. Both roads are in excellent condition, and will have no problem serving the estimated 15,500 truckloads per year. The BNSF railroad runs along the border of the property and has a 110-car spur off the main line.

Utilities to the Site:

Montana Dakota Utilities (MDU) has an existing 2 inch gas line running to the site tapped off the Poplar lateral 60 feet away. MDU has said that based on projected use, they would be able to increase the line to 3 inches with only minimal cost to the plant. Both MDU and Northern Electric Cooperative serve that site with High Voltage Electricity. Projected electrical usage would decide which of the two would serve the Proposed Plant.

Cost of Land:

Estimated cost of this property is approximately $100,000, with most of that going for clearing of the land and preparing it for construction. There is no actual cost as the County has promised to donate the land for the project.

Suitability for Commercial Development:

The site is already zoned for commercial use. Therefore there won't be any problems with the zoning.

Access to Water:

The site is within 20 feet of a proposed water pipeline owned by the Fort Peck Indian Reservation. This pipeline will eventually connect to a new water treatment plant. The building of this water treatment plant is contingent on the availability of federal funds. The treatment plant location is ½ mile to the South of the proposed ethanol plant complex. Currently there is no existing water main at this location.

Impact on Local Environment/Community:

The nearest habitable structures are ¾ of a mile away. The impact on noise, traffic, and smell to the surrounding area will be minimal.

Advantages of the Site:

- Columbia grain elevators less than 3 miles away.
- Site is located next to a 110-car rail spur.
- Site has easy and close access to Highways 2 and 13.
- Good access to natural gas lines and high voltage electrical lines.
- Already zoned for commercial use.
- Minimal cost for buying and using the land.

Disadvantages of the Site:

- Possible problem with EPA clean up.
- No existing water line.


Site 1 Old Refinery
ROOSEVELT CO
MC CONE CO

2. Alternate Site 2: Oswego Site T27N, R45E, section 34:

Location:

This property, located in Osweego, Roosevelt County, and is comprised of two parcels. The first parcel has 113 acres and is in the upper Northeast part of the section. The second parcel has 275 acres and is located in the lower Southwest portion of the section. For the purposes of the ethanol plant complex, only the first parcel is of interest.

Land status:

Currently the land is not being used. The land is rolling contoured and uneven and would need to be leveled before any development could take place.

Access to Site:

The site sits ½ mile off Highway 2, and about ¾ mile off BIA road 1. Highway 2 would have no problem serving the estimated 15,500 truckloads per year; however, there is construction on going at this time causing lengthy delays and detours. BIA 1 would not be able to handle truck traffic without an extensive overhaul and widening of the road. The BNSF railroad runs at the border of the property, but there is no spur to handle the offloading of grain and the loading of Ethanol.

Utilities to the Site:

There is no existing natural gas line to the site. The closest line that could be tapped is over 2 miles north of the site. High voltage electricity is available from Valley Electric Cooperative.

Cost of Land:

The cost for this parcel is approximately $300.00 per acre.

Suitability for Commercial Development:

This site is currently zoned for agriculture, but could be re-classified without any foreseeable problems.

Access to Water:

There is no existing water main currently at this site. There is an abundance of groundwater, but very poor quality. There is an irrigation ditch ½ mile away, and the Missouri River is 1.5 miles away. The Fort Peck Indian Tribe will be putting a water pipeline close to the border of the property, but that is dependant upon the availability of federal funds, and negotiating a deal with the Tribes.

Impact on local environment/community:

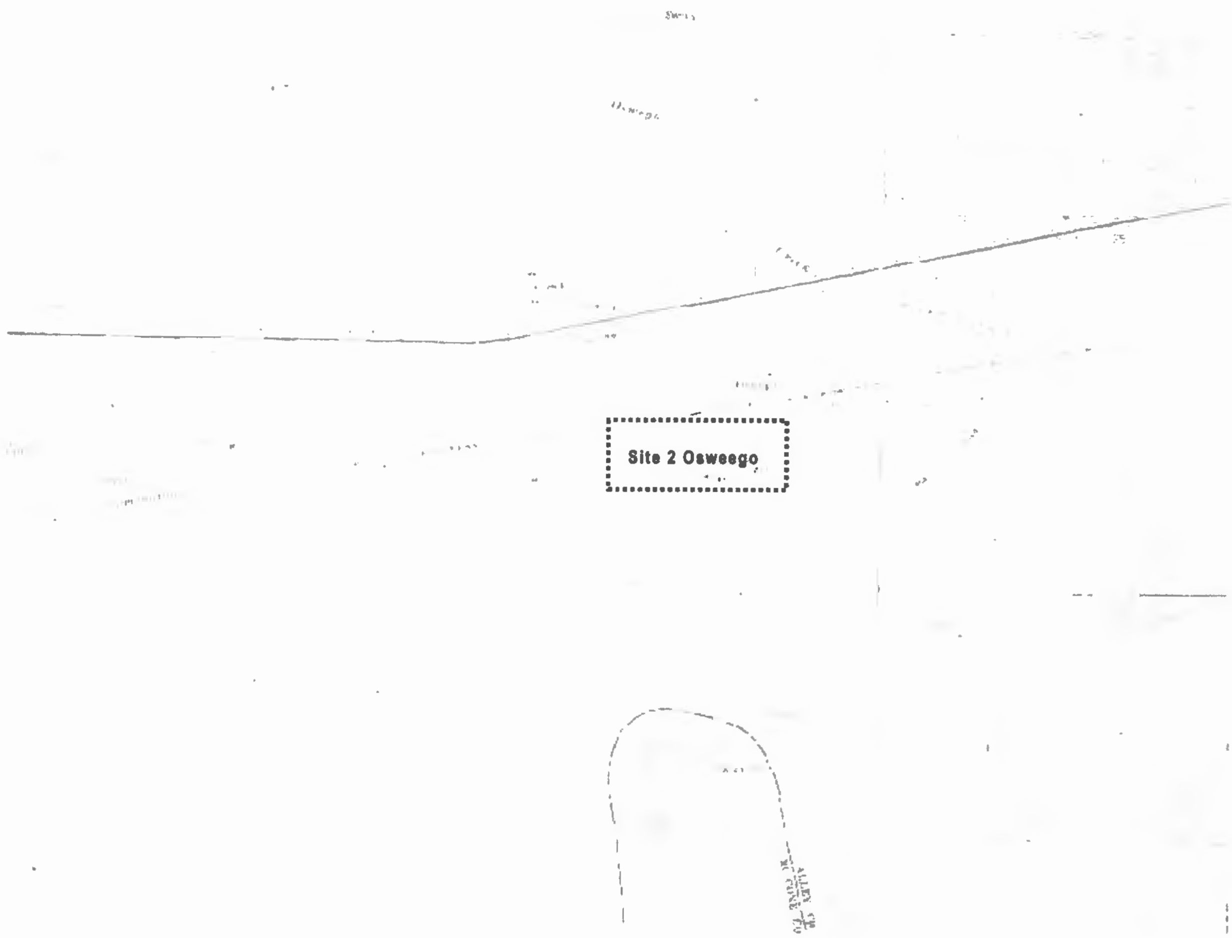
The closest habitation is almost 1 mile away. There would be a minimum of problems with noise, traffic, and smell at this site.

Advantages of the Site:

- Habitation 1 mile away.
- Low cost for the land.
- Only ½ mile from Highway 2.
- Availability of high voltage electricity.

Disadvantages of the Site:

- No existing water main.
- Natural gas line is 2 mile away.
- Land needs to be leveled.
- No railroad spur.
- Grain elevators 12 miles away.
- Poor quality of groundwater.
- Absence of adequate grain elevator storage



3. *Alternate Site 3: Frazier Site T27N, R44E, sections 28 and 29:*

Location:

This property, located in Frazier, Valley County and contains several parcels, but only the parcel in the Southwest corner applies to this project. The property contains an old abandoned grain elevator. The site is narrow and shaped like a triangle. This parcel is right alongside the BNSF railroad and about 60 feet from Highway 2. There is a housing development approximately 75 yards to the south, as well as several businesses.

Land status:

Currently the land is not being used, and as mentioned above, there exists an old grain elevator.

Access to Site:

Highway 2 is 60 feet to the North, and would be able to handle the estimated 15,500 truckloads in and out of the site per year. The BNSF railroad runs alongside the property, with a small two-car spur.

Utilities to the Site:

MDU has an existing gas main to that location. High voltage electricity is available through Valley Electric Cooperative.

Cost of Land:

This parcel comprises between 10-30 acres and could be had for $300 per acre.

Suitability for Commercial Development:

The site has already been used for commercial purposes, so zoning would not be a problem.

Access to Water:

The Town of Frazier has a water distribution system that would be available to that site, but the amount and usage would have to be negotiated with the city.

Impact on local environment/community:

There is a housing development and several businesses only 75 yards away to the South. This plant location would definitely have a negative impact on this community. The location of the Little Porcupine Creek running about 150 yards to the South could also raise contamination problems.

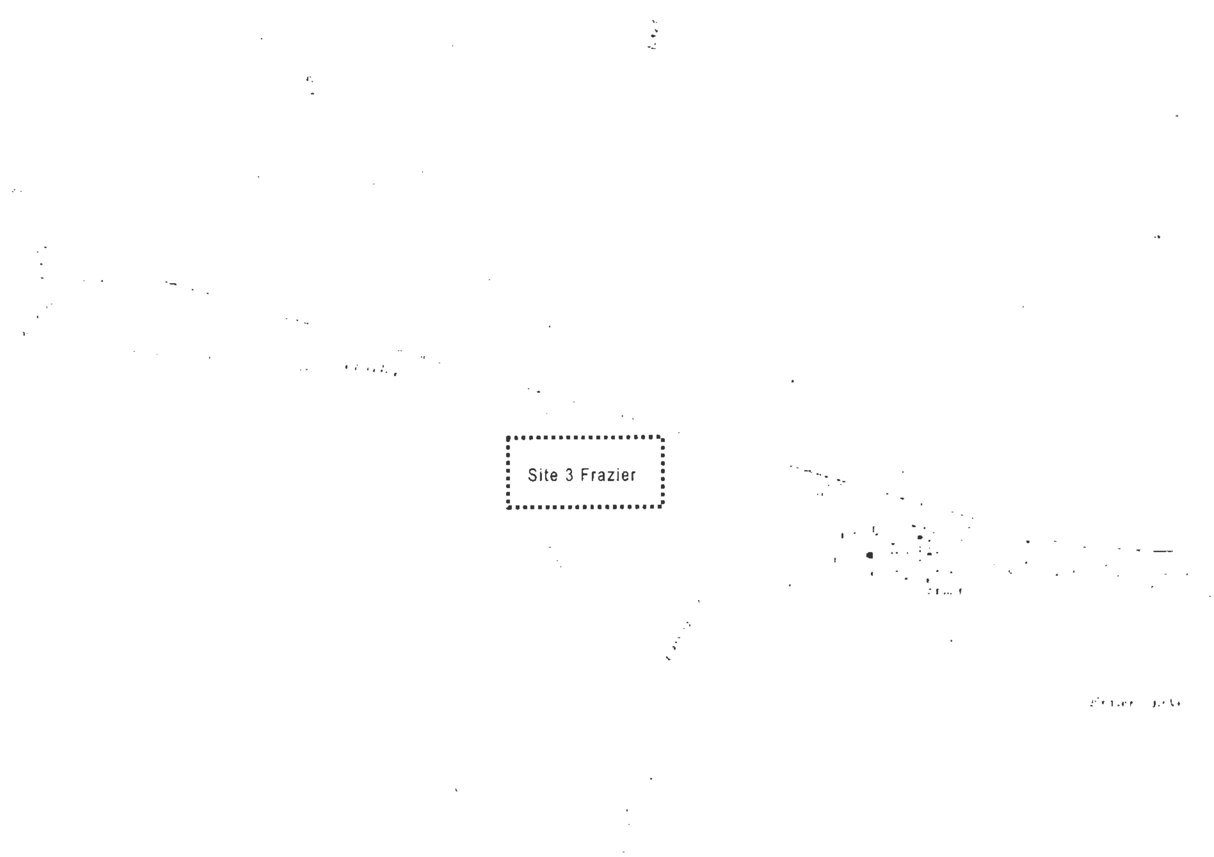
Advantages of the Site:

- Natural gas line runs to the site.
- Site has access to high voltage electricity.
- Availability of water through the Frazier Township.

- Close to Highway 2.
- Alongside the BNSF railroad.
- Low cost for the land.

Disadvantages of the Site:

- Close proximity to housing and business.
- No room for a cattle feed lot.
- Only a two-car RR spur.
- Absence of adequate grain elevator storage



4. *Alternate Site 4: Nashua Site T28N, R42E, section 32:*

Location:

This 82-acre parcel is located in Nashua, Valley County, in the lower Southwest corner of this section. It is bounded by parcels controlled by the Assiniboine & Sioux Tribes. Within 150 yards to the West, lie an elementary school, a middle school and a high school, as well as the outskirts of the town of Nashua.

Land status:

This parcel is currently used for grazing and additional parts are fallow at this time.

Access to Site:

This site is in between Highway 2, ¼ mile to the North, and the BNSF railroad to the South. There is easy access to the site from Highway 2.

Utilities to the Site:

MDU has existing Natural gas lines at the site. Both Valley Electric Cooperative and Northern Electric Cooperative serve that site with high voltage electricity.

Cost of Land:

This land would cost $300.00 per acre.

Suitability for Commercial Development:

Currently the land is zoned for agriculture, but could be changed over to commercial with the minimum of foreseeable problems.

Access to Water:

The town of Nashua has water wells at the site, but the usage would have to be negotiated with the city.

