Attachment 33

701-974-4RED

December 11, 2003

Karlene Fine Executive Director
North Dakota Industrial Commission
State Capital
600 East Boulevard Avenue
Bismarck, N. D. 58505

RE: RED TRAIL ENERGY LLC

Dear Karlene:

This letter is to inform you that RED TRAIL ENERGY L.L.C. wishes to have their application "Demonstrating North Dakota Lignite's Profitability In Energy Production And Agricultural Processing" to the North Dakota Lignite Resource Council amended and considered.

The amendment that we offer is a change in the "Amount of Request". We would ask that the "Amount of Request" be changed to 5(five) million dollars, as compared to the 28.2(twenty-eight point two) million dollars as was originally proposed. We ask that this change be reflected through out the document as necessary.

RED TRAIL ENERGY understands that the October grants have been considered and that the RED TRAIL ENERGY proposal was omitted. We ask that The Commission would grant us the opportunity for review of our project on a timely manner, so that the technical merits of our project may be weighed.

Additionally, it is now our understanding that such projects as ours, need to have a sponsorship from within the Lignite Energy Council. We offer the attached letter of sponsorship to accommodate this apparent need.

We also offer for your review the attached letters of support.

As always we are grateful for and appreciative of your efforts in assisting us in this matter.

Respectfully:

Frank Kirschenheiter
Project Coordinator
RED TRAIL ENERGY L.L.C.

RED TRAIL ENERGY

April 15, 2004

Mr. Harvey Ness
Director, Lignite Research and Development
Industrial Commission of North Dakota
P. O. Box 2277
Bismarck, N.D. 58502

Re: RED TRAIL ENERGY

Dear Mr. Ness:

This is in response to your email of April 14, 2004.

Please consider the following sources and uses table as additional information regarding the matching funds needed in the Lignite Research Council grant.

RED TRAIL ENERGY LLC
Proposed Sources and Uses of Funds

Sources of Funds	**Total**
Senior Debt (LRC Matching)	$43,020,000
Members Equity (LRC Matching)	$25,000,000
Seed Capitol (LRC Matching)	$1,200,000
North Dakota State Program Equity	$3,500,000
Grant Income (LRC and others)	$5,500,000
Total Sources	**$78,220,000**

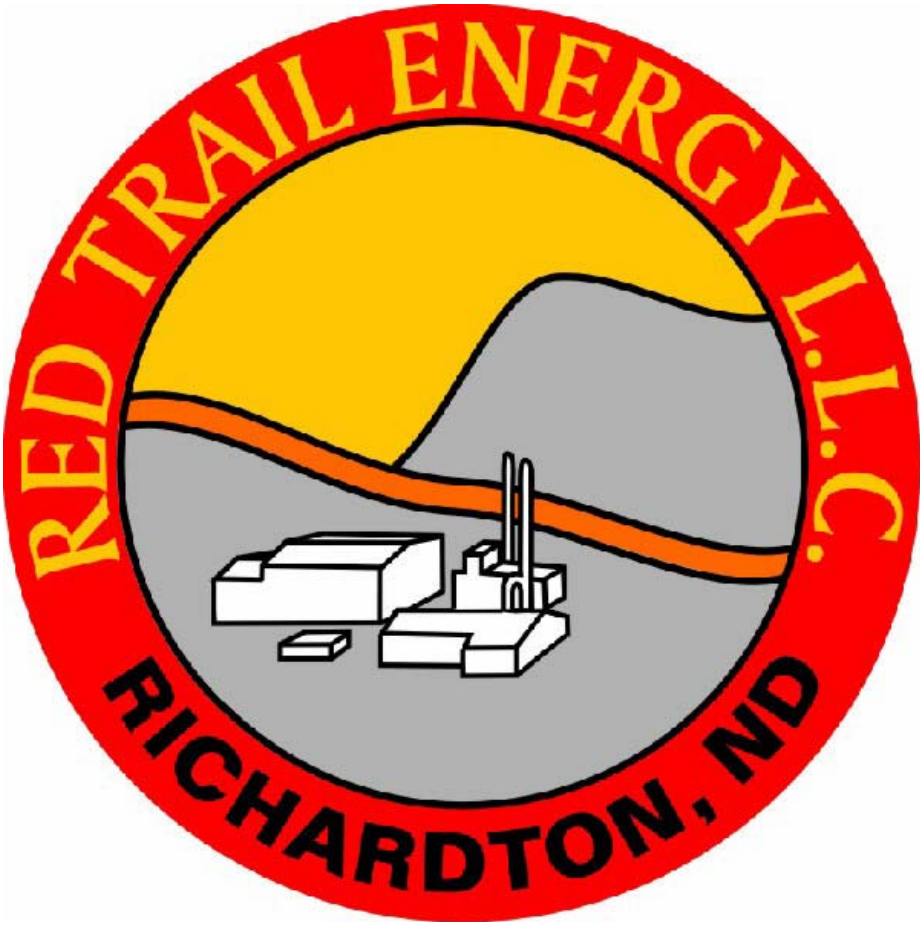
Uses of Funds	**Total**
Ethanol Production Facility	$50,000,000
Lignite Energy Center (LRC grant use)	$11,000,000
Site development costs	$1,300,000
Construction contingency	$1,000,000
Construction performance bond	$450,000
Construction insurance costs	$90,000
Administrative building	$200,000
Office equipment	$40,000
Computers, software, network	$100,000
Railroad	$2,300,000
Fire protection & water supply	$300,000
Consulting contract	$2,800,000
Capitalized interest	$1,100,000
Rolling stock	$250,000
Start up costs:	
Financing costs	$650,000
Organization costs	$860,000
Pre production period costs	$500,000
Inventory – working capital	$2,500,000
Inventory – corn	$1,200,000
Inventory – chemicals and ingredients	$350,000
Inventory – work in process	$950,000
Total uses	**$78,220,000**

Should you need any additional information or clarification of any of this information, please feel free to contact me at RED TRAIL ENERGY @701-974-4733

Respectfully:

Frank Kirschenheiter
Project Coordinator
RED TRAIL ENERGY LLC

cc: Karlene Fine
Ron Rauschenberger
Rep. C. B. Haas



Demonstrating North Dakota Lignite's Profitability In Energy Production And Agricultural Processing

1.Transmittal Letter

RED TRAIL ENERGY, LLC

September 18, 2003

Lignite Council

Dear Lignite Council:

This letter is to confirm the commitment of Red Trail Energy, LLC, to complete the job described in our application for a Lignite Council grant if the Council approves that grant. I have the authority to make this commitment on behalf of Red Trail Energy, LLC.

Sincerely,

RED TRAIL ENERGY, LLC

By: _____
Ambrose Hoff, President

2. Title Page

To: Lignite Research Fund
Lignite Research, Development & Marketing Program
Bismarck, North Dakota
Attention: Mr. Harvey Ness
Karlene Fine, Industrial Commission

NDCC 57-61-01.5
Matching Fund Grant Application
for North Dakota Lignite Utilization

Project Title: **Red Trail Energy - Ethanol from Lignite**

Applicant: **Red Trail Energy L.L.C.**
Ambrose Hoff, President
Richardton, N.D. 58652

Principal Investigator: **Frank Kirschenheiter**
322 12th Avenue West
Richardton, ND 58652
Phone: 701.290.3953
Email: frank_k@goesp.com

Application Date: **September 30, 2003**

Amount of Request: **$28,200,000**

Red Trail Energy L.L.C. Project Team:

GREENWAY CONSULTING, LLC	**Plant Management**
ERG	**Plant Permitting**
HCM	**Plant Design**

3. Table of Contents

Application Component — Tab Number

4. Abstract

4. Abstract

Red Trail Energy, L.L.C. is seeking partners to build the first North Dakota lignite-powered ethanol plant. It will show profitability through close proximity to North Dakota lignite, North Dakota corn producers and North Dakota beef and dairy industries coupled with proven technologies for ethanol production. Together, these factors will reduce the overall cost of energy to run the ethanol plant by 70 percent in comparison to the conventional natural gas-fired ethanol plants located in the nation's corn belt.

Primary Objectives:

1. Build a 50-million-gallon-per-year ethanol plant in proximity to North Dakota lignite reserves demonstrating the profitability of using lignite fired fluid bed boilers and applying this success to a wider range of industries through the conversion of existing or new plants to lignite

2. Utilize clean lignite technologies in the production of ethanol

3. Capitalize on the nation's imminent need to increase ethanol production by nearly another 2 billion gallons

4. Provide North Dakota livestock producers with additional profitability through a local and inexpensive feed source using plant byproducts

5. Utilize and expand North Dakota corn acreage and increase profitability of corn producers

Duration until plant opening: October 2003 to August 2005 (See Sec.12)

Total Project Construction Cost: $85,255,700

Participants: Applicant Red Trail Energy, L.L.C.

Project Team Greenway Consulting, L.L.C.
Environmental Resource Group, L.L.C.
ICM, Inc.

5. Project Summary

5. Project Summary

Objective 1. Build a 50-million-gallon-per-year ethanol plant in proximity to North Dakota lignite reserves, demonstrating the profitability of using lignite-fired fluid-bed boiler, and applying this success to a wider range of industries as well as through the conversion of existing or new plants to lignite.

Red Trail Energy, L.L.C. will use North Dakota lignite to provide steam energy for fuel ethanol production. North Dakota lignite is an abundant, inexpensive resource offering significant economic advantages in comparison to using natural gas as an energy source for ethanol production. This ethanol production facility plant will employ 36 people. It will be located in Stark County near Richardton, North Dakota, and will utilize more than 400 tons of North Dakota lignite per day to produce ethanol and electricity. The plant will demonstrate fluid-bed combustion technology and utilize state-of-the-art air pollution control technology.

The fluid-bed boiler will be large enough to provide process steam for the ethanol plant and a co-generation electrical steam turbine. The steam turbine will provide the electrical energy for the plant (approximately 4 MW), as well the potential for 4 MW of additional electrical power to supplement the local grid or power an on-site or nearby industrial or agricultural enterprise.

By demonstrating the marriage of these technologies and the long-term benefits of producing ethanol from an abundant, low-cost energy source, this project will encourage other existing and new ethanol plants to utilize North Dakota lignite instead of natural gas. The plant's success will be applicable to an

even wider range of processing plants or industries willing to locate near North Dakota lignite fields.

The nation's fuel ethanol consumption has grown to more than 3 billion gallons annually. Ethanol provides needed oxygen to gasoline to reduce air pollution in metropolitan areas. While adding octane to gasoline to improve engine performance, ethanol serves to extend the nation's gasoline supply by reducing its dependence on imported oil.

Currently, there are more than 75 ethanol plants in the United States. The majority of those plants burn natural gas to produce process steam. Only a handful of these facilities utilize any type of coal, and none are currently using North Dakota lignite. The primary reason for not using lignite is the high cost of the capital equipment for handling, transporting, combusting and controlling the emissions from lignite compared to natural gas. This increases both the initial construction cost and the ongoing production costs as well. The Red Trail Energy, L.L.C. lignite-fired facility will cost an estimated $85 million to construct compared to approximately $55 million for a natural gas-fired plant.

Projected production-cost savings using lignite rather than natural gas for ethanol production is estimated to be more than $5 million annually, or more than 10 cents per gallon. This represents a significant production-cost savings. In addition North Dakota lignite contracts can be negotiated in terms of years (possibly up to ten years) whereas natural gas can rarely be contracted for more than six months. Economic indicators are that the cost of natural gas will remain high and may go higher.