Impact on local environment/community:

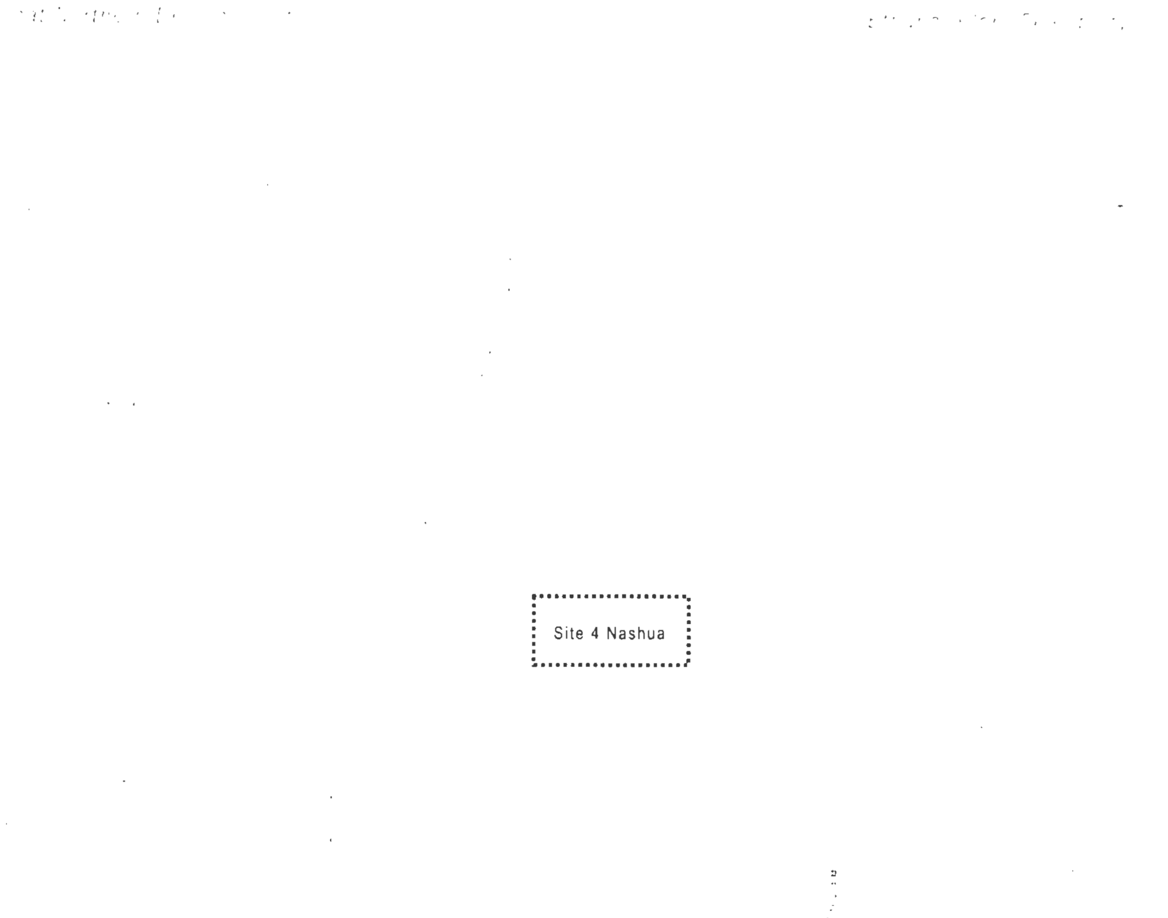
The close proximity of three schools would make this site almost unacceptable. There is also the issue of the possible contamination of the Little Porcupine Creek overflow.

Advantages of the Site:

- Availability of water supply
- Existing natural gas lines
- Adequate supply of high voltage electricity
- Cost of the land
- Proximity to Highway 2
- Alongside BNSF railroad

Disadvantages of the Site:

- Absence of adequate grain elevator storage
- Close proximity to three schools
- Lack of spur from the BNSF line for loading and off loading



5. *Alternate Site 5: Tom Nichols Site T27N R46E, section 27:*

Location:

This parcel located in Roosevelt County, comprises 160 acres, and is in the center of the section. This piece is surrounded on both sides by land controlled by Fort Peck Indian Tribe, and private grazing land. There is a farmstead and outbuildings, owned and occupied by the current owner of the land. Closest other habitation is 1 mile away.

Land status:

This parcel is currently being used as farmland and grazing land

Access to Site:

Highway 2 is ½ mile to the North. The property sits on both sides of the BNSF rail line, for a distance of ¾ mile.

Utilities to the Site:

The property is ½ mile south of an existing MDU gas line. Valley Electric Cooperative serves the site and high voltage lines are available alongside Highway 2.

Cost of Land:

The cost for this parcel is $4000 per acre

Suitability for Commercial Development:

This site is zoned for agriculture, but could be changed for commercial use.

Access to Water:

This site has underground water access and the owner has the water rights

Impact on local environment/community:

This site is at least a mile away from all habitation, other than the owners' farmstead. The owner has said that having a plant on site would not be a problem for him or his family.

Advantages of the Site:

- Availability of an adequate water supply.
- Natural gas available within ½ mile.
- High voltage electric within ½ mile.
- Parcel is level and ready for development.
- Proximity to Highway 2.
- Distance to other habitation.
- BNSF railway goes through the site

Disadvantages of the Site:

- Cost of the land.

- Questions about possible conflict of interest.
- Distance to grain elevators.
- Farmstead on the property
- Gas line ½ mile away
- Absence of spur from the railway

Site Selection Conclusions & Recommendations

As can be seen from the descriptions of the sites above, only the first site meets the various criteria that would help make the proposed plant a success.

The "Old refinery site" is close to major highways, has an existing gas line running to the plant, is alongside the BNSF which has an existing spur siding, has more than adequate electricity, and is within 20' of a proposed water line. Another major factor in choosing this site is that the land for the project will be donated by the county, making this site even more attractive.

VII. Financial Feasibility

GNDC requested that RCI focus the feasibility study on the integration of an ethanol plant and a feedlot to consume the distiller's by-products. Subsequent discussions with the GNDC added to the scope work, which led RCI to pursue not only the combined facility analysis but also financial analysis on each individual part as if it were a stand-alone ethanol plant and a stand-alone feedlot. In addition, GNDC indicated they were leaning primarily towards a small ethanol plant, compared to today's large plant sizes commonly found in the industry. Therefore, this study considered a small ethanol plant of 10-million-gallon annual capacity coupled with a very small feedlot of 15,000 head capacity. As a result, Chimonas modeled that facility as well as a 20-million-gallon-per-year ethanol plant coupled with a 30,000 head feedlot. Both of these facilities at this size are considered small by current industry standards.

Below are the assumptions and cost factors for both sized facilities and then followed by the financial projections of the two plant sizes.

This financial analysis contains forecasts based on information provided by Katzen International, Chimonas Enterprises, Durante and Associates, RCI and other consultants, and was generated utilizing proprietary economic and financial modeling of the operation of an ethanol plant in conjunction with an adjacent feedlot operation.

Ethanol Assumptions 10 MGY versus 20 MGY

The following two tables provide a comparison of the assumptions used for the two financial scenarios—10 million-gallon-per-year capacity and a 20-million-gallon-per-year capacity.

Nature of Operations and Concentrations of Credit Risk

Great Northern Development Corporation or a new value-added ag cooperative or LLC will be engaged in the production of fuel grade ethanol and the feeding of beef cattle through an integrated feedlot, feed processing, and fuel ethanol complex. Ethanol will be marketed to wholesalers throughout the intermountain west and beef cattle will be custom fed for cattle producers in the geographic area. The finished cattle will be transported a significant distance to slaughterhouses that service their individual markets. The model allows for the increased freight in cattle transportation.

The construction period is expected to be eighteen months to start upon completion of the equity campaign and negotiation of bank financing. The years one to ten presented represent information for the first ten full years of operation after completion of construction.

Income Statements Assumptions

Revenue assumptions

	20 mgy Etoh/30,000 Cattle	10 mgy Etoh/15,000 Cattle
Ethanol plant production	54,000 gallons/day	27,000 gallons/day
Market value of ethanol	$1.65 per gallon (net at plant gate)	$1.65 per gallon (net at plant gate)
Feedyard capacity	30,000 head	15,000 head
Feedyard occupancy	90% (27,000 head)	90% (13,500 head)
Finished Cattle Price	$64/CWT FOB Plant	$64/CWT FOB Plant
Wet Distiller's Grains & Syrup cattle feed value	$35 per ton	$35 per ton
State ethanol incentive payments	$1,000,000 annually	$1,000,000 annually
Federal small producer credit	$1,500,000 annually	$1,000,000 annually
Bioenergy program credit	$5,000,000 1st year only	$2,500,000 1st year only
CO_2 Sales	-0-	-0-

- **State Ethanol Producer Credit Program** – The state ethanol producer tax credit provides a tax credit of $.20 per gallon of production up to $2,000,000 per plant.
- **Small Producer Credit Program** – The small producer federal tax credit provides a tax credit of $.10 per gallon of production up to 15,000,000 gallons or $1,500,000.
- **Bioenergy Program Credit** – The federal government, through the CCC program, provides for a 2.5:1 credit for every bushel of new grain that is utilized for ethanol production.

Costs of Sales – Cost assumptions

	20 mgy Etoh/30,000 Cattle	**10 mgy Etoh/15,000 Cattle**
Daily barley consumption	23,158 bushels	11,579 bushels
Cost of feed barley fob plant	$2.55 per bushel	$2.55 per bushel
Conversion rate on barley to ethanol	2.35 gallons/bushel	2.35 gallons/bushel
Cost of denaturant	$1.50 per gallon	$1.50 per gallon
Cost of enzymes	$0.05 per gallon of ethanol	$0.05 per gallon of ethanol
Cost of yeast chemicals	$0.0036 per gallon of ethanol	$0.0036 per gallon of ethanol
Cost of natural gas	$7.00 per MM/BTU	$7.00 per MM/BTU
Cost of electricity	$0.04 per kwh	$0.04 per kwh
Feed Costs:	As Fed Basis	As Fed Basis
Rolled Corn / barley	$86.07/ton / $98.08/ton	$86.07/ton / $98.08/ton
WDG	$35.00 /ton	$35.00/ton
Syrup	$35.00 /ton	$35.00 /ton
Alfalfa Hay	$71.50 ton	$71.50 ton
Mineral Mix	$350 ton	$350 ton
Feed Costs:	As Fed Basis	As Fed Basis

Dry ration mix per head:	**20.50 pounds**
Corn	2.78 pounds
Barley	2.78 pounds
Wet Distiller's Cake	7.90 pounds
Syrup	5.59 pounds
Ground Alfalfa	1.03 pounds
Mineral Mix	.41 pounds

Operating Expenses – Production, feed and other operating costs are estimated as follows:

Labor Costs:	
Ethanol management	$570,000 annually
Feedlot management	$238,000 annually
Feedyard hourly	$10.00 to $18.00 per hour
Ethanol plant hourly	$13.50 to $20.00 per hour
Benefits package	23% of salary
Repairs and maintenance:	
Feedlot	3.0% of feedlot cost
Ethanol plant	1.3% of ethanol plant cost

- **Depreciation –** Depreciation on buildings is straight line over 33 years and on machinery & equipment is over 10 years
- **Interest** – Interest expense is calculated based on current prime rate and a variable loan value
- **Income Taxes** – All income is taxed at a corporate rate of 40 percent

Other Assumptions

Financial Proformas

Following are the financial projections, including detailed assumptions, pro-forma income and loss and cash flows. The following forecasts are provided from an extensive proprietary database and financial model utilized for such a facility. These projections have not been reviewed by an outside accounting firm. The final financial forecast will vary as development moves forward and additional information is known on the site, markets, and other outside determining factors.

In modeling the facility several assumptions were made on inputs to both the ethanol production facility as well as the livestock operation. Local grain prices were researched and a 10-year average was determined to be the most appropriate indicator of barley and corn pricing. Same methodology was utilized in determining the cattle costs both in feeder as well as finished animals. The operating data from the ethanol-engineering consultant, Katzen International, was used throughout the ethanol model to predict the overall cost of ethanol production. Katzen also provided the capital cost estimate for the ethanol facility. Market price indication was derived from the marketing study conducted by Durante & Associates, taking under account regional market practices.

The list of assumptions for both the ethanol plant and the cattle feedlot are tabulated below:

Ethanol Plant Assumptions & Costs – 10MM gal/Year Scenario

Ethanol Operation	
Plant Capacity MGPY Denatured	10
Corn to Ethanol Conversion gal/bu	2.755
Barley to Ethanol Conversion gal/bu	2.350
Wheat to Ethanol Conversion gal/bu	2.491
Corn WDG Lbs/bu	23.00
Barley WDG Lbs/bu	27.46
Wheat WDG Lbs/bu	27.46
Syrup Production lbs/bu	6.80
CO2 Recovery lbs/bu	15.00
Steam Requirement Lbs/gal	20.21
Electrical Requirement KWh/gal	1.00
Denaturant %	5.00
Operating Days/Year	355

Capital Cost Summary	
Land	20,000
Project Development & Permitting	700,000
Site Prep & Utilities	550,000
Ethanol Plant & Equipment	16,300,000
Project Management & Engineering Fees	2,255,000
Plant Start-Up and Training	300,000
Working Capital - 1 month's Expenses	1,350,835
Office & Landscape	500,000
Contingency @ 20% of Installed Costs	3,921,000
Construction Interest	1,050,000
Total Capital Expense	**26,946,835**

Revenue Parameters	
Ethanol Price FOB Plant $/gal	1.65
WDG Price FOB Plant $/ton	35.00
Syrup Price $/ton	35.00
CO2 Price FOB plant $/ton	-
Federal Small Producer Credit $/gal	0.10
Bioenergy Program Credit $ million	2.50
State Ethanol Tax Credit $/gal	0.20

COGS	
Corn Ethanol %	-
Barley Ethanol %	100.00
Wheat Feedstock %	-
Corn Cost $/bu (10-yr avg)	2.41
Barley Cost $/bu (10-yr avg)	2.55
Wheat Cost $/bu (10-yr avg)	3.49
Natural Gas Cost $/MMBTU	7.00
Electricity Cost $/KWh	0.040
Gasoline Denaturant Cost $/gal	1.50
Enzymes $/gal Etoh	0.05
Yeast $/gal Etoh	0.0036
Other Chemicals $/gal Etoh	0.0139
Water $/gal Etoh	0.006
Labor Payroll & Burden $/year	750,000
Labor Escalation %/year	3
Contract Labor & Prof. Services	280,000
Freight	-
R&M $/year	300,000

SG&A	
Management $/year	450,000
Real Estate Taxes % of Cap. Exp.	1.00
Licenses Fees & Insurance $/year	200,000

Ethanol Plant Assumptions & Costs – 20MM gal/Year Scenario

Ethanol Operation	
Plant Capacity MMGPY Denatured	20
Corn to Ethanol Conversion gal/bu	2.755
Barley to Ethanol Conversion gal/bu	2.350
Wheat to Ethanol Conversion gal/bu	2.491
Corn WDG Lbs/bu	23.00
Barley WDG Lbs/bu	27.46
Wheat WDG Lbs/bu	27.46
Syrup Production lbs/bu	6.80
CO2 Recovery lbs/bu	15.00
Steam Requirement Lbs/gal	20.21
Electrical Requirement KWh/gal	1.00
Denaturant %	5.00
Operating Days/Year	355
Capital Cost Summary	
Land	20,000
Project Development & Permitting	700,000
Site Prep & Utilities	750,000
Ethanol Plant & Equipment	23,079,000
Project Management & Engineering Fees	3,282,000
Plant Start-Up and Training	330,000
Working Capital - 1 month's Expenses	2,541,886
Office & Landscape	500,000
Contingency @ 20% of Installed Costs	5,522,200
Construction Interest	1,550,000
Total Capital Expense	**38,275,600**

Revenue Parameters	
Ethanol Price FOB Plant $/gal	1.65
WDG Price FOB Plant $/ton	35.00
Syrup Price $/ton	35.00
CO2 Price FOB plant $/ton	-
Federal Small Producer Credit $/gal	0.10
Bioenergy Program Credit $ million	5.00
State Ethanol Tax Credit $/gal	0.20
COGS	
Corn Ethanol %	-
Barley Ethanol %	100.00
Wheat Feedstock %	-
Corn Cost $/bu (10-yr avg)	2.41
Barley Cost $/bu (10-yr avg)	2.55
Wheat Cost $/bu (10-yr avg)	3.49
Natural Gas Cost $/MMBTU	7.00
Electricity Cost $/KWh	0.040
Gasoline Denaturant Cost $/gal	1.50
Enzymes $/gal Etoh	0.05
Yeast $/gal Etoh	0.0036
Other Chemicals $/gal Etoh	0.0139
Water $/gal Etoh	0.006
Labor Payroll & Burden $/year	875,000
Labor Escalation %/year	3
Contract Labor & Prof. Services	345,000
Freight	-
R&M $/year	500,000
SG&A	
Management $/year	570,000
Real Estate Taxes % of Capital Exp.	1.00
Licenses Fees & Insurance $/year	200,000