North Dakota lignite will cost approximately $1.20 /MMBtu, compared to approximately $1.60/MMBtu for Montana sub-bituminous coal and an estimated $3.5 to $5.00/MMBtu for natural gas. It is expected the project will demonstrate the actual cost of lignite is less than $1.20/MMBtu. This comparative cost savings will contribute to further investment in the more expensive lignite-fired fluid-bed boiler and the associated coal handling and air pollution control equipment.

These economic advantages of using North Dakota lignite come with the obvious disadvantages. The plant will meet the challenges of handling lignite and the combustion process of a comparatively high-ash, high-sulfur fuel with limited heating value compared to other fossil fuels. By locating this project near the North Dakota lignite mining operations, the project can use the existing North Dakota mining and reclamation infrastructure. This shall keep lignite acquisition, transportation and ash mitigation costs to a minimum.

<u>Objective 2.</u> Utilize clean lignite technologies in the production of ethanol

Fluid-Bed Technology.

The 250 MMBtu/hour lignite-fired fluid-bed boiler will be the heart of the Red Trail facility. As stated before, the plant will consume 400 tons of North Dakota lignite per day. The unit will have limestone injection for sulfur control and ammonia/urea injection for nitrogen oxides (NOx) control. The exhaust will be further controlled by a lime-slurry dry scrubber and a fabric-filter bag house. The pollution control systems will exceed current best available control technology (BACT) practices in the EPA BACT clearinghouse database.

The exhaust from the fluid-bed boiler will be utilized in an efficient water-tube heat-recovery steam generator (HRSG) to produce steam for electrical generation from a steam turbine. Steam from the turbine will pass through a steam-tube dryer. The steam-tube dryer will directly dry spent grain wet cake from the ethanol fermentation process centrifuges. The exhaust from the steam-tube dryer can potentially be exhausted to a waste-heat evaporator. The evaporator will condense water from the dryer exhaust by exchanging heat with a spent-grain process stream. A portion of the steam from the turbine will also pass through a steam-coil heat exchanger to recover additional heat for a spent-grain rotary-drum dryer. The rotary-drum dryer will further dry the wet cake and the syrup from the ethanol process evaporators. Exhaust from the rotary dryer will be controlled by a natural gas-fired regenerative thermal oxidizer (RTO). The RTO will be sized at less than 20 MMbtu/hour with a nominal operating rate of less than 5 MMBtu/hour. The rotary-drum dryer exhaust may be routed to the

fluid-bed boiler to supplement the combustion air. The engineering for this option is still being developed.

Steam from the turbine will also be used in the ethanol process in fermentation and distillation. Economizers will recover additional heat for the ethanol process before the exhaust enters a lime-slurry dry scrubber followed by a bag house.

There are several novel features of the energy system described that have not been previously used in the ethanol industry. Heat recovery from the steam-tube-dryer exhaust, the rotary-dryer exhaust and the process-steam unit greatly increase the thermal efficiency of this facility.

<u>Objective 3.</u> Capitalize on the nation's imminent need to increase ethanol production by nearly another 2 billion gallons.

There is a window of opportunity for the Red Trail Energy, L.L.C. facility and more lignite-fired ethanol-production facilities to become a reality in North Dakota. Ethanol industry leaders predict an increase in the demand for ethanol in the United States by 2015. (See Appendix C)

Congress is in the process of passing a new energy bill. According to the August 2003 edition of Ethanol Producer Magazine[1], the energy bill would ban the use of the additive MTBE, which is found to contaminate drinking water. Ethanol replaces this additive. As it stands now, the energy bill would provide $16 million in tax brakes and incentives to promote energy production and conservation. In addition, the energy bill will have new renewable fuel standards that will be beneficial to the ethanol industry. The legislation will increase the nation's consumption of ethanol to 5 billion gallons annually. This is 1.8 billion gallons more than the 3.2 billion gallons currently produced in all of the existing 75 ethanol plants.

So, how many new plants will be needed to meet this increased demand? By simple math calculations, if all the new plants produced 50 million gallons annually, the nation would need an additional 36 ethanol plants. There are ten plants under construction, and it is likely that some of the existing plants could expand to increase production. There are also an unknown number of plants in the various proposal stages.

[1] Senate Passes Energy Bill, Moves Issue to Conference, pg 12, August 2002 edition, Ethanol Producer Magazine

It is imperative to build this plant now and demonstrate the marriage of these technologies and the profitability of lignite fired ethanol plants in North Dakota. It is then possible that North Dakota could build identical operations within the window of opportunity now presented.

The demand for ethanol is projected to increase beyond the 5 billion gallons stated earlier in this section. Both the Richardton Development Corporation Feasibility Study and the article in Appendix C, A Dozen Years Out, agree on this statement. The exact amount of that increase is where the controversy lies. The predictions were between 5.75 to 8.1 billion gallons by the year 2015.

<u>Objective 4.</u> Provide North Dakota livestock producers with additional profitability through a local and inexpensive feed source using plant by products.

The facility will also produce more than 180,000 tons per year of high quality distillers dry grains and soluble (DDGS) as feed for the North Dakota dairy and beef cattle industry. The further development of the spent grain feed market in western North Dakota will also be another significant measure of the project's success.

Traditionally in North Dakota, beef calves are born in the spring and sold in the fall. It is widely thought that feeding calves during the winter and selling them closer to a slaughter weight (backgrounding) isn't cost effective. Many believe this because logically a good portion of the feed is consumed keeping the cattle warm rather than towards weight gain. Weight gain and decreased feed costs translate into profit for the cattle producer. Recent studies by North Dakota State University indicate the potential of profitable back-grounding of calves in southwestern North Dakota.

A recently completed report from the Southwest Feeders Project[2] states backgrounding can be profitable to the producer. The report also states "there is in excess of $20,000,000 in economic activity available to the agricultural community of southwestern North Dakota associated with beef backgrounding. Statewide, the potential level of activity is $55,000,000. Lamb finishing would increase the statewide level by $2,100,000". The full report is found in Appendix A.

[2] Southwest Feeders Project: 2002 Final Report, L.P. Anderson, D.J. Nudell, W.W. Poland, T.C.Faller, and D. Stecher; Hettinger Research Extension Service, Dickinson, ND; Research Extension Center, Dickinson, North Dakota

The Southwest Feeders study cost nearly $200,000 and was funded by ten different entities in North Dakota. This partnership shows the interest and preparation already in place in southwestern North Dakota for the expansion of the beef backgrounding industry. The study is ongoing and will provide research, education and demonstration of best practices in backgrounding.

The study shows a profit to producers using barley-pea haylage and a whole-corn base. According to researchers at the Hettinger (N.D.) Research Extension Center, the addition of dry distillers grain to this diet would provide nutritional value and reduce feed costs. Lower feed costs while maintaining cattle performance translates to increased profitability for the beef producer.

<u>Objective 5.</u> Utilize and expand North Dakota corn acreage and increase profitability of corn producers.

By consuming 18 million bushels of corn each year, the Red Trail Energy L.L.C. facility will provide a new market for corn in North Dakota. It is anticipated the local price of corn will increase by 15 cents per bushel[3].

There is an abundance of corn in the tri-state area. In 2002, North Dakota corn producers harvested 114.4 million bushels, South Dakota 304 million bushels and Minnesota 1,051 million bushels[4]. All by itself, the ethanol producing capacity of North Dakota's corn is 305 million gallons.

Corn hybrids requiring low levels of rainfall (less than 10 inches) have been shown to produce yields of 70 to 80 bushels an acre using no-till farming practices in southwestern North Dakota. The no-till technique results in no moisture or carbon loss from the soil and prevents erosion. The corn stover remaining after harvest can be used for livestock bedding material. Farmers have been reluctant to perform this promising farming practice due to the lack of local markets for corn. The Richardton facility will provide a competitive, profitable and long-term market for local farmers.

It is likely that the number of acres of corn grown in the state and the total bushels of North Dakota corn used within the state will increase. According to a North Dakota State University study, about 80 percent of the 81 million bushels (raised in 2001 according to the Ag Statistical Reporting Service) of corn grown in the state is exported.

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[3] Richardton Development Corporation Feasibility Study, May 2003, BBI International Consulting
[4] Same as above

6. Project Description

6. Project Description - Red Trail Energy, L.L.C. Ethanol Plant Operations

Provided by Ken Ulrich, ICM and Todd Potas, ERG

Grain Receiving

A rail unloading system will be provided to unload unit trains of corn within a 15-hour limit to avoid demurrage charges. A typical unit train consists of 110 cars and will require a redundant system capable of an unloading rate of at least 30,000 bushels per hour. As back up, a truck-unloading pit will also be provided.

Milling

Grain is conveyed from the silos into a day bin that feeds the hammer mills via a computer-controlled, variable-frequency-driven volumetric feeder. The corn-feed rate is adjusted to maintain a 30 percent solids solution in the mash slurry. The design corn-feed rate is 2,250 bushels per hour. Ground flour from the hammer mill is conveyed to the process building where it is mixed with water to create a slurry of approximately 30-percent solids. Water in the process is recycled and added at a rate estimated to be 126 gallons per minute.

Cook Process

ICM utilizes a hot-slurry process. This means that the grain slurry is held above the gel point (156°F) and blended with various water recycling streams to make up the cook formula. The purpose for hot slurry is to reduce the amount of enzyme required for liquefaction (reducing to a liquid state) and to include the slurry tank as part of the liquefaction process. After the grain is slurried with the water and enzyme, the slurried mash is pumped through a screen and the hydro heater. From the hydro heater, the mash flows to the cook tube where it is held

approximately ten (10) minutes at 220° F. The purpose of the cook tube is to help liquefy the starch and sterilize the mash stream. Heated mash is continually discharged from the cook tube and through a flash tank where the mash is flash cooled to 190° F. The flashed water vapors are drawn over to distillation for energy reuse. The slurry is then held in a series of tanks for an additional two hours to complete the liquefaction process. The liquefied mash is cooled through a series of cross flow heat exchangers and pumped to fermentation.

Yeast Propagation and Fermentation

While most of the liquefied mash goes to fermentation, a portion is diverted to a yeast propagation tank. The yeast propagation is designed as a continuous propagator that is pumped two-thirds empty at the beginning of fermenter fill and refilled with fresh mash and allowed to propagate the yeast to the desired levels prior to transferring to the next fermenter. The advantage of using continuous yeast propagation is that yeast will acclimate to the local environment. After seven to ten days, the yeast become acclimated to the mash slurry, and a slightly improved performance is achieved. At any time, and at the discretion of the operators, the propagator can be run in a batch mode where fresh yeast is added and propagated for the each fermenter fill.

The ICM design utilizes batch-style fermentation (rather than continuous fermentation) to reduce cost , increase production, and facilitate the ability to isolate any infection. The fermenter tanks are designed for an approximate twenty-four (24) hour fill time and forty-eight (48) hour fermentation time. The mash is then transferred to a beer well. The tanks are constructed of stainless

steel with top-mount mixers and external heat exchange for maintaining fermenter temperature. The fermenter tanks are also fitted with clean-in-place (CIP) systems for cleaning the tank prior to each fill.

Distillation Process

ICM's proprietary vacuum-distillation process allows for heat recovery from both the cook process and the evaporation process. The distillation strips the ethanol from the beer and concentrates it to188 proof. The 188-proof ethanol is then stored in a liquid form and pumped back to the molecular sieve system for final dehydration.