Livestock Assumptions & Costs – 15,000 Head Scenario

Livestock Operation	
Feedlot Capacity - Head	15,000
Occupancy %	90
Cattle on Feed	13,500
Annual Turnover	2.30
Cattle Weight In Lbs	750
Cattle Weight Out Lbs	1,250
Dry Matter Intake Lbs/day	20.50
Conversion	6.50
Daily Weight Gain Lbs	3.15

Capital Cost Summary	
Land	80,000
Project Development & Permitting	375,000
Project Management & Eng/ng Fees	800,000
Cattle Pens	2,000,000
Feedmill	2,200,000
Office, Scales, Shop & Hospital	400,000
Manure System & Environmental	700,000
Equipment	400,000
Contingency @ 5% of Installed Costs	343,750
Construction Interest	350,000
Total Capital Expense	**7,648,750**

Revenue Parameters	
Cattle to Market – Head/year	31,081
Cattle Price FOB Plant $/CWT lbs	64.00
Grower Price FOB Plant $/CWT lbs	74.60

Ration % Dry Matter	
Corn % in ration	13.58
Barley % in Ration	13.58
Wet Distillers Grain	38.56
Syrup	27.28
Hay	5.00
Mineral Mix	2.00
Total	100.00

COGS	
Corn Feed $/bu	2.41
Barley Feed $/bu	2.55
Hay $/ton	71.50
Mineral Mix $/ton	350
Labor Payroll & Burden $/year	725,000
Contract Labor & Prof. Services	75,000
Freight (@$3.15/ truck mile)	44.43
R&M % of Capital Expense	3
Vet Costs $/Head/Year	11.00

SG&A	
Management	185,000
Real Estate Taxes % of Cap. Exp.	1.00
Fees, Insurance & Misc	175,000

Livestock Assumptions & Costs – 30,000 Head Scenario

Livestock Operation		**Revenue Parameters**	
Feedlot Capacity - Head	30,000	Cattle to Market - Head/year	62,162
Occupancy %	90	Cattle Price FOB Plant $/CWT lbs	64.00
Cattle on Feed	27,000	Grower Price FOB Plant $/CWT lbs	74.60
Annual Turnover	2.30		
Cattle Weight In Lbs	750	**Ration % Dry Matter**	
Cattle Weight Out Lbs	1,250	Corn % in ration	13.58
Dry Matter Intake Lbs/day	20.50	Barley % in Ration	13.58
Conversion	6.50	Wet Distillers Grain	38.56
Daily Weight Gain Lbs	3.15	Syrup	27.28
		Hay	5.00
		Mineral Mix	2.00
		Total	100.00
Capital Cost Summary		**COGS**	
Land	80,000	Corn Feed $/bu	2.41
Project Development & Permitting	400,000	Barley Feed $/bu	2.55
Project Management & Eng/ng Fees	1,000,000	Hay $/ton	71.50
Cattle Pens	3,900,000	Mineral Mix $/ton	350
Feedmill	2,800,000	Labor Payroll & Burden $/year	1,172,000
Office, Scales, Shop & Hospital	500,000	Contract Labor & Prof. Services	100,000
Manure System & Environmental	1,000,000	Freight (@$3.15/ truck mile)	44.43
Equipment	700,000	R&M % of Capital Expense	3
Contingency @ 5% of Installed Costs	515,000	Vet Costs $/Head/Year	11.00
Construction Interest	350,000		
Total Capital Expense	**11,245,000**	**SG&A**	
		Management	238,000
		Real Estate Taxes % of Cap. Exp.	1.00
		Fees, Insurance & Misc	218,000

Financial Results

GNDC originally requested that RCI focus the feasibility study on the integration of an ethanol plant and a feedlot to consume the distiller's by-products. Subsequent discussions with the GNDC led RCI to pursue not only the combined facility analysis but perform financial analysis on each individual part as if it were a stand-alone ethanol plant and a stand-alone feedlot. In addition GNDC has indicated that they were leaning primarily towards a small ethanol plant, compared to today's large plant sizes commonly found in the industry. This study considered a small ethanol plant of 10-million-gallon annual capacity, coupled with a very small feedlot of 15,000 head capacity. In addition, it has modeled a 20-million-gallon-per-year ethanol plant coupled with a 30,000 head feedlot. Both of these size facilities are considered small by current industry standards.

The summary of financial results of each facility are presented below for each size plant and followed by the combined proforma income statements for each size plant.

Summary of Financial Results
10 MGY Plant

Capital Costs		
Ethanol Plant	19,625,000	56.2%
Cattle Feedlot	6,580,000	18.8%
Bank Fees	335,206	1.0%
Project Development	1,075,000	3.1%
Plant Start-up & Training	300,000	0.9%
Working Capital	1,350,835	3.9%
Construction Interest	1,400,000	4.0%
Contingency	4,264,750	12.2%
Total Project Costs	**34,930,791**	100.0%
Financing		
CBDG Funds	-	0%
Other Grants	-	0%
Equity	17,465,395	50%
Sub Debt	-	0%
Senior Debt	17,465,395	50%
Total Project Funding	**34,930,791**	100%

Investment Analysis	
Return on Equity	**27.2%**
Average Net Cash Flow	**$ 9,497,788**
Net Present Value @ 12% DCF	**16,540,942**
10 Yr Internal Rate of Return	**23.8%**
Payback - years	**3.77**

Summary of Financial Results
20 MGY Plant

Capital Costs		
Ethanol Plant	27,631,000	55.8%
Cattle Feedlot	9,980,000	20.2%
Bank Fees	453,782	0.9%
Project Development	1,100,000	2.2%
Plant Start-up & Training	330,000	0.7%
Working Capital	2,541,886	5.1%
Construction Interest	1,400,000	2.8%
Contingency	6,037,200	12.2%
Total Project Costs	**49,473,868**	100.0%
Financing		
CBDG Funds	-	0%
Other Grants	-	0%
Equity	24,736,934	50%
Sub Debt	-	0%
Senior Debt	24,736,934	50%
Total Project Funding	**49,473,868**	100%

Investment Analysis	
Return on Equity	**33.3%**
Average Net Cash Flow	**$16,481,304**
Net Present Value @ 12% DCF	**38,934,336**
10 Yr Internal Rate of Return	**31.1%**
Payback - years	**3.03**

10 MGY Ethanol Plant Proforma

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Fuel Ethanol Sales - gal	10,000,000	10,467,000	10,955,809	11,467,445	12,002,975	12,002,975	12,002,975	12,002,975	12,002,975	12,002,975
Revenues										
Fuel Ethanol Sales	16,500,000	17,270,550	18,077,085	18,921,285	19,804,909	19,804,909	19,804,909	19,804,909	19,804,909	19,804,909
Wet Distillers Grains Sales	1,947,518	2,038,467	2,133,663	2,233,305	2,337,601	2,337,601	2,337,601	2,337,601	2,337,601	2,337,601
Syrup Sales	1,377,913	1,442,261	1,509,615	1,580,114	1,653,905	1,653,905	1,653,905	1,653,905	1,653,905	1,653,905
CO2 Sales	-	-	-	-	-	-	-	-	-	-
Small Producer Credit	1,000,000	1,046,700	1,095,581	1,146,745	1,200,297	1,200,297	1,200,297	1,200,297	1,200,297	1,200,297
Sate Ethanol Credit	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Bioenergy Program Credit	2,500,000	182,447	182,447	182,447	182,447	-	-	-	-	-
Total Revenues	**24,325,431**	**22,980,425**	**23,998,391**	**25,063,895**	**26,179,159**	**25,996,712**	**25,996,712**	**25,996,712**	**25,996,712**	**25,996,712**
Cost of Goods										
Grain Purchases	10,334,347	10,816,960	11,322,113	11,850,855	12,404,290	12,404,290	12,404,290	12,404,290	12,404,290	12,404,290
Natural Gas Purchases	1,562,907	1,635,894	1,712,291	1,792,255	1,875,953	1,875,953	1,875,953	1,875,953	1,875,953	1,875,953
Labor Costs	750,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000
Chemicals	675,000	706,523	739,517	774,053	810,201	810,201	810,201	810,201	810,201	810,201
Gasoline Denaturant	714,286	747,643	782,558	819,103	857,355	857,355	857,355	857,355	857,355	857,355
Electricity Cost	400,000	418,680	438,232	458,698	480,119	480,119	480,119	480,119	480,119	480,119
Total Cost of Goods	**14,436,539**	**15,075,700**	**15,744,710**	**16,444,963**	**17,177,918**	**17,177,918**	**17,177,918**	**17,177,918**	**17,177,918**	**17,177,918**
SG&A										
Contract Labor	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000	280,000
Maintenance	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000
Insurance & Fees	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Real Estate Taxes	242,260	242,260	242,260	242,260	242,260	242,260	242,260	242,260	242,260	242,260
G&A	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000	450,000
Miscellaneous	301,218	301,218	301,218	301,218	301,218	301,218	301,218	301,218	301,218	301,218
Total SG&A	**1,773,478**	**1,773,478**	**1,773,478**	**1,773,478**	**1,773,478**	**1,773,478**	**1,773,478**	**1,773,478**	**1,773,478**	**1,773,478**
EBITDA	**8,115,414**	**6,131,247**	**6,480,203**	**6,845,454**	**7,227,763**	**7,045,316**	**7,045,316**	**7,045,316**	**7,045,316**	**7,045,316**
Depreciation	2,454,600	2,454,600	2,454,600	2,454,600	2,454,600	2,454,600	2,454,600	2,454,600	2,454,600	2,454,600
Taxes	2,264,326	1,470,659	1,610,241	1,756,342	1,909,265	1,836,286	1,836,286	1,836,286	1,836,286	1,836,286
Cash Flow	**8,305,688**	**7,115,188**	**7,324,562**	**7,543,713**	**7,773,098**	**7,663,630**	**7,663,630**	**7,663,630**	**7,663,630**	**7,663,630**
IRR	**25%**									

15,000 Head Cattle Feedlot Proforma

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cattle Sales - Head/year	**31,081**	**31,081**	**31,081**	**31,081**	**31,081**	**31,081**	**31,081**	**31,081**	**31,081**	**31,081**
Revenues										
Cattle Sales	24,864,923	24,864,923	24,864,923	24,864,923	24,864,923	24,864,923	24,864,923	24,864,923	24,864,923	24,864,923
Total Revenues	**24,864,923**	**24,864,923**	**24,864,923**	**24,864,923**	**24,864,923**	**24,864,923**	**24,864,923**	**24,864,923**	**24,864,923**	**24,864,923**
Cost of Goods										
Growers	17,389,906	17,389,906	17,389,906	17,389,906	17,389,906	17,389,906	17,389,906	17,389,906	17,389,906	17,389,906
Feed Ration	5,290,713	5,290,713	5,290,713	5,290,713	5,290,713	5,290,713	5,290,713	5,290,713	5,290,713	5,290,713
Vet Care	341,893	341,893	341,893	341,893	341,893	341,893	341,893	341,893	341,893	341,893
Labor Costs	725,000	725,000	725,000	725,000	725,000	725,000	725,000	725,000	725,000	725,000
Freight	1,380,780	1,380,780	1,380,780	1,380,780	1,380,780	1,380,780	1,380,780	1,380,780	1,380,780	1,380,780
Total Cost of Goods	**25,128,292**	**25,128,292**	**25,128,292**	**25,128,292**	**25,128,292**	**25,128,292**	**25,128,292**	**25,128,292**	**25,128,292**	**25,128,292**
SG&A										
Contract Labor	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000
Maintenance	229,463	229,463	229,463	229,463	229,463	229,463	229,463	229,463	229,463	229,463
Insurance & Fees	175,000	175,000	175,000	175,000	175,000	175,000	175,000	175,000	175,000	175,000
Real Estate Taxes	76,488	76,488	76,488	76,488	76,488	76,488	76,488	76,488	76,488	76,488
G&A	185,000	185,000	185,000	185,000	185,000	185,000	185,000	185,000	185,000	185,000
Total SG&A	**740,950**	**740,950**	**740,950**	**740,950**	**740,950**	**740,950**	**740,950**	**740,950**	**740,950**	**740,950**
EBITDA	(1 004,318)	(1,004,318)	(1,004 318)	(1,004,318)	(1,004,318)	(1,004,318)	(1,004,318)	(1,004,318)	(1,004,318)	(1,004,318)
Depreciation	**360,938**	**360,938**	**360,938**	**360,938**	**360,938**	**360,938**	**360,938**	**360,938**	**360,938**	**360,938**
Taxes	-	-	-	-	-	-	-	-	-	-
Cash Flow	(643,381)	(643,381)	(643,381)	(643,381)	(643 381)	(643,381)	(643 381)	(643,381)	(643,381)	(643,381)
IRR	**none**	**(negative)**								

20 MGY Ethanol Plant Proforma

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Fuel Ethanol Sales - gal	**20,000,000**	**20,934,000**	**21,911,618**	**22,934,890**	**24,005,950**	**24,005,950**	**24,005,950**	**24,005,950**	**24,005,950**	**24,005,950**
Revenues										
Fuel Ethanol Sales	33,000,000	34,541,100	36,154,169	37,842,569	39,609,817	39,609,817	39,609,817	39,609,817	39,609,817	39,609,817
Wet Distillers Grains Sales	3,895,035	4,076,934	4,267,326	4,466,611	4,675,201	4,675,201	4,675,201	4,675,201	4,675,201	4,675,201
Syrup Sales	2,755,826	2,884,523	3,019,230	3,160,228	3,307,811	3,307,811	3,307,811	3,307,811	3,307,811	3,307,811
CO2 Sales	-	-	-	-	-	-	-	-	-	-
Small Producer Credit	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Sate Ethanol Credit	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Bioenergy Program Credit	5,000,000	348,239	348,239	348,239	348,239	-	-	-	-	-
Total Revenues	**47,150,861**	**44,350,796**	**46,288,965**	**48,317,647**	**50,441,068**	**50,092,829**	**50,092,829**	**50,092,829**	**50,092,829**	**50,092,829**
Cost of Goods										
Grain Purchases	20,668,693	21,633,921	22,644,225	23,701,710	24,808,580	24,808,580	24,808,580	24,808,580	24,808,580	24,808,580
Natural Gas Purchases	3,125,813	3,271,789	3,424,581	3,584,509	3,751,906	3,751,906	3,751,906	3,751,906	3,751,906	3,751,906
Labor Costs	875,000	875,000	875,000	875,000	875,000	875,000	875,000	875,000	875,000	875,000
Chemicals	1,350,000	1,413,045	1,479,034	1,548,105	1,620,402	1,620,402	1,620,402	1,620,402	1,620,402	1,620,402
Gasoline Denaturant	1,428,571	1,495,286	1,565,116	1,638,206	1,714,711	1,714,711	1,714,711	1,714,711	1,714,711	1,714,711
Electricity Cost	800,000	837,360	876,465	917,396	960,238	960,238	960,238	960,238	960,238	960,238
Total Cost of Goods	**28,248,078**	**29,526,401**	**30,864,421**	**32,264,927**	**33,730,836**	**33,730,836**	**33,730,836**	**33,730,836**	**33,730,836**	**33,730,836**
SG&A										
Contract Labor	345,000	345,000	345,000	345,000	345,000	345,000	345,000	345,000	345,000	345,000
Maintenance	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
Insurance & Fees	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Real Estate Taxes	338,332	338,332	338,332	338,332	338,332	338,332	338,332	338,332	338,332	338,332
G&A	570,000	570,000	570,000	570,000	570,000	570,000	570,000	570,000	570,000	570,000
Miscellaneous	301,218	301,218	301,218	301,218	301,218	301,218	301,218	301,218	301,218	301,218
Total SG&A	**2,254,550**	**2,254,550**	**2,254,550**	**2,254,550**	**2,254,550**	**2,254,550**	**2,254,550**	**2,254,550**	**2,254,550**	**2,254,550**
EBITDA	**16,648,234**	**12,569,845**	**13,169,994**	**13,798,170**	**14,455,682**	**14,107,443**	**14,107,443**	**14,107,443**	**14,107,443**	**14,107,443**
Depreciation	**3,418,320**	**3,418,320**	**3,418,320**	**3,418,320**	**3,418,320**	**3,418,320**	**3,418,320**	**3,418,320**	**3,418,320**	**3,418,320**
Taxes	**5,291,966**	**3,660,610**	**3,900,670**	**4,151,940**	**4,414,945**	**4,275,649**	**4,275,649**	**4,275,649**	**4,275,649**	**4,275,649**
Cash Flow	**14,774,588**	**12,327,555**	**12,687,645**	**13,064,550**	**13,459,057**	**13,250,114**	**13,250,114**	**13,250,114**	**13,250,114**	**13,250,114**
IRR	**33%**									