The ethanol is vaporized and then is passed through the molecular sieve to remove the rest of the water to produce 199-plus- proof fuel grade ethanol. The energy used to vaporize the ethanol flows through the evaporation process and the distillation process. Running the distillation under vacuum reduces the temperature in the beer column. The low temperature minimizes the protein scaling in the beer column and reduces scheduled cleanings. Therefore, ICM's vacuum distillation design keeps the plant online more hours per year than other designs.

Liquid Solid Separation

Once the ethanol is removed from the beer, the remaining product is called whole stillage. This whole stillage is pumped from the beer column to a series of centrifuges. The purpose of the centrifuges is to remove the water from the solids prior to drying. The liquid removed by the centrifuge is called thin stillage and the solids portion removed by the centrifuge is called wet cake. The

wet cake is approximately 34-percent solids and is fed directly to the dryers. The liquid portion from the centrifuge is approximately 6-percent total solids and is pumped to the thin stillage tank.

Thin Stillage Evaporation

The thin stillage evaporation is a two-effect system in which falling film evaporators are used. The evaporation results in thin stillage solids of approximately 40 percent which is now called syrup. Steam condensed in the first effect of the system is returned to the boiler. The second-effect condensate is routed through the methanator and cleaned and returned to the process as cook water. This proprietary ICM design makes it possible for the entire plant to run with 70-percent steam condensate return back to the boiler and claim a zero-process discharge for the plant. The evaporator is positioned along side the distillation columns to minimize piping costs and reduce pressure drop of the system.

Drying Distillers Dried Grains and Solubles (DDGS)

Steam driven dryers will be provided to produce distillers dried grain and solubles (DDGS) with 10 percent moisture content. The amount of water to be evaporated is approximately 63,000 pounds per hour. Plant management can produce product with moisture levels to 50 percent or bypass the dryer completely. Bypassing the dryer enables the plant to sell distillers wet grains (DWG), an excellent beef-ration ingredient.

Increased focus on air emissions associated with the ethanol industry has forced the implementation of a thermal oxidizer (TO) in many plants, especially

larger facilities with higher emissions. The TO is able to eliminate enough of the volatile organic compounds (VOC's) and hazardous air pollutants (HAP's) to comply with the new, stricter emission limits. A gas-fired thermally efficient regenerative thermal oxidizer will be specified to bring the dryer emissions into compliance. The heat used to evaporate the water in the dryer will be steam driven; however, to accomplish the thermal oxidation, an alternate fuel other than North Dakota lignite will be required. Typically natural gas is used. A maximum demand of 20 MM btu/hr will be required to fuel the thermal oxidizer.

The dryer adds value by maintaining the local price of wet and dry distillers grain because dry product can be shipped out of the region. DDGS can be shipped via hopper truck, rail cars or barges. It has an unlimited shelf life and is easy to handle.

Distillers Grain and Ethanol Storage

Distillers wet grains (DWG) are stored in a flat storage area, pushed into a pit via a front-end loader and conveyed into the outbound live-bottom semi-trailer trucks. Most of the syrup from the evaporator will be added to the DWG. Additional syrup storage and shipping facilities are part of the design.

Dried distillers grains (DDGS) are stored on concrete inside an un-insulated pre-engineered building. Shipping is accomplished by pushing the product into a floor-recessed auger with a skid- or front-end loader, lifted via a short elevator leg and dropped into hopper cars or trucks.

Denatured ethanol is stored in a large floating roof tank and is loaded for transport via rail or truck loading stations to market.

Utilities

Steam will be generated in a lignite-fired fluidized-bed burner with steam generated in a heat-recovery steam generator. Steam demand to the process will be 100,000 pounds per hour and approximately 110,000 pounds per hour for the dryers, subject to the final configuration of the dryers. Depending on the final configuration of the steam generator, and its efficiency, the demand for lignite will be approximately 400 tons per day.

A double-extraction steam turbine will be specified to generate electricity on site, as the process uses steam at two levels of pressure (150 psig and 5 psig). The boiler will be specified to generate steam at a high enough pressure to match the electrical energy demand of the facility, which is expected to be 4 MW. A start-up diesel generator will also be specified. Local utility-supplied electricity will be recommended for the office electrical power. The electrical system is designed with motor-control centers (MCCs) in the various process areas. Electrical power is transported through lines on cable trays that are mounted in pipe racks distributed throughout the entire plant complex.

The instrumentation is also designed to have multiple termination points throughout the plant. From these termination points cabling is run to the distributed control system (DCS) that is located in the control room and the main office. The DCS is also designed to be remotely accessed off-site for engineering oversight and configuration. This allows for engineering support to be ongoing from anywhere with telephone access.

The cooling system and cooling tower locations are site-specific based on the prevailing winds and the climate history at the plant site, as the cooling tower is sized for the highest wet bulb temperature observed. A chiller is not expected to be required at this location.

Waste Treatment

The Phoenix/ICM Waste Treatment design incorporates a bio-methanator unit for treating all of the second effect evaporator condensate. The methanator unit will achieve 90 to 95 percent reduction of the soluble BOD (biological oxygen demand) in the evaporator condensate. By doing this, acid levels are reduced in fermentation and overall plant performance is significantly improved. The material is converted to methane gas and will be routed to displace fuel for the thermal oxidizer.

The only excess water from the facility will be sanitary, water treatment blowdown and cooling tower blowdown. Blowdown is typically the dissolved solids removed from the local water supply. All other streams will be recycled back through the plant with 90-percent-plus of the organics removed.

General Plant

The plant general arrangement is somewhat flexible and ICM will design the Red Trail Energy facility to allow for ease of maintenance access and to accommodate future expansion. (See proposed project site diagram in Figure 1 at the end of 6. Project Description.) The plant is monitored by a staff of three operators per shift. The operators are able to monitor and control all of the plant functions from the control room.

Air Emission Performance

Demonstrating compliance through emissions tests and air dispersion modeling with no impacts will be a significant measure of the plant's success. From an air-permitting standpoint, the project will have to meet stringent air emission standards. The plant will be permitted as a major emission source demonstrating best available control technology (BACT) pollution control. However, the pollution control technologies being used are projected to produce emission levels only slightly over, if not below, major source thresholds. The project will be required to maintain compliance with the National Ambient Air Quality Standards (NAAQS) beyond the facility property boundaries through air dispersion modeling. North Dakota has little increment available for additional sulfur dioxide (SO_2) emissions, requiring $S0_2$ control in excess of 92 percent. This facility will remedy this concern by controlling $S0_2$ emissions through limestone injection in the fluid-bed boiler and an additional lime slurry dry scrubber prior to a bag house. Accomplishing these goals will be a top priority of the project and are more difficult, but achievable, with ND lignite utilization.

Ash Handling

Other environmental performance measures include the demonstration of ash handling, transport and end utilization. Red Trail Energy plans to build on the successful ash-utilization options of existing lignite mining companies.

Water Discharge and Use

In addition, the project will not discharge any process water by recycling the water within the process. Non-process-water discharges from the cooling towers and the water treatment systems will be permitted under the National Pollutant Discharge Elimination System (NPDES). Water use for the facility will be permitted under the North Dakota State Water Commission.

Environmental Impacts During Construction

Construction of the Red Trail facility will be completed inside an approximate footprint of 14-acres of land. The 14-acre footprint is part of an 87-acre parcel near Richardton. The 14-acres that will be disturbed will include the perimeter roads, buildings, tanks and equipment. A small administration building and parking area will be located about 400-feet from the plant footprint that will disturb just over one additional acre of the 87-acre parcel. The construction project will include approximately two months of soil correction activity for the roads, footings, secondary containment and grade correction for storm water purposes. Once these activities are complete, the environmental impact from the construction activities will be negligible over the rest of the 12 to 14 month construction period.

The project will require a National Pollutant Discharge Elimination System (NPDES) permit for storm water discharge during project construction. This permit will be obtained prior to the start of construction. The permit includes an erosion control and storm water pollution prevention plan for the plant construction. The plans will include best management practices for storm water

pollution prevention, including; silt fencing, bale and rock ditch checks, bale slope barriers, and sediment traps, temporary erosion control blankets and seeding/mulching. These BMPs are consistent with the North Dakota Guide for Temporary Erosion-Control Measures for Contractors, Designers and Inspectors, published by the North Dakota Department of Health in June 2001.

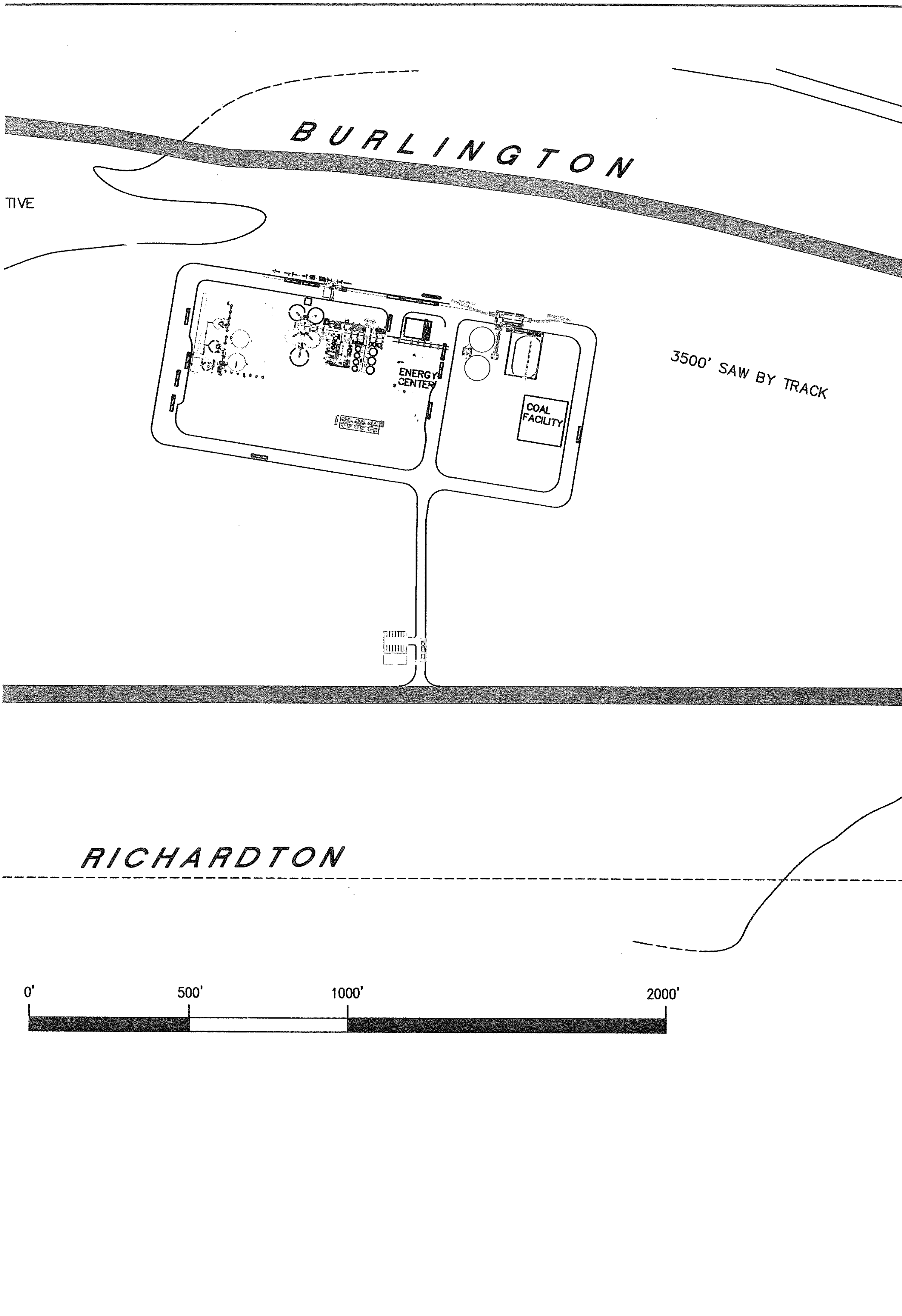
The project team has reviewed the North Dakota Chapter 49-22, Energy Conversion and Transmission Facility Siting Act for applicability. The Red Trail facility electrical generation is projected to be less than 10 megawatts (MW) and ethanol production is not projected to exceed 220,000 gallons per day. Therefore, the Act is not applicable, as the electrical generation threshold is 50 MW and the liquid hydrocarbon products threshold is 2.099 million gallons per day (7949.36 cubic meters/day). Red Trail Energy will be constructed in a manner consistent with the currently applicable NDDPH rules and regulations.