30,000 Head Cattle Feedlot Proforma

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cattle Sales - Head/year	**62,162**	**62,162**	**62,162**	**62,162**	**62,162**	**62,162**	**62,162**	**62,162**	**62,162**	**62,162**
Revenues										
Cattle Sales	49,729,846	49,729,846	49,729,846	49,729,846	49,729,846	49,729,846	49,729,846	49,729,846	49,729,846	49,729,846
Total Revenues	**49,729,846**	**49,729,846**	**49,729,846**	**49,729,846**	**49,729,846**	**49,729,846**	**49,729,846**	**49,729,846**	**49,729,846**	**49,729,846**
Cost of Goods										
Growers	34,779,811	34,779,811	34,779,811	34,779,811	34,779,811	34,779,811	34,779,811	34,779,811	34,779,811	34,779,811
Feed Ration	10,581,426	10,581,426	10,581,426	10,581,426	10,581,426	10,581,426	10,581,426	10,581,426	10,581,426	10,581,426
Vet Care	683,785	683,785	683,785	683,785	683,785	683,785	683,785	683,785	683,785	683,785
Labor Costs	1,172,000	1,172,000	1,172,000	1,172,000	1,172,000	1,172,000	1,172,000	1,172,000	1,172,000	1,172,000
Freight	2,761,561	2,761,561	2,761,561	2,761,561	2,761,561	2,761,561	2,761,561	2,761,561	2,761,561	2,761,561
Total Cost of Goods	**49,978,583**	**49,978,583**	**49,978,583**	**49,978,583**	**49,978,583**	**49,978,583**	**49,978,583**	**49,978,583**	**49,978,583**	**49,978,583**
SG&A										
Contract Labor	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Maintenance	337,350	337,350	337,350	337,350	337,350	337,350	337,350	337,350	337,350	337,350
Insurance & Fees	218,000	218,000	218,000	218,000	218,000	218,000	218,000	218,000	218,000	218,000
Real Estate Taxes	112,450	112,450	112,450	112,450	112,450	112,450	112,450	112,450	112,450	112,450
G&A	238,000	238,000	238,000	238,000	238,000	238,000	238,000	238,000	238,000	238,000
Total SG&A	**1,005,800**	**1,005,800**	**1,005,800**	**1,005,800**	**1,005,800**	**1,005,800**	**1,005,800**	**1,005,800**	**1,005,800**	**1,005,800**
EBITDA	(1,254,537)	(1,254,537)	(1,254,537)	(1,254,537)	(1,254,537)	(1,254,537)	(1,254,537)	(1,254,537)	(1,254,537)	(1,254,537)
Depreciation	**540,750**	**540,750**	**540,750**	**540,750**	**540,750**	**540,750**	**540,750**	**540,750**	**540,750**	**540,750**
Taxes	-	-	-	-	-	-	-	-	-	-
Cash Flow	(713,787)	(713,787)	(713,787)	(713,787)	(713,787)	(713,787)	(713,787)	(713,787)	(713,787)	(713,787)
IRR	**None**	**(negative)**								

Notes to the following Combined Proformas:

Note 1: Ethanol plant output is increased 4.7% per year for the first four years and remains flat in following years.

Note 2: Ethanol price includes all transport & marketing costs resulting in a net projected gate price of $1.65 per gallon.

Note 3: The bio-energy programs assume full payment in the 1st year, with the incremental production increase of 4.7% in the subsequent four years.

Note 4: The Small Producer Tax Credit is an income tax credit derived from the first 15 million gallons of production.

Note 5: The Montana State Ethanol Credit was limited to $1 million for each plant in the state

Note 6: Depreciation is calculated using GAAP method (useful life) of assets.

Note 7: This forecast is dependent on future events and may be significantly affected by changes in economic and other circumstances and should not be considered to be a representation of future results.

Combined 10 MGY Etoh/15,000 Head Cattle Facility Proforma Financial Results

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Income										
Fuel Ethanol	16,500,000	17,270,550	18,077,085	18,921,285	19,804,909	19,804,909	19,804,909	19,804,909	19,804,909	19,804,909
CO2	0	0	0	0	0	0	0	0	0	0
Finished Cattle	24,864,923	24,864,923	24,864,923	24,864,923	24,864,923	24,864,923	24,864,923	24,864,923	24,864,923	24,864,923
Total Income	**41,364,923**	**42,135,473**	**42,942,008**	**43,786,208**	**44,669,832**	**44,669,832**	**44,669,832**	**44,669,832**	**44,669,832**	**44,669,832**
Other Operating Income										
BioEnergy Program	2,500,000	182,447	182,447	182,447	182,447	0	0	0	0	0
Small Producer Credit	1,000,000	1,046,700	1,095,581	1,146,745	1,200,297	1,200,297	1,200,297	1,200,297	1,200,297	1,200,297
State Ethanol Credit	1,000,000	1,000,000	1,000,000	1,000,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Total Other Operating Income	**4,500,000**	**2,229,147**	**2,278,028**	**2,329,192**	**2,882,744**	**2,700,297**	**2,700,297**	**2,700,297**	**2,700,297**	**2,700,297**
Cost of Goods Sold										
Ethanol Grain Feedstock	10,334,347	10,816,960	11,322,113	11,850,855	12,404,290	12,404,290	12,404,290	12,404,290	12,404,290	12,404,290
Cattle Feed (Non Ethanol)	1,965,282	1,809,985	1,647,435	1,477,294	1,299,207	1,299,207	1,299,207	1,299,207	1,299,207	1,299,207
Growers	17,389,906	17,389,906	17,389,906	17,389,906	17,389,906	17,389,906	17,389,906	17,389,906	17,389,906	17,389,906
Energy & Utilities	1,962,907	2,054,574	2,150,523	2,250,952	2,356,072	2,356,072	2,356,072	2,356,072	2,356,072	2,356,072
Direct Labor	1,475,000	1,475,000	1,475,000	1,475,000	1,475,000	1,475,000	1,475,000	1,475,000	1,475,000	1,475,000
Contract Labor	355,000	355,000	355,000	355,000	355,000	355,000	355,000	355,000	355,000	355,000
Chemicals	1,731,178	1,796,058	1,863,968	1,935,048	2,009,449	2,009,449	2,009,449	2,009,449	2,009,449	2,009,449
Maintenance & Repairs	529,463	529,463	529,463	529,463	529,463	529,463	529,463	529,463	529,463	529,463
Total Cost of Goods Sold	**35,743,082**	**36,226,946**	**36,733,406**	**37,263,518**	**37,818,386**	**37,818,386**	**37,818,386**	**37,818,386**	**37,818,386**	**37,818,386**
Gross Profit	**10,121,841**	**8,137,674**	**8,486,630**	**8,851,881**	**9,734,190**	**9,551,743**	**9,551,743**	**9,551,743**	**9,551,743**	**9,551,743**
Administrative Expenses										
Fees, Property Taxes, Insurance & Misc	994,965	994,965	994,965	994,965	994,965	994,965	994,965	994,965	994,965	994,965
Management	635,000	635,000	635,000	635,000	635,000	635,000	635,000	635,000	635,000	635,000
Total Admin. Expenses	**1,629,965**	**1,629,965**	**1,629,965**	**1,629,965**	**1,629,965**	**1,629,965**	**1,629,965**	**1,629,965**	**1,629,965**	**1,629,965**
EBITDA	**8,491,876**	**6,507,709**	**6,856,665**	**7,221,916**	**8,104,225**	**7,921,778**	**7,921,778**	**7,921,778**	**7,921,778**	**7,921,778**
Depreciation	**3,493,079**	**3,493,079**	**3,493,079**	**3,493,079**	**3,493,079**	**3,493,079**	**3,493,079**	**3,493,079**	**3,493,079**	**3,493,079**
Taxes	**1,999,519**	**1,205,852**	**1,345,434**	**1,491,535**	**1,844,458**	**1,771,480**	**1,771,480**	**1,771,480**	**1,771,480**	**1,771,480**
Cash Flow	**9,985,436**	**8,794,936**	**9,004,309**	**9,223,460**	**9,752,846**	**9,643,377**	**9,643,377**	**9,643,377**	**9,643,377**	**9,643,377**

20 MGY Etoh/30,000 Head Cattle Facility Pro-Forma Financial Results

Income										
Fuel Ethanol	33,000,000	34,541,100	36,154,169	37,842,569	39,609,817	39,609,817	39,609,817	39,609,817	39,609,817	39,609,817
CO2	0	0	0	0	0	0	0	0	0	0
Finished Cattle	49,729,846	49,729,846	49,729,846	49,729,846	49,729,846	49,729,846	49,729,846	49,729,846	49,729,846	49,729,846
Total Income	**82,729,846**	**84,270,946**	**85,884,016**	**87,572,415**	**89,339,663**	**89,339,663**	**89,339,663**	**89,339,663**	**89,339,663**	**89,339,663**
Other Operating Income										
BioEnergy Program	5,000,000	348,239	348,239	348,239	348,239	0	0	0	0	0
Small Producer Credit	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
State Ethanol Credit	1,000,000	1,000,000	1,000,000	1,000,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Total Other Operating Income	**7,500,000**	**2,848,239**	**2,848,239**	**2,848,239**	**3,348,239**	**3,000,000**	**3,000,000**	**3,000,000**	**3,000,000**	**3,000,000**
Cost of Goods Sold										
Ethanol Grain Feedstock	20,668,693	21,633,921	22,644,225	23,701,710	24,808,580	24,808,580	24,808,580	24,808,580	24,808,580	24,808,580
Cattle Feed (Non Ethanol)	3,930,565	3,619,970	3,294,870	2,954,587	2,598,414	2,598,414	2,598,414	2,598,414	2,598,414	2,598,414
Growers	34,779,811	34,779,811	34,779,811	34,779,811	34,779,811	34,779,811	34,779,811	34,779,811	34,779,811	34,779,811
Energy & Utilities	3,925,813	4,109,149	4,301,046	4,501,905	4,712,144	4,712,144	4,712,144	4,712,144	4,712,144	4,712,144
Direct Labor	2,047,000	2,047,000	2,047,000	2,047,000	2,047,000	2,047,000	2,047,000	2,047,000	2,047,000	2,047,000
Contract Labor	445,000	445,000	445,000	445,000	445,000	445,000	445,000	445,000	445,000	445,000
Chemicals	3,462,357	3,592,116	3,727,935	3,870,097	4,018,898	4,018,898	4,018,898	4,018,898	4,018,898	4,018,898
Maintenance & Repairs	837,350	837,350	837,350	837,350	837,350	837,350	837,350	837,350	837,350	837,350
Total Cost of Goods Sold	**70,096,589**	**71,064,317**	**72,077,237**	**73,137,461**	**74,247,197**	**74,247,197**	**74,247,197**	**74,247,197**	**74,247,197**	**74,247,197**
Gross Profit	**20,133,257**	**16,054,869**	**16,655,018**	**17,283,194**	**18,440,705**	**18,092,466**	**18,092,466**	**18,092,466**	**18,092,466**	**18,092,466**
Administrative Expenses										
Fees, Property Taxes, Insurance & Misc	1,170,000	1,170,000	1,170,000	1,170,000	1,170,000	1,170,000	1,170,000	1,170,000	1,170,000	1,170,000
Management	808,000	808,000	808,000	808,000	808,000	808,000	808,000	808,000	808,000	808,000
Total Admin. Expenses	**1,978,000**	**1,978,000**	**1,978,000**	**1,978,000**	**1,978,000**	**1,978,000**	**1,978,000**	**1,978,000**	**1,978,000**	**1,978,000**
EBITDA	**18,155,257**	**14,076,869**	**14,677,018**	**15,305,194**	**16,462,706**	**16,114,467**	**16,114,467**	**16,114,467**	**16,114,467**	**16,114,467**
Depreciation	**4,947,387**	**4,947,387**	**4,947,387**	**4,947,387**	**4,947,387**	**4,947,387**	**4,947,387**	**4,947,387**	**4,947,387**	**4,947,387**
Taxes	**5,283,148**	**3,651,793**	**3,891,852**	**4,143,123**	**4,606,128**	**4,466,832**	**4,466,832**	**4,466,832**	**4,466,832**	**4,466,832**
Cash Flow	**17,819,496**	**15,372,463**	**15,732,552**	**16,109,458**	**16,803,965**	**16,595,021**	**16,595,021**	**16,595,021**	**16,595,021**	**16,595,021**

Sensitivity Analysis

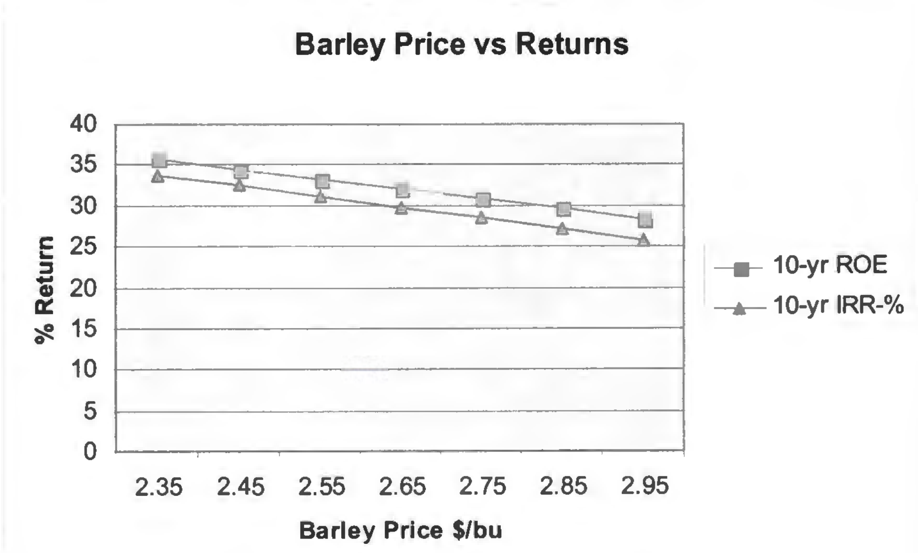
The daily ethanol production, conversion rate of barley to ethanol, feedlot occupancy, and the prices of ethanol, barley, and feed are sensitive assumptions. A change in the rate or price of any of these items could alter the information shown in these forecasted statements significantly. Sensitivity analysis of these items has been done, and has found possible impacts of price and rate fluctuations as follows:

1. Barley and Ethanol Price Sensitivity

Changes in barley or ethanol price have a significant impact on financial returns. Following is a table and chart depicting the effect of barley price on both the 10-year return on equity as well as the 10-year internal rate of return, assuming a fixed ethanol price of $1.65 per gallon FOB plant:

20 MGY Etoh Plant/ 30,000 Head Cattle Feedlot

Barley $/bu	2.35	2.45	2.55	2.65	2.75	2.85	2.95
10-yr ROE	35.8	34.5	33.1	32.1	30.9	29.7	28.4
10-yr IRR-%	33.8	32.5	30.9	29.8	28.5	27.1	25.7

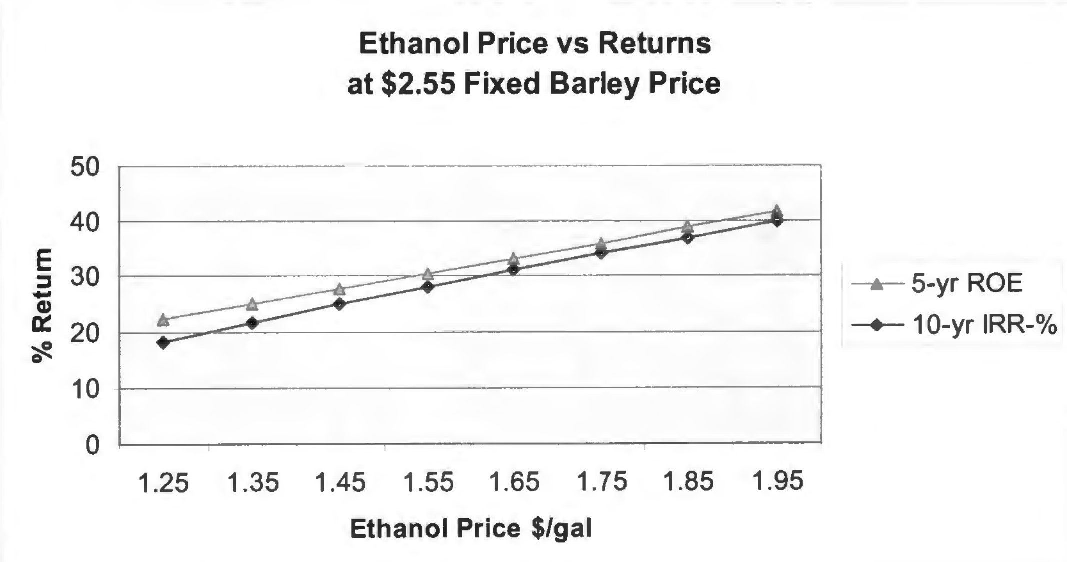


The table and chart depicts the ten-year return on equity on a pro-forma basis. ROE is interest to the equity investors in the project. A reasonable return is indicated in the range of barley pricing considered. For barley priced form $2.35 to $2.95 per bushel, the return on equity provides for excellent returns in the 30 to 36 percent range.

The overall financial performance of the 50 percent leveraged project is depicted with the 10-year internal rate of return line. The barley price range produces an excellent range of IRR from 27 to 34 percent. Barley prices would have to increase to over $4.00 per bushel for this 20-mgy ethanol plant to be no longer profitable.

The next table and chart depicts the effect of ethanol price on both the five-year return on equity as well as the 10-year internal rate of return, assuming a fixed barley price of $2.55 per bushel FOB plant:

Etoh $/gal	1.25	1.35	1.45	1.55	1.65	1.75	1.85	1.95
10-yr ROE	22.2	25.0	27.7	30.5	33.3	36.1	38.9	41.7
10-yr IRR-%	18.3	21.7	24.9	28.1	31.1	34.1	37.0	39.9

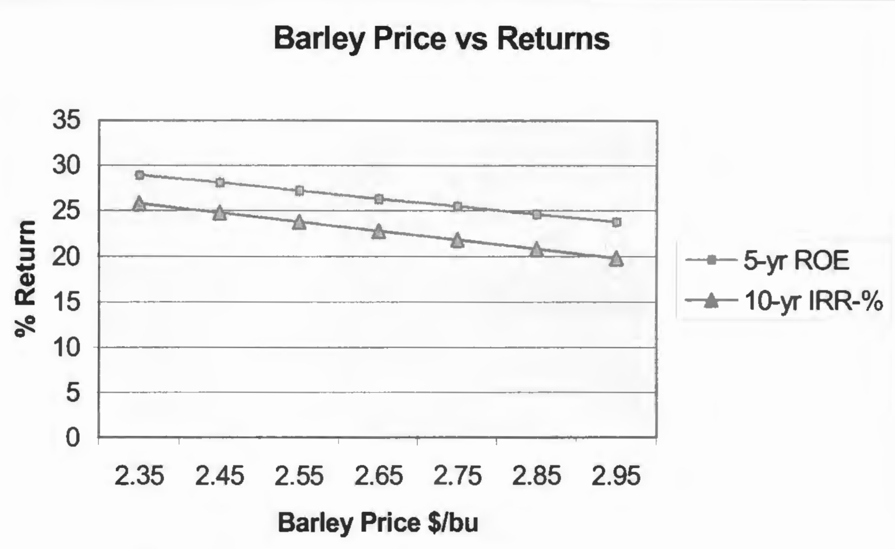


The table and chart depicts the ten-year return on equity on a pro-forma basis. ROE is of interest to the equity investors in the project. A reasonable return is indicated in the range of ethanol pricing considered. For ethanol priced form $1.25 to $1.95 per gallon, the return on equity provides for excellent returns in the 22 to 42 percent range.

The overall financial performance of the 50 percent leveraged project is depicted with the 10-year internal rate of return line. The ethanol price range produces a very good range of IRR from 18 percent to 40 percent. Ethanol prices would have to decrease to under $1.00 per gallon for this 20-MGY ethanol plant to be no longer profitable.

10 MGY Etoh Plant/ 15,000 Head Cattle Feedlot

Barley $/bu	2.35	2.45	2.55	2.65	2.75	2.85
10-yr ROE	28.9	28.1	27.2	26.3	25.5	24.6
10-yr IRR-%	25.8	24.8	23.8	22.8	21.8	20.8

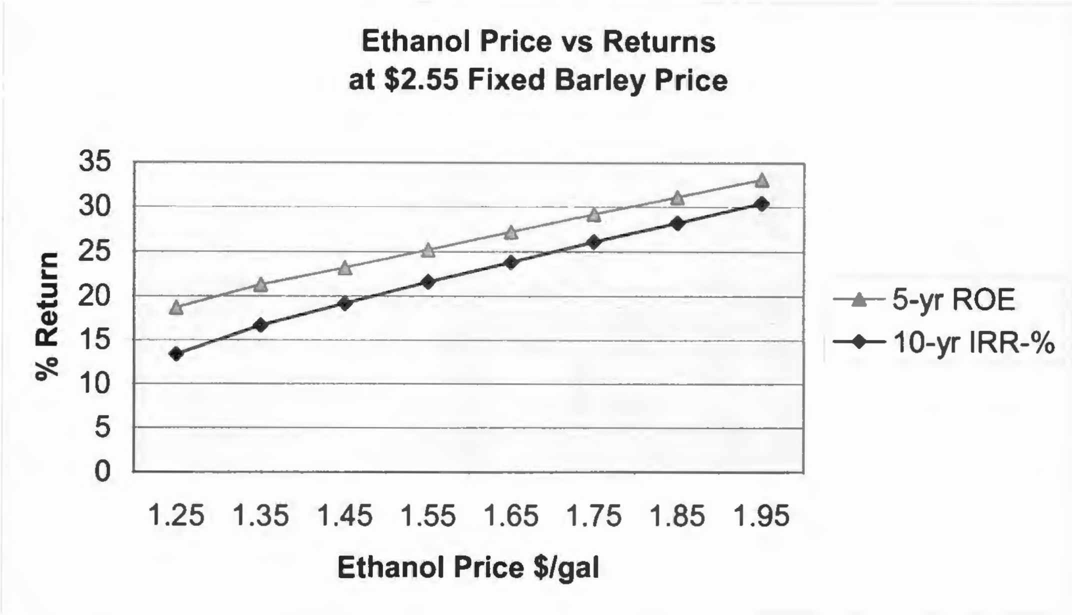


The table and chart depicts the ten-year return on equity on a pro-forma basis. ROE is interest to the equity investors in the project. A reasonable return is indicated in the range of barley pricing considered. For barley priced form $2.35 to $2.95 per bushel, the return on equity provides for very good returns in the 25 to 29 percent range.

The overall financial performance of the 50 percent leveraged project is depicted with the 10-year internal rate of return line. The barley price range produces a reasonable range of IRR from 21 to 26 percent. Barley prices would have to increase to over $4.00 per bushel for this 10-mgy ethanol plant to be no longer profitable.

The next table and chart depicts the effect of ethanol price on both the 10-year return on equity as well as the 10-year internal rate of return, assuming a fixed barley price of $2.55 per bushel FOB plant:

Etoh $/gal	1.25	1.35	1.45	1.55	1.65	1.75	1.85	1.95
10-yr ROE	18.7	21.3	23.2	25.2	27.2	29.2	31.1	33.1
10-yr IRR-%	13.4	16.7	19.2	21.6	23.8	26.1	28.2	30.4



The table and chart depicts the ten-year return on equity on a pro-forma basis. ROE is of interest to the equity investors in the project. A reasonable return is indicated in the range of ethanol pricing considered. For ethanol priced form $1.25 to $1.95 per gallon, the return on equity provides for excellent returns in the 19 to 33 percent range.

The overall financial performance of the 50 percent leveraged project is depicted with the 10-year internal rate of return line. The ethanol price range produces a low range of IRR from 13 to a good return rate of 30 percent. Ethanol prices would have to decrease to under $1.00 per gallon for this 10-mgy ethanol plant to be no longer profitable.

Conclusion

- As shown in Chapter VII Financial Feasibility, both the 10 MGY and 20 MGY capacity ethanol plants can be profitable given today's relatively low grain prices and significantly higher than historical fuel prices. However, the smaller ethanol plant is more sensitive to price fluctuations in either the prices of grain or of ethanol. It still yields a positive cash flow even at depressed but rather historical ethanol prices. The price of ethanol would have to drop below $1.00 per gallon or barley would have be rise to $4.00 per bushel for a facility of this size to result in negative cash flows. Nevertheless, fuel prices have been known to reach depressed levels and stay there for prolonged periods of time, particularly during expansion and over-production eras. The grain price is also likely to experience high pricing periods, albeit short lived.
- To insulate the business from such low profitability periods, the typical solution employed is to invest in a substantially larger ethanol production unit. In today's energy price

environment the optimum size is larger than 20 million gallons per year and typically 40 to 80 million gallons. At the 20-million-gallon size—and as can be seen by the sensitivity analysis in Chapter VII—the ethanol plant remains quite profitable even if ethanol dropped to $1.25 per gallon or the barley price were to rise above $4.00 per bushel. However, in the event that ethanol prices stayed persistently at the historical $1.25 level and barley were to rise to just $3.00 per bushel the facility would barely be able to make its interest payments. If this were to happen with a 10 MGY plant, the business would not be able to service its debt and in fact would be operating at a loss.

- As can also been seen from the proformas on the cattle feedlot, that operation simply cannot be run profitably whether it is a 15,000 or 30,000 head in size. This sizing is just too small in today's cattle feeding industry to be built from scratch as a grassroots facility and to be operated as a stand-alone unit. Naturally, certain synergies and efficiencies can be obtained from operating a feedlot side by side with an ethanol plant. The most obvious one would be the ready-made, no-cost outlet for the ethanol byproducts, which are quite valuable as cattle feed. The facilities were sized to consume all the wet cake as well as the evaporated syrup that the ethanol plant would produce on a daily basis. The ethanol financial results are good enough to provide relatively strong financial performance for both business units combined as discussed and shown in the sensitivity analysis in the Financial Feasibility chapter below.

APPENDICES

Appendix A - Public Hearings

Notes from the Wolf Point Community Meeting held on June 29th-30th

A meeting was held in the offices of Great Northern Development Corporation on June 29th, where members of the community had been invited to ask questions and give comments on the proposed Ethanol Plant. Michael Utter, Chief Executive Officer of RCI representing the study team was the primary spokesperson at the meeting. Gary Quixote Rapport, Development Director for RCI provided back-up.

The primary purpose of this meeting was to listen to the residents and try to get a picture of what the people in the community wanted from the Ethanol Plant. Major questions centered on plant location, plant management, plant financing, and available feed stocks. Twelve people showed up for the meeting, and included representatives from the Valley and Roosevelt County Commissioners, local ranchers and farmers, and a USDA representative.

Attendance:

The following individuals attended the meeting:

Shirley Ball	President of Ethanol Producers and Consumers (EPAC), Farmer,
Richard Iversen	Assist. Coordinator RC&D Eastern Plains Area, USDA, Farmer, Rancher
Linda Twitchell	Great Northern Development Corporation, Farmer, Rancher
Cole Sibley	Farmer
Norman Ruud	Daniels County Commissioner/Farmer
Jim Hammer	Farmer, Rancher
Robert Anderson	Farmer, Rancher
Sharon Anderson	Farmer, Rancher
David Pippin	Valley County Commissioner
Gary Macdonald	Roosevelt County commissioner, Horse Rancher
Bruce Peterson	Valley County Commissioner, Retired Educator
Jim Shanks	Roosevelt County Commissioner, Farmer, Rancher
Michael Utter	Chief Executive Officer, RCI

Gary Quixote Rapport   Development Director, RCI

The following concerns and questions were brought up:

- **What are some of the assumptions that can be used for discussion purposes?**
    - Assume $1.25 cost for a small plant to produce a gallon of ethanol.
    - Assume $1.65 cost with transportation.
    - Assume $70.00 for a barrel of oil.
    - Assume $3.70 current selling price on CBOT for a gallon of Ethanol
    - Assume a $2.50 6 months future price for a gallon of Ethanol.
- **One big concern among the group was the lack of precipitation in the recent years in this region.**
- **What are some other value added products of the ethanol plant?**
    - Wet Distillers Grain for the cattle
    - Carbon Dioxide
    - Manure
- **A big concern is wondering what the market will be for the WDG.**
    - Michael Utter explained that the cattle feed lot component would use a large part of that and the rest could be sold to local ranchers.
- **Another concern is that there might soon be a glut of Ethanol.**
    - Michael Utter explained that with MTBE being banned in many states, oil prices going so high, and the nation's desire to lessen our dependence on foreign oil, most experts predict a deficit of ethanol, not a glut.
- **4 sites were talked about and plans were made to visit them on the 30th of June.**
    - Oswego site
    - Frazier site
    - Old refinery site
    - Nashua site
- **The Roosevelt County Commissioners pushed the old refinery site and explained how it could be had for very little money.**
    - Have to deal with possible EPA problems.
- **Most of the group wanted to know how many acres were needed.**
    - The number of acres needed depends on the components of the plant, as well as the proximity to habitation, rivers, streams, and wildlife areas.
- **Richard Iversen and Shirley Ball suggested having a drying facility as a component.**
- **Most of the group is concerned with outsiders coming in and taking control.**

- Michael suggested forming a co-op
- County Commissioners are in favor of a locally owned plant, as it would making zoning easier
- Some discussion on sharing control with Fort Peck Indian Reservation

❖ **The group was concerned at the approximate $50 million price tag**

❖ **Michael brought up the management of the plant.**

- The group agreed that professionals need to run the plant for a period of time, while training a local core to eventually take over.