Economic Impacts

The direct economic impact of the Red Trail Energy L.L.C. is through the creation of 36 jobs and a payroll of approximately $1.4 million annually according to the feasibility study. Additional support jobs include 2-5 jobs for people connected to the provision of coal to the plant according to estimates provided by the Center Coal Company, Center, North Dakota. Opportunities for additional employment could also be incurred in trucking the distillers dry grain soluble to cattle producers. It is estimated the construction of the plant will involve 200-400 jobs.

As stated earlier in Section 5, Objective 4, the availability of the distillers dry grains and solubles as cattle feed will provide nutritional value and reduced feed costs to cattle producers. This availability could help southwestern ranchers move toward the potential market of $20 million dollars associated with beef back grounding. An increase in cattle herds would have a ripple effect into other agri-businesses as well.

Although tax revenue information for the Richardton plant is not available, the recently announced 17 million gallon Williston ethanol plant is estimated to have state tax revenues of $4.5 million and $1.5 million in local tax revenues according to Lee Peterson, director of the North Dakota Department of Commerce.



General Arrangement
Red Trail Energy LLC
50MMGPY

CLIENT:

DRAWN BY: MAB
DATE: 9/16/03
ELECTRONIC FILE NAME: Richardtonplot-1
SCALE: 1"=200'

DRAWING NUMBER: D02080CL001
REV: –
SHT. – OF –

ICM INDUSTRY CONSULTING & MARKETING
P.O. BOX 397
310 N. 1st.
COLWICH, KANSAS
67030-0397
PHONE: (316) 796-0900 FAX: (316) 866-3102

REV.	DATE	DESCRIPTION
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REVISION:

7. Standards of Success

7. Red Trail Energy Project Success Measures

The Red Trail Energy project is a full-scale commercial construction plant that will produce 50-million gallons of undenatured ethanol when fully operational. The project will be successful from a demonstration standpoint the first day of start-up. Start-up will represent the first ethanol plant in the country utilizing North Dakota lignite for the generation of process steam and electricity for the plant. With successful start-up and sustained operation other measures of success will be obtainable, including the following performance items:

a. Production cost performance,
b. Air emission performance,
c. Ash handling performance,
d. Water discharge and use performance, and
e. Product marketing performance.

a. Product Cost Performance

The utilization of ND lignite is a trade-off of increased capital cost and operational complexity for reduced operating cost. Projected production cost savings using lignite versus natural gas for ethanol production in Richardton, North Dakota, are estimated to be more than $5 million per year or more than 10 cents per gallon of ethanol produced. This represents a significant production cost savings and greatly increased energy cost stability. Lignite contracts are generally negotiated over 10-year periods with natural gas contract

terms as short as one month. Success of the project will be measured by accomplishing the projected cost savings and realizing the business benefits of stable energy costs. ND lignite will cost approximately $1.20 /MMBtu, compared to approximately $1.60/MMBtu for Montana sub-bituminous coal and an estimated $3.5 to 5.00/MMBtu for natural gas. A goal of this project is to demonstrate the actual cost of lignite is less than $1.20/MMBtu and will result in a short-term payback for investing in the more expensive lignite-fired fluid-bed boiler and the associated coal handling and air pollution control equipment. Success measures include (1) Equity Drive, (2) Plant Construction, (3) Ethanol Production Cost Savings, (4) Ethanol Production Goals.

b. Air Emissions Performance

Air permit issuance, air dispersion modeling for National Ambient Air Quality Standards (NAAQS) compliance, air dispersion modeling showing no impact to the Theodore Roosevelt National Park and demonstrating compliance through emissions tests will be significant measures of the plant's success. The plant will be permitted as a major emission source demonstrating best available control technology (BACT) air pollution control. North Dakota has little increment available for additional sulfur dioxide (SO_2) emissions. The facility will resolve this concern by implementing

more than 92 percent $S0_2$ control. Accomplishing these goals will be a top priority of the project and are more difficult, but achievable, with ND lignite utilization. Success measures include (1) Air Emissions Permitting, (2) Meet Air Emission Goals.

c. Ash Handling Performance

Other environmental performance measures include the demonstration of ash handling, transport and end utilization. Red Trail plans to build on the successful ash utilization options from the existing lignite mining company suppliers. Success measure is (1) Creating partnerships for environmentally safe ash handling.

d. Water Discharge and Use Performance

Successful permitting and compliance with the water use and discharge permits will be more measures of project performance. In addition, the project will not discharge any process water by recycling it all within the process. Non-process water discharges from the cooling towers and the water treatment systems will be permitted under the National Pollutant Discharge Elimination System (NPDES). Water use for the facility will be permitted under the North Dakota State Water Commission. Success measures are (1) Permitting, (2) Water Use Compliance, (3) Discharge permitting.

e. Product Marketing Performance

Another significant measure of the project success will be the development of the spent grain feed market in western North Dakota. A study by North Dakota State University has indicated that if an additional feed source was available to the cattle industry, more than $20 million per year of additional cattle business could be realized. Red Trail Energy will produce enough feed (180,000 ton per year) for approximately 200,000 head of beef cattle or 80,000 head of dairy cattle. The availability of this feed source will not only increase the volume of cattle business but improve the production cost per head in the region. The degree that additional local markets versus more regional or out-of-state markets are realized will measure the project success.