❖ **There was a discussion on the sizing of the plant.**

- It was suggested that the plant start out small and grow with time.
- Michael explained that the economics wouldn't support that.
- Gary talked about his conversations with Poundmaker officials about the sizing of the plant.
- Michael said that the final study would have 2 models, a 10 million gallon per year, and a 20 million gallon per year.

❖ **The group wanted to know what the breakeven point was for each of the different feed stocks.**

- Michael said that the charts will be in the final Feasible study

❖ **Michael brought up the possibility of the Anaerobic Digester, and being energy self-sufficient.**

- Most of the group didn't think it was a good idea from the start, maybe later.
- Michael explained the benefits if the digester.
- It was agreed to mention it in the study, but not focus on that component.

Appendix B

1. Alternative Feed stocks for the Ethanol Plant

Field Peas:

Many of the farmers in this area are growing field peas, and would like to know how that could be utilized for the proposed ethanol plant. According to Chet Hill, Area Extension Specialist for the Williston Research Extension Center, NDSU in North Dakota, farmers will plant over 500,000 acres of dry peas in 2006. Local processors have no idea where all those peas will go. Producers will have to find different markets, like the ethanol industry, and cattle feed lots to use up all that is produced. There is an average of 35 bushels of peas per acre, so that works out to about 17.5 million bushels just in this region. One of the reasons that so many acres of peas are in production now, is that the USDA Farm Loan Deficiency Payment Program (LDP) makes it profitable for the farmers. However, that program is going through a re-design, and no one can really say what the changes will be.

Another factor in possibly using peas as a feed stock for the ethanol plant is that at this time, there is not a single ethanol plant making use of peas. Nancy Nichols, USDA Agriculture Research Service microbiologist, is hopeful that eventually, a plant can utilize up to 10% of feed stock with peas. "Right now, even though peas have a high starch value, the fermented pea starch yielded only 1.7 gallons of ethanol per bushel, compared to 2.8 gallons using corn." Ms. Nichols also stated that at this time, it would take the current entire US production of peas to fulfill the needs of a 40 million gallon per year ethanol plant.

An additional factor in deciding on which feed stock to use is the type of equipment needed to process the feedstock. Peas would need special equipment which would add to the cost of the plant.

Soft White Wheat

Many farmers are interested in growing soft white wheat. We have been asked to look into the possibility of using it as a feed stock for the ethanol plant. We looked at many factors, including its use in ethanol plants located in Saskatchewan Canada. One advantage for the ethanol plants in Canada is that there are a number of subsidies that offset the higher price of the wheat.

According to the Department of Crop and Soil Science at Oregon State University, Soft White Wheat has a very low protein level, but a very high starch level, which makes it suitable for ethanol production. The price is usually higher per bushel as most of the wheat goes to make flour for products other than bread. Products like Tortillas, cookies, cakes, and snack foods drive the price higher as there is a large demand currently for those products.

There are several problems with using it here in Montana. According to Chet Hill, Area Extension Specialist for the Williston Research Extension Center, NDSU in North Dakota, the average yield for Soft White Wheat is 10%-20% less per acre than for Hard White. Also, much of the acreage farmed in North East Montana is dry farmed, which isn't as suitable for Soft White Wheat. In years where there is a large amount of precipitation, this would create a surplus which would drive down the price, making it feasible for the ethanol plant, but on average, the North East Montana area doesn't usually have that much precipitation.

Sugar Beets

It has been suggested by members of the steering committee that sugar beets might be an alternative feed stock for the Ethanol plant. According to a report published on-line in Forbes, (July 10th, 2006), "Making ethanol from sugar could be profitable with the current high demand for the gasoline substitute, but it probably won't be for long" USDA reported.

"At this high unusual price, I can conclude that it is economically feasible to produce ethanol from sugar cane and sugar beets" said the USDA Chief Economist, Keith Collins, "however, I would not want to pour concrete based on $3.00-a-gallon ethanol prices. The futures market predicts that ethanol will be $2.50 by next year"

Collins continues to say "At that price, sugar to ethanol would not be economically feasible." The report concluded that sugarcane and sugar beets were nearly 2 and ½ times as expensive to turn into ethanol as corn.

Given this report we believe at this time, sugar beets and sugar cane would not be a viable alternative for the Wolf Point Plant.

Distressed Barley

There is a large number of bushels of barley in Montana that are being planted for malting purposes that (because of weather and other factors) do not meet the required standards demanded by malt producers. This is distressed barley. These bushels are then used for feed, cereals, and other purposes; and could possibly be used for ethanol production.

Looking at the chart, it is clear that there is a large fluctuation in the number of bushels not used for malting each year. While the number varies from year to year, there is a sufficient quantity that could be used to offset the other feed stocks needed for ethanol production. This would result in a savings for the ethanol plant, as well as helping the local farmers in years where their barley doesn't meet malt standards.

One additional factor needs to be examined when looking at the use of distressed barley. If the Ethanol plant will be linked with a cattle feedlot, then the use of the distressed barley and the possibility of toxicity to cattle must be looked at more closely.

Average Montana Barley Not used for Malt

(in bushels)	**2005**	**2004**	**2003**	**2002**	**2001**
Total Barley acres planted	900,000	1,000,000	1,150,000	1,180,000	1,100,000
Total Barley acres Harvested	700,000	830,000	850,000	930,000	720,000
Total Bushels used for malt	*(est.) 18.5m	19.7m	14.8m	9.3m	7.5m
Total Bushels Used for feed or other use	***(est.) 5.5m**	**14.6**	**6.5m**	**15.3m**	**9.9m**

Montana Wheat and Barley Committee, Summer 2006

Poundmaker, Saskatchewan, Canada

OVERVIEW:

Pound-Maker was established in 1970 when local area farmers were looking for an alternative market for their grain. A 2,500-head feedlot was constructed to utilize this grain with 50 local area farmers as shareholders. By the mid eighties, the feedlot expanded to 8,500 head in order to continue to allow farmers to diversify and market their grain locally.

It became apparent that continued investigation was required in order to come up with other areas in which the local farmers could market their products. After lengthy investigations and feasibility studies, a 10,000-head feedlot and a 10 million-liter ethanol plant was constructed in 1991. At this time a share offering occurred and the 50 shareholders grew to over 200 represented in Pound-Maker Investments Ltd. The number of employees at Pound-Maker has increased from 15 to approximately 50 with 75% of them raised locally.

Pound-Maker Investments Ltd. owns 100% of the operating company Pound-Maker Agventures Ltd and the investment company Pound-Maker Capital Corp. All Pound-Maker companies are governed by a Board of Directors of 8.

The shareholders of Pound-Maker Investments have the first right to deliver grain, price and quality being equal. If additional supplies are needed, non-shareholders and other grain companies can deliver.

In 1994 and in 1998, expansion occurred resulting in a one-time feedlot capacity of 28,500 head. Ethanol production has increased to 12.5 million liters due to technological improvements.

Pound-Maker's initial goal, to provide local area farmers an alternative market for their grain, to provide employment for their children and to enhance their community continues to be the guiding force in day-to-day operations.

Pound-Maker
Operational Statistics

Feedlot Information

2004 - 2005 Marketings	43,102 Head
Cattle Purchased in Saskatchewan	61%
Cattle Sold in Saskatchewan	57%
Feed Grain Consumption	2,800,000 bushels
Co-Product Consumption	19,775 MT (As Fed)

[Equivalent to	315,000 bu of barley]
Forage Consumption	25,000 MT
Straw Requirements	12,500 Bales
Acres of Production Required	200 per day
Total Annual Payroll	$1,250,000

Ethanol Information

2004 - 2005 Production	11,572,483 Litres
Sold in Saskatchewan	38%
Feed Grain Consumption	1,227,000 bushels
Acres of Production Required	95 per day
Total Annual Payroll	$750,000

Information for period of
August 1st 2004 to July 31st 2005

FEEDLOT:

Pound-Maker has a one-time capacity of 28,500 head of cattle and provides a wide variety of custom services. Historically, Pound-Maker has fed a combination of company owned and custom owned cattle, both retained ownership and investment feeding. All cattle at Pound-Maker are fed to finish weights and sold to slaughter plants in Canada and the United States, either on a cash or contract basis.

Pound-Maker purchases cattle through auction markets, order buyers, by forward contract or direct from producers. Steers and heifers, from 500 to 900 pounds, are purchased throughout the year. Each animal is individually weighed upon arrival and placed into a lot of cattle of the same weight range. The cattle are fed a starter ration of 30% grain and 70% forage. As the cattle move towards the projected finished weight of approximately 1300 pounds, the rations changes to 80% grain with the remaining being forage. The co-products of ethanol production are also included in the ration.

Individuals can feed cattle at Pound-Maker either by purchasing cattle from Pound-Maker, delivering animals to the feedlot through an order buyer or by delivering animals to the feedlot from their own operation and maintaining the ownership of the cattle. Pound-Maker's custom feeding program is conducted on a feed and yardage basis. The yardage rate is determined by the number of head owned. Pound-Maker has a finance program in which either cattle or cattle and feed may by financed on approved credit. For more information on custom feeding or feeder finance, please contact the main

ETHANOL PLANT:

Ethanol is produced from high starch feed wheat. Varieties used at Pound-Maker are Canadian Prairie Spring Wheat, Fall Rye, Durum, Triticale, Winter Wheat and soft white wheat (AC Andrew). Farmers deliver these grains to the feed mill where it is first screened to remove large material and then elevated into three storage bins.

Milling

The grain is transferred into the ethanol plant and passes over a weight belt. The grain then drops into a hammer-mill and is milled into smaller particles so more surface area is exposed to the water and enzymes.

Cooking

The milled grain is now mixed with hot water in a mash mix tank where enzymes are added to help control viscosity. The mash is then pumped into a continuous jet cooker where the temperature is increased by the addition of high temperature steam. The mash is cooked to sterilize the grain and hydrolyze the starch into fermentable sugars. The mash then goes into a liquefaction tank where more enzymes are added to complete the conversion of starch into sugar. It is then pumped through mash coolers where the temperature is reduced before fermentation.

Starch Conversion

Enzymes are added (alpha-amylase) to convert short chain starch into sugars. With the help of yeast, the sugars are then converted to ethanol and carbon dioxide.

Fermentation

There are 4 fermenter tanks in the plant each holding 283,000 litres of product. It takes approximately 20 hours to fill one fermenter and an additional 48 hours to complete fermentation. While one fermenter tank is filling the other three fermenters are in various stages of fermentation. Yeast is added to the mash along with enzymes. The fermenters are constantly circulated and cooled through a plate exchanger to maintain a constant temperature. The yeast is using the sugar to reproduce and this results in the production of carbon dioxide and alcohol.

It is very important to have good sanitation in the fermenter to reduce the growth of bacteria. The fermenters get cleaned with hot liquid caustic after each batch which kills any organic matter that may be present.

When all of the sugar is consumed the product is now called beer because of its chemical properties. At this time, the product is 10% to 12% alcohol per volume. The contents of the fermenter are now transferred into a beerwell.

Distillation

The beer is pumped into a distillation column where the alcohol is boiled off. The ethanol evaporates to the top of the column and the grain and water fall to the bottom. The ethanol that is at the top of the column is 94% alcohol.

Ethanol Dehydration

The ethanol is purified further by removing the last 6% of water. It is dehydrated by a molecular sieve which purifies the ethanol to 99.5% alcohol. The molecular sieve consists of four vessels containing desiccant which is a bead like material. The beads will allow ethanol to pass around them and the water is absorbed into the beads. A vacuum pump regenerates the saturated beds every few minutes which means the water that has been collected is removed and recycled. Before the ethanol leaves the plant, it is denatured with gasoline to ensure that it does not go into the potable market.

Ethanol Storage
The final product is transferred into two large storage tanks each holding 500,000 litres.

Transport to Gasoline Blending
Tanker trucks pick up the ethanol and take it to a blending station where it is blended with gasoline at 5 to 10% ethanol.

By-Products
The plant produces two co-products, WDG and thin stillage, which are fully utilized in the feedlot. The grain and water that falls to the bottom of the distillation column is called whole stillage. The whole stillage is passed over vibrating screens to separate the suspended solids from the liquid. The solid fraction is then pressed (by a screw press) for further removal of water and solubles.

Thin Stillage
The liquid thin stillage is stored in a large holding tank. The thin stillage contains about 5 to 7% dissolved solids which is mostly made up of protein. It is then pumped to the water bowls in the feedlot.

Wet Distillers Grain

The second by-product produced is wet distillers grains (WDG). All the starch in the grain is used up in the fermentation process to produce ethanol. What is remaining is a concentrated form of protein. The WDG produced is very moist - between 75 and 78% moisture. Because of this moisture the WDG needs to be used within a few days.

About 100 metric tonne of CPS wheat is milled each day in the plant producing 36,000 litres of ethanol. One bushel of wheat will yield about 10 litres of ethanol.

Water Supply
The ethanol plant draws its water from 2 deep wells (300 feet) and uses over 400,000 litres per day. The high pressure boiler needs very pure water and this is achieved by an Industrial Reverse Osmosis unit which purifies the make up water.

Advantages of Producing Ethanol

Produced from renewable resources such a grain and other plant matter.

Contains oxygen
Because ethanol contains oxygen, combustion in the engines is more complete. This results in a substantial reduction in carbon monoxide emissions into the atmosphere.

High octane
Gasoline with too low an octane rating converts fuel to heat, rather than power, making for less efficient fuel usage and a reduction in engine life

Carbon dioxide
Carbon dioxide is released into the atmosphere when ethanol is burned. Carbon dioxide is easily reabsorbed by growing plants. This completes the natural carbon cycle and helps to reduce the greenhouse effect. [10]

In conversations with Plant President, Brad Wilderman, and Plant Manager Keith Rueve, it was clear that if and when they have the opportunity, they would make many changes to a new plant design. First they would like to add the Anaerobic Digester component to the plant. Second, they would like to greatly increase plant capacity almost 6-7 times current capacity. Third, they would like to find additional local markets to ship their WDG, so as to increase their profits from this source.

E3 BioFuels, Mead, Nebraska

The Mead, Nebraska, site was selected due to its existing "clean manure" feedlot, which the anaerobic digester unit requires for optimal performance. Clean manure contains minimal amounts of dirt, sand and water, unlike manure from conventional dirt feedlots. The Mead feedlot has been in operation since 1969 and has had consistent ownership since 1988. This feedlot has also used wet distillers' by-products since 1995.

The plant will use about 7 million bushels of corn to produce about 20 million gallons of ethanol a year.

Fueled solely by methane gas generated from the manure, the ethanol plant will not need to be fueled by more traditional - and costly - natural gas, Hallberg said. The cattle will eat the distillers grain right at the site, eliminating the need to dry and ship the product and saving energy and expense, he said.

This location has excellent access to both Omaha and Lincoln ethanol markets. Another positive factor of the site is an abundant corn supply in the surrounding area. This site also benefits from an existing natural gas supply line, so there is solid backup for all facilities in the event of a temporary biogas interruption.

Locating the specially designed feedlot with the ethanol plant provides a unique benefit: eliminating the need to dry and ship out protein co-products. Union Pacific rail access is approximately two miles from the E3 complex; trucking ethanol to this rail terminal or installing a pipeline would significantly expand the geographic range of E3's ethanol marketing program.

The feedlot is in Saunders County, which provides an adequate labor pool from which to draw

[10] Material supplied by Poundmanker Ethanol Plant, President Brad Wilderman, and Keith Rueve, Plant manager June 26th 2006

qualified employees. In addition, the site is located within 40 miles of Fremont, Lincoln and Omaha, which will further enable E3 to recruit and retain qualified employees.

The E3-Mead complex is now under construction, with operations scheduled to commence in July 2006. The complex, a commercial-scale, integrated system that profitably manages the wastes generated by concentrated beef cattle feeding operations and produces ethanol, is unprecedented. The key factors for developing this project and driving its efficiencies and profitability are as follows:

- environmentally friendly solid waste management that meets CAFO requirements
- use of an existing concrete slatted feedlot operation with historical profitability and retained management
- elimination of costs for transporting the protein co-products to remote locations
- reduction in "net starch" costs compared to competition
- elimination of natural gas requirements in the ethanol plant, resulting in savings of millions of dollars each year
- an experienced and dedicated management and advisory team
- reduction of capital expenditures for the ethanol plant (primarily due to elimination of drying and pollution control equipment)

The E3 solid waste management facility disposes of animal wastes in compliance with all CAFO and EPA regulations. The design is by one of the most experienced firms in the United States, RCM of Berkley, California. As mentioned earlier, the patented use of an admixture of manure and thin stillage increases its anaerobic digester's efficiency and output of both biogas and biofertilizers, which in turn provides substantial cost savings and new revenue potential. The anaerobic digester treatment of manure also facilitates the use of commercially available nutrient removal processes that will in the future reduce nutrient management costs and have the potential to generate significant revenues from the recovery and sale of the nutrients, especially important in light of escalating costs for natural gas-based fertilizers.

The anaerobic digester uses manure from the feedlot, and thin stillage waste streams from the ethanol plant as feed stocks to produce all of the biogas needed to generate the thermal energy required to run the E3 ethanol plant. This facility will have state-of-the-art computerized monitoring, handled around the clock by the ethanol plant's staff.[11]

Frontier Ethanol Plant, Gowrie, Iowa

Frontier Ethanol, LLC, opened in June 2006 and located near Gowrie, Iowa, will consume approximately 21 million bushels of locally-grown corn and produce 60 million gallons of ethanol annually. Frontier Ethanol will not only provide an environmentally-friendly fuel, but also a premium, high-quality Dakota Gold brand livestock feed for regional, national and international markets.
The Grand opening was at the end of May, with production to start before the end of June. Frontier Ethanol was built by Sioux Falls-SD-based Broin Companies, who began building ethanol plants in 1987.

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[11] Material supplied by E^3 BioFuels, Omaha, Nebraska June 26th, 2006

The plant, which will produce 60 million gallons of ethanol annually from 21 million bushels of corn, is the 23rd ethanol plant built by **Broin Companies**, which provides turnkey development, design, engineering, construction, management, and marketing services for their premier partner plants.

The plant, which is located north of Gowrie, will also produce 178,000 tons of Dakota Gold Enhanced Nutrition Distillers Products™ for regional, national, and international markets. in the Gowrie area, Frontier Ethanol will use 21 million bushels of corn raised on 130,000 acres of local land—that's 200 square miles of Iowa corn.

The plant incorporates Broin Companies' revolutionary BPX™ technology, which increases ethanol yield per bushel, lowers energy input requirements, and lowers plant emissions.[12]

a) *Montana 2006 Legislation and Incentives*

1) 15-70-204
    a. Money collected from the Fuel tax will be used to fund the Ethanol incentive
    b. Gasohol(ethanol) will be subjected to 85% of the $.27 from each gallon of fuel sold in Montana
2) 15-70-201
    a. Definition of Ethanol
    b. Distributor pays full price per gallon, then gets rebate, based on percentage of Montana products used in the production of Ethanol
3) 82-15-121

    Twelve months after the State of Montana has certified that a minimum of 40 million gallons per year (GPY) has been produced and maintained for at least 3 months after that date, a state mandate kicks in requiring that all gasoline sold in Montana, with the exception of off road racing, and Aviation fuel, be blended 10% with Ethanol, and cannot contain any but trace amounts of MTBE. If Ethanol production subsequently drops below 20 million GPY, then the mandate resets to not requiring Ethanol blend. The legislation doesn't state what happens if the level goes back up to over 40 Million GPY.
4) 15-70-522
    a. Tax incentive
    b. $20 per gallon up till $2,000,000 per producer
    c. Must be produced in Montana from 100% Montana products
    d. Pro rated reduction for percentage produced outside Montana
    e. Available to producers for the 1st 6 years from the start of production.

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[12] Material supplied by Broin Companies, Rebecca Sevening, Director of Communications, June 26th 2006

f. Total statewide incentive cannot exceed $6,000,000 per calendar year.

g. Must file business plan two years before the estimated start of production, to be entered on the list for incentives.

h. Must use a minimum of 20% Montana products the 1st year, 25% the 2nd year, 35% the 3rd year, 45% the 4th year, 55% the 5th year, and 65% the 6th and final year.

i. The ethanol plant must apply for the incentive by submitting an application when the plant has commitments from lenders to finance the package. Within 45 days, after confirmation, the state will enter into a contract with the plant, guaranteeing the incentive payment.

There is some confusion within the government about the application process. Some say that it's "first come first served". In other words, the first to apply will be the first to get the incentives. Others think the intent of the legislature was that the first to actually produce will get the incentives. This matter is being discussed and clarified, and will be updated shortly. As of June 2006, two companies have officially applied, but neither has broken ground, nor received all of the necessary permits.

3. Federal Incentives

Federal Incentive Program

1) **Excise tax Incentives:** Most Ethanol sold in the U.S. incorporates the federal excise tax incentive (VEETC). The federal government provides various levels of exemption from federal excise taxes for qualified alcohol fuels.

- **Income Tax Credit for Alcohol Fuels:** The federal income tax credit for blenders of gasoline and ethanol is currently in the law until 2010. The incentive is presently .51 cents per gallon. While the credit can be carried forward, it is non-refundable and non-transferable. Therefore it is of little use to entities that have no federal income tax liability.

- **Income Tax Credit:** The income tax credit discussed above has generally been considered as an incentive to increase ethanol use. This perception is based on the fact that the application of this incentive is tied to the blending of all components of the finished fuel, i.e., ethanol and gasoline. Although seldom applied as a production incentive, this credit may be narrowly viewed as an incentive for ethanol production.

- **Income Tax Credit for Small Ethanol Producers:** Effective January 1, 1991, certain small ethanol fuel producers were eligible to receive an income tax credit of ten cents for each gallon of qualified denatured ethanol fuel produced. The provision limits the qualified ethanol fuel production of any producer for any taxable year to no more than 15 million gallons per year produced at a facility whose total production capacity does not exceed 60 million gallons per year. The tax credit is included in income and is therefore taxable, is nonrefundable and nontransferable, but can be carried forward into future taxable years.

- **Loans and Loan guarantee Program**: Fifteen years ago Congress authorized a series of programs to encourage development of alternative energy enterprises in the U.S. Among the primary incentives available through these programs were loans and loan guarantees. The Departments of Energy and Agriculture have administered loan and loan guarantee programs for which ethanol projects were eligible. Under the programs, qualified applicants were eligible for loans or loan guarantees that provided direct financing or guaranteed loans for capital construction. Funding and authorization for the ethanol related provisions of these programs are extremely limited under Department of Energy programs today but USDA programs authorized under the 2002Farm Bill include several applicable programs.

- **Grant Programs:** In past years the Departments of Energy and Agriculture have administered grant programs for which ethanol projects have been eligible. In most cases the grants have been for projects that met specific criteria. However, the availability of grants can often provide leverage for project financing. Because grants are, in effect, a gift, they do not dilute equity or encumber a project with additional debt. The DOE and USDA both administer programs for which plants meeting specific criteria may qualify.

- **Cooperative Financing:** The federal Bank of Cooperatives has been an important source of financing for many ethanol projects built in the Midwest. Ethanol ventures that are structured as cooperatives are eligible for project financing. The Bank of Cooperatives has been active in direct loan and loan guarantee programs during the past decade. The Bank remains an active participant in ethanol ventures today. This source of debt financing is often more accessible to new ethanol ventures than conventional lenders.

- **Feedstock Incentives:** On many occasions the federal government has provided commodities to meet specific needs or policy objectives. This mechanism has also been used as a production incentive for ethanol. The Commodity Credit Corporation has provided corn and other commodities to ethanol producers as a production inducement and an inventory control measure. While this mechanism has been used only on a limited basis, it serves as an example of an incentive that can stimulate ethanol production. At present, a federal bio-fuels production incentive is available for new or expanded ethanol production. These provisions are included under the Energy Title of the 2002 Farm Bill but are likely to expire after 2006. Prospective ethanol producers wishing to enroll in the program should evaluate the Bioenergy Program Agreement. Details of the agreement and of the Bioenergy Program are available via the Internet at www.fsa.usda.gov/daco/bio_daco.htm

- **Other Federal Incentives**: The primary challenge of encouraging investment in new ethanol production facilities is to create an environment that mitigates risk. Many of the federal incentives are designed to reduce risk in different ways. The value of incentives is often dependent on specific projects. For example, some start-up projects may find incentives most useful if they help attract capital. Companies that are capable of financing projects internally may find market-based incentives like contract preferences to be more valuable .Some incentives are designed to provide a supplement to costs that are typically applicable to all projects. Infrastructure grants and job training grants are examples of these incentives. While these grants may be administered by state agencies, the federal government provides the funding for these programs. Infrastructure incentives simply decrease total project cost to the developer if such costs are borne by other entities. Job training grants typically offset the cost of training new employees for operations at the ethanol facility. Since the skills required might not be generally available in a local labor pool, training costs can be expensive. Job training grants offset the direct cost to the project developer, thereby making funds otherwise spent on this activity available for other project needs.[13]

4. Federal EPA CAFO Rules

The Environmental Protection Agency is working with the agriculture community to control water pollution from the nation's largest livestock operations while at the same time keeping American agriculture strong and viable.

These final rules replace the prior technology requirements and permitting regulations that are over 25 years old. The past regulations were out of date and did not establish adequate expectations for environmental performance. These rules will protect America's waters by controlling runoff from agricultural feeding operations, preventing billions of pounds of pollutants from entering America's waters every year.

EPA fully recognizes that farmers have a long history of stewardship of the land. As livestock production methods change, it is important that environmental management practices keep pace and protect our valuable land and water resources for future generations. Effective manure management practices required by this rule will maximize the use of manure as a resource for agriculture while reducing its impact as waste on the environment.

Environmental Progress:

EPA's final CAFO rule will provide substantial and measurable environmental and public health benefits. The rule significantly improves the way animal manure will be managed at large CAFOs. Together with USDA's voluntary programs, this rule will help protect the Nation's waters from nutrient over enrichment and eutrophication, which cause algal blooms and fish kills and contribute to the expansion of the Gulf of Mexico dead zone. The rule will also reduce pathogens in drinking water and improve coastal water quality.

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[13] A Guide for Evaluating the Requirements of Ethanol Plants, Clean Fuels Development Coalition, Summer 2006

Over the past two decades, the animal production industry has changed. This rule will require large livestock operations to develop nutrient management plans. These plans will ensure that manure is properly managed and that manure nutrients are utilized by crops, rather than entering surface waters.

The rule will lead to an estimated annual reduction of over 56 million pounds of phosphorus released from CAFOs into the environment, over 110 million pounds of nitrogen, over 2.1 billion pounds of sediment, over 911,000 pounds of metals, and significant percentage reductions in pathogens, based on estimates during development of the final rule.

Animal manure is a valued resource, when managed effectively. While nutrients like phosphorus and nitrogen are valuable components of manure, and essential for crop growth and animal production, improper management of manure can lead to eutrophication of rivers, lakes and estuaries. Eutrophication is the accelerated "aging" of waters caused by excessive nutrient loading which causes excessive plant growth, fish kills and reduced aesthetic quality.

Improving Implementation of CAFO Rules:

Despite their existence for 25 years, current rules have proven to be ineffective and inadequate. EPA is strengthening the existing rules to remove ambiguity as to which operations are covered by the rules, and to address all aspects of ensuring effective manure management by large operations, including land application.

For the first time, all of the Nation's large CAFOs, including beef, dairy, swine, and poultry operations, are required to get Clean Water Act permits from the States or EPA, regardless of whether they discharge only during large storms.

The permits issued by EPA and States will require large livestock operations to develop nutrient management plans that ensure that manure is properly managed and land applied in ways that assure utilization of nutrients by crops.

States will play a key role in implementing these final rules. EPA will work closely with states to implement these rules.

Rural Partnerships:

EPA and USDA are setting an example for environmental and agriculture partnership through our combined efforts. EPA's regulatory actions are designed to complement USDA's voluntary programs and policies, resulting in seamless national environmental objectives for all livestock agriculture.

EPA and USDA support similar partnerships at the state and local level. EPA and USDA will be working with the State environmental and agriculture agencies to develop cooperative regulatory and voluntary efforts to support all animal feeding operations to take prudent steps to protect water quality.

EPA and USDA jointly support local watershed efforts that target resources to the pollution sources that pose the greatest water quality risks, whether they are from agriculture, industry or cities.

EPA is promoting watershed-based efforts including national watershed pilot efforts, water quality trading, watershed-based permitting and other approaches that provide State and local communities with the tools and abilities to target their efforts to improve water quality. EPA and USDA will also continue providing financial support from Clean Water Act programs and the Environmental Quality Incentives Program to support efforts by livestock producers.

To help these livestock operations meet the rule's requirements, Congress increased funding for land and water conservation programs in the 2002 Farm Bill by $20.9 billion, bringing total funding for these programs to $51 billion over the next decade. The Environmental Quality Incentives Program (EQIP) was authorized at $200 million in 2002 and will ultimately go up to $1.3 billion in 2007; 60 percent of those funds must go to livestock operations. New technology is also being perfected to aid farmers in meeting this new rule.

State Flexibility:

This final rule maintains substantial flexibility and adds new opportunities for States to tailor these final rules to their needs.

The final rule maintains important flexibility for States that allows them to focus their resources and ensures that federal programs complement existing State efforts. EPA has retained the existing structure of when medium and small operations may be subject to the regulations. EPA has recommended that States use voluntary and incentive programs to help small and medium operations avoid water pollution problems that would make them subject to these new regulations.