Success measure include (1) increase sales of corn in-state, (2) increase in the number of corn acres, (3) successfully marketing spent grain feed, (4) increase in the production cost per head of cattle in region utilizing spent grain feed, (5) increase in herd numbers of cattle operations utilizing spent grain feed in the region, (6) number of new cattle operations utilizing spent grain feed.

8. Background

8. Background
Red Trail Energy, L.L.C.

FROM THE BEGINNING

Dec. 2002	Someone mentions in a newsletter to corn producers that there should be an ethanol plant built in western North Dakota, and that Richardton would be a great location.
Dec. 2002	Local radio personality, Wild Bill and other media pick up on the newsletter, and stir further interest in the idea.
Dec. 2002	Richardton Development Company (RDC) begins to research the possibilities of such a project.
Jan. 2003	Representatives of RDC meet with the North Dakota EDC.
Jan. 2003	RDC applies for and receives approval for a $40,000 matching grant from Southwest REAP, and begins to pursue matching funds.
Feb. 2003	RDC meets with Mark Yancy of BBI International to discuss the project and the ethanol industry.
Mar. 2003	RDC orders a feasibility study to be done by BBI.
Mar. 2003	RDC has a public meeting in Richardton to review progress to date with government officials, energy interests, and interested citizens.
May 2003	RDC receives feasibility study from BBI and decides to further investigate the possibilities of building an ethanol facility.
June 2003	RDC meets with representatives of Greenway Consulting L.L.C. (Greenway) to determine if RDC has a feasible project, and what direction to take in that case.
July 2003	RDC establishes Red Trail Energy, L.L.C.
Aug. 2003	Red Trail Energy, L.L.C. contracts with Greenway to take the project to completion.
Sept. 2003	On September 24, 2003 Red Trail Energy, L.L.C. receives approval from the SEC to sell $1.2 million of membership units for the initial capitalization of the L.L.C.
Sept. 2003	On September 30, 2003 Red Trail Energy, L.L.C. completes its initial capitalization drive, with $1.2 million of subscriptions.

RED TRAIL ENERGY, L.L.C.

Board of Directors

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State of North Dakota

SECRETARY OF STATE

CERTIFICATE OF ORGANIZATION OF

RED TRAIL ENERGY, LLC
Secretary of State ID#: 19,464,900

The undersigned, as Secretary of State of the State of North Dakota, hereby certifies that Articles of Organization for

RED TRAIL ENERGY, LLC

duly signed and executed pursuant to the provisions governing a North Dakota Limited Liability Company, have been received in this office and are found to conform to law.

ACCORDINGLY the undersigned, as such Secretary of State, and by virtue of the authority vested in him by law, hereby issues this Certificate of Organization to

RED TRAIL ENERGY, LLC

Effective date of organization: July 16, 2003

Issued: July 16, 2003

Alvin A. Jaeger
Secretary of State

8. Background:

Greenway Consulting, L.L.C.
227 South County Road 22
Morris, MN 56267
320.589.2931

Greenway Consulting, L.L.C. is a consulting company formed by Diversified Energy Company, L.L.C., a 20-million-gallon-per-year ethanol facility located in Morris, Minnesota. Greenway Consulting, L.L.C. was formed to assist start-up ethanol producers with project development, construction, management, training and operations. The Greenway Consulting, L.L.C. team provides a broad scope of knowledge in the ethanol industry with more than 50 years of combined experience including management, business development, construction and operations.

Greenway Consulting, L.L.C. is involved with numerous ethanol projects, providing the following services:

- Management and plant operation:
    - Greenway is contracted with ICM to supply 3,000 hours of start-up services to new ICM facilities.
    - Plants in Galva, Iowa, and Rosholt, South Dakota.
- Lab services to an ICM, Inc. plant in Watertown, South Dakota.

- Project development:
    - IRE plant in Rochelle, Illinois
    - Rocky Mountain Ethanol in Hardin, Montana.
    - OTEC in Davenport, Nebraska

Greenway Consulting L.L.C. Projects 2002

- April – IRE: Development consulting services
- June – Tri-State: Consulting services
- July – Quad County: Consulting contract
- August – Adkins Energy: Plant start-up services
- October – Badger State Ethanol: Plant start-up services
- December – Rocky Mountain Ethanol: Development and management services

Greenway Consulting L.L.C. Projects 2003

- Ongoing – IRE: Developmental consulting services
- Ongoing – OTEC: Development & management services
- Ongoing – RME: Development & management services
- Ongoing – Quad County: Contract extension, consulting services
- March – Husker Ag, L.L.C.: Plant start-up services
- November – Kappa Ethanol: ICM start-up services
- December – Vera Sun – ICM start-up services

8. Background:

Environmental Resource Group, L.L.C. (ERG)
1000 IDS Center
80 South Eighth Street
Minneapolis, MN 55402
612.339.4815

Environmental Resource Group L.L.C. (ERG) is a professional service firm offering environmental consulting services to private industry and governmental agencies. Our clients' projects range from small, specially focused tasks to strategic environmental management systems. Services provided to our clients