The final rule also maintains a variety of flexibilities to accommodate State program implementation including:

• Flexibility for States to tailor their permit program to address specific needs. For example, States retain the authority to determine the type of permit, general or individual, to be issued to a given operation. This enables States to develop permits that take into account the size, location, and environmental risks that may be posed by an operation.

• State authority to determine that specific CAFO operations have no potential to discharge pollutants under any circumstances, and hence do not need permits. This flexibility recognizes the geographic diversity and climatic variations that can exist.

• States have substantial flexibility to tailor nutrient management for CAFOs.

• States can authorize alternative performance standards for existing and new CAFOs that will help promote innovative technologies.

Public Accountability:

The final CAFO rule will fundamentally improve the implementation of Clean Water Act requirements for CAFOs and significantly improve accountability to the public to ensure them that CAFOs are effectively managing manure and protecting water quality. All CAFOs will be required to submit annual reports to the permitting authority with important information on nutrient management plan implementation.

Innovation and Technology:

EPA recognizes the power of American ingenuity to develop new technologies to solve today's problems. While manure is a valuable resource when used properly for agricultural purposes, there are areas of the country where there is simply too much manure for the available land. Also, some livestock producers are moving forward with development of new technology for manure management, such as a feedstock for compost and fertilizer and for energy generation.

The final rule provides for the States' ability to approve "alternative performance standards" to encourage and provide stimulus to ongoing technology innovation efforts within the industry. As this industry grows and changes, it is important that its practices and technologies keep pace with those changes so our valuable land and water resources are adequately protected.[14]

Revised National Pollutant Discharge Elimination System Permit 2006

Regulation and Effluent Limitation Guidelines for Concentrated Animal

Feeding Operations in Response to Waterkeeper Decision

SUMMARY: EPA is proposing to revise the National Pollutant Discharge Elimination System (NPDES) permitting requirements and Effluent Limitations Guidelines and Standards (ELGs) for concentrated animal feeding operations (CAFOs) in response to the order issued by the Second Circuit Court of Appeals in Waterkeeper Alliance et al. v. EPA, 399 F.3d 486 (2nd Cir. 2005). This proposed rule responds to the court order while furthering the statutory goal of restoring and maintaining the nation's water quality and effectively ensuring that CAFOs properly manage manure generated by their operations.

This proposal would revise several aspects of EPA's current regulations governing discharges from CAFOs. First, EPA proposes to require only the owners and operators of those CAFOs that discharge or propose to discharge to seek coverage under a permit. Second, EPA proposes to require CAFOs seeking coverage under a permit to submit their nutrient management plan (NMP) with their application for an individual permit or notice of intent to be authorized under a general permit. Permitting authorities would be required to review the plan and provide the public with an opportunity for meaningful public review and comment. Permitting authorities would also be required to incorporate terms of the NMP as NPDES permit conditions. Third, this action proposes to authorize permit writers, upon request by a CAFO, to establish best management, zero discharge effluent limitations when the facility demonstrates that it has designed an open containment system that will comply with the no discharge requirements. This proposed rule also responds to the court's remand orders regarding water-quality based effluent limitations (WQBELs) and pathogens. EPA proposes to clarify that WQBELs are available in permits with respect to production area discharges and non-precipitation related discharges from land application, but are statutorily unavailable in permits for Large CAFOs with respect to precipitation related land application discharges because the only allowable discharge from a land application area is due to agricultural storm water which is by statute exempt from permitting requirements. Finally, EPA proposes to clarify its selection of BCT technologies for pathogens (fecal coliform), and reaffirm its decision to set the BCT limitations for fecal coliform to be equal to the BPT limits established in the 2003 CAFO rule.[15]

5. Montana CAFO Rules

Introduction:

[14] United States Environmental Protection Agency, EPA 833-G-02-014, May/2002

[15] ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 122 and 412

Wastes from confined livestock can be a source of pollutants when they are discharged to state waters. Pollutants most often reach state water as a result of precipitation (rainfall or snow melt).Pollution of surface and ground water is prohibited, and permits are required for discharges containing pollutants. This chapter describes the permitting requirements that apply to livestock production facilities and outlines the process for determining which operations require permits.

The Montana Water Quality Act:

Discharges of wastes, including animal wastes to state waters are governed by The Montana Water Quality Act (75-5-101 et seq. MCA). Section 605 of the Act states that it is unlawful to cause pollution of any state waters or to place wastes in a location where they will cause pollution (75-5-605 (1)(a) MCA). It is also unlawful to discharge sewage, industrial waste, or other wastes into any state waters without a current permit from the Department of Environmental Quality (DEQ) (75-5-605 (2)(c) MCA).

"State waters" means a body of water, irrigation system, or drainage system, either surface or underground. The term does not apply to a) ponds or lagoons used solely for treating, transporting, or impounding pollutants; or b) irrigation waters or land application disposal waters when the waters are used up within the irrigation or land application disposal system and the waters are not returned to state waters. (See 75-5-103(29), MCA.)

Livestock owners can assess their operations by asking, **"Do waterborne wastes discharge, or have the potential to discharge, from my livestock production area or land application area into any state waters?"** If the answer is "no," a permit is not required. If the answer is "yes", the owner needs to obtain coverage under a Montana Pollutant Discharge Elimination System (MPDES) permit. Achieving compliance may only require minor changes to completely isolate wastes from state waters. Permits are only required for animal feeding operations (AFOs) that actually discharge, and for operations that are either defined or designated as Concentrated Animal Feeding Operations (CAFOs).

The Permit Program:

The DEQ Water Protection Bureau administers the MPDES permit program. The MPDES program includes a discharge permit for AFOs. An AFO has **both** of the following conditions: **1.** Animals are stabled, confined, and fed or maintained for a total of **45 days or more** in any 12-month period; and,

2. Crops, vegetation forage growth, or post-harvest residues are **not sustained** in the normal growing season over any portion of the facility.

An AFO is a CAFO if it meats the definition of either a large or medium CAFO

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A large CAFO is an AFO that stables or confines at a minimum:

(a) 700 mature dairy cows, whether milked or dry;
(b) 1,000 veal calves;
(c) 1,000 cattle other than mature dairy cows or veal calves;
(d) 2,500 swine each weighing 55 pounds or more;
(e) 10,000 swine each weighing less than 55 pounds;
(f) 500 horses;
(g) 10,000 sheep or lambs;
(h) 55,000 turkeys;
(i) 30,000 laying hens or broilers if the AFO uses a liquid manure-handling system;
(j) 125,000 chickens, other than laying hens, if the AFO uses other than a liquid manure handling system;
(k) 82,000 laying hens if the AFO uses other than a liquid manure-handling system;
(l) 30,000 ducks if the AFO uses other than a liquid manure-handling system; or
(m) 5,000 ducks if the AFO uses a liquid manure-handling system.

A medium CAFO is an AFO with the type and number of animals that fall within any of the ranges listed in subsection (a) below and that has been defined or designated as a CAFO. An AFO is defined as a medium CAFO if:

(a) the type and number of animals that it stables or confines falls within any of the following ranges:

(i) 200-699 mature dairy cows, whether milked or dry;

(ii) 300-999 veal calves;
(iii) 300-999 cattle other than mature dairy cows or veal calves;
(iv) 750-2,499 swine each weighing 55 pounds or more;
(v) 3,000-9,999 swine each weighing less than 55 pounds;
(vi) 150-499 horses;
(vii) 3,000-9,999 sheep or lambs;
(viii) 16,500-54,999 turkeys;
(ix) 9,000-29,999 laying hens or broilers if the AFO uses a liquid manure-handling system;
(x) 37,500-124,999 chickens, other than laying hens, if the AFO uses other than a liquid manure-handling system;
(xi) 25,000-81,999 laying hens if the AFO uses other than a liquid manure-handling system;
(xii) 10,000-29,999 ducks if the AFO uses other than a liquid manure-handling system; or
(xiii) 1,500-4,999 ducks if the AFO uses a liquid manure-handling system; and

(b) either of the following conditions is met:

(i) pollutants are discharged into waters of the state through a manmade ditch, flushing system, or other similar manmade device; or
(ii) pollutants are discharged directly into waters of the state that originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.

The DEQ must conduct a site inspection prior designating an operation with less than 301 animal units as a CAFO and requiring a permit (ARM 17.30.1330(5)). Details regarding size, runoff volume, distance to surface or ground water, slope and ground cover conditions must be considered by DEQ in assessing the likelihood and frequency of a discharge and making a case-by-case designation. Other relevant factors may include proximity to public water supplies, or public complaints.

Two or more AFOs under common ownership are considered to be a single AFO for the purposes of determining the number of animals at an operation if they adjoin each other or if they use a common area or system for the disposal of wastes.

A CAFO operator applies for the permit by completing Short Form B, paying a $600.00 application fee, and paying a $600.00 first year annual fee. Short Form B requests information on facility ownership, location, size, physical surroundings, and waste control and land application practices.

Discharge Limits and Performance Standards of the Permit:

The general permit places limits on discharges to surface and ground water. A discharge is allowable only when precipitation causes an overflow from a facility **designed, constructed, and operated to contain all process generated wastewaters plus the runoff from a 25-year, 24-hour rainfall**. A 25-year, 24-hour storm refers to the number of inches of rainfall in a 24-hour period that is expected to occur once in 25 years.

Rainfall from the 25-year, 24-hour storm has been mapped within Montana; the amount ranges between 1.8 and 4.4 inches. A permitted CAFO that discharges due to rainfall less than the 25-year, 24-hour storm is in violation of the permit. **Without a permit, any discharges of wastes from a CAFO to state waters are violations of the Montana Water Quality Act.**

A discharge of pollutants to state **ground waters** may only occur under certain, site-specific circumstances as determined in a facility's permit or permit authorization. Ground water contamination from AFOs most often results from leaking storage ponds and surface accumulations of solid manure, and confined animals on coarse-textured soil over shallow ground water.

The CAFO permit contains performance standards specifying that land application rates of solid manure, liquid manure or other solid or liquid wastes, not exceed annual crop requirements for nutrients. All facilities used for the collection, storage or treatment of manure, bedding materials, feeds and other substances having a waste contributing potential must be managed to prevent any pollutant from entering state waters. All wastes from dipping vats, pest and parasite control units and other facilities utilized for the application of hazardous or toxic chemicals must be handled and disposed of in a manner that prevents any pollutant from entering state waters.

6. BNSF Spur Guidelines

This information is provided by BNSF AG Marketing to provide specific detail as it applies to BNSF's Shuttle projects. This information is a supplement to BNSF Engineering's 'Design Guidelines for Industrial Track Projects', last published in June of 2005.

Definition

Shuttle – facility that can accept 110-cars in one string and can load or unload them in 15 hours without fouling the mainline. Products – corn, wheat, soybeans and milo.

Requirements

1. Load or unload in 15 hours
2. Drop-off & pick-up in one string
3. Crossing closure – a letter must be received from the governing authority for the closure – state, county, township, city, etc.
   A. Any crossings involved must be permanently closed.
   B. If that is not possible, then the crossing must be temporarily closed while the shuttle is on site – could be up to 24 hours.
4. Engine storage – must have a dedicated track for BNSF engine storage while shuttle is on-site; three (3) locomotives at 75 ft. lengths.
5. Equipment lengths used when figuring how much track is needed –
6. Locomotives: 75 ft. (and how many), cars: 62 ft.
7. Visual clearance at crossings – must maintain 250 ft. on either side of the centerline of the road while a crossing is open.
8. Vehicle inspection road – must have an inspection road that meets BNSF & state standards for BNSF personnel.
9. An inspection walkway is required on the opposite side of the track from the inspection road.
10. Track (rail weights) – 112 lb. or greater. If the project is an expansion and existing track structure is used, then it does not need to be replaced as long as it is 90 lb. or better and the Roadmaster approves it.

11. Mainline Turnouts – must have access from two directions (2 switches); must be new No.11 – 136 lb., no exceptions.
12. Interior Turnout – No.11 is required. It must be at least 115 lb. weight.
13. Maximum Loop Track grade – ½%
14. Maximum Loop Track curvature – 7°30'
15. Minimum Loop Track length– 7,300 track feet @$350.00 per foot
16. In BNSF Terminal locations/areas EXCEPTIONS to these 'Guidelines' may exist depending on local conditions.
17. Customer will be responsible for cost of BNSF Flagging Services at any time customer/contractor construction is within 25-foot clearance from the center-line BNSF Main Line Track. The customer/contractor should discuss Flagging Service requirements with BNSF Roadmaster, estimating how many hours/days construction will be within the 25-foot clearance limits. Current cost for BNSF Flagging Services is $95.00 per hour and $500.00 per 8-hour day.
18. Unit Train Shuttle projects on BNSF Short Line Partners are required to meet BNSF 'Design Guidelines' as identified.

This information is provided by BNSF Ag Products Marketing to provide guidance in the design of railroad facilities at ethanol plants. This information is a supplement to BNSF Engineering's much more detailed 'Design Guidelines for Industrial Track Projects' which was last published in June of 2005.

Service Offering

BNSF offers "Ethanol Express" unit train service handling 95 cars of ethanol into the unit train unloading facility in the L.A. Basin. This service allows expedited handling of the product, 24 hour unloading of the unit train and expedited return of the empty cars via unit train back to the origin. Private fleet cycle time improvements of 40-50% can be realized.

BNSF also provides transportation for single carloads of ethanol and DDGs to major consumption areas throughout the western two-thirds of the United States. We offer coordinated service to eastern and southeastern markets through our interline partners.

Rail Facility Design Guidelines

1. Rail facilities should have access to the BNSF main track in both directions. This allows empty cars to be spotted into the ethanol facility from either direction and loaded cars to be pulled from the facility in either direction.
2. There should be adequate track capacity at the plant to provide for both loaded and empty car storage. There should be enough empty cars on site to contain at least 3 to 5 days worth of production at the plant.
3. If the facility will take part in BNSF's "Ethanol Express" unit train service, track capacity should allow the plant to release blocks of 35-95 ethanol tank cars at one time. These blocks of loaded cars must be assembled on one track with air hoses connected. Unit train block sizes are 35 cars for plants producing up to 75 million gallons of ethanol a year ; and 95 cars for plants producing more than 75 million gallons a year. These are guidelines for geographic areas that are currently in the "Ethanol Express" network. Plants that are located outside of the established "Ethanol Express" network may be subject to different unit train requirements.
4. Ideally, plants should be constructed so that BNSF can spot a cut of empty cars on one track and pick up a string of loaded cars from a second track.
5. Consideration should be given to release DDGs in 25-30 car blocks in the future.
6. Track (rail weight) of 112 lbs. per yard or greater is required for new construction.
7. Mainline Turnouts must be new No.11 – 136 lb., no exceptions.
8. It is recommended that interior turnouts also be No.11.These should be at least 115 lb. weight.
9. Ethanol plants located on BNSF Short Line Partners are required to meet BNSF 'Design Guidelines' as identified.
10. Ethanol tank car lengths can be calculated using 62' as an average railcar length.

Contact Information

Angela Caddell – Manager, Ethanol & Ag Products – 817-867-6035

Susan Stockstill – Manager, Barley & Malt - 817-867-6713

Dennis Bell – Manager, Oils & Feeds – 817-867-6702

John Rider – Manager, Economic Development – 817-867-6246

Rob Keller – Manager, Feedgrains – 817-867-6728

Todd Whitmore – Manager Logistics – 817-867-6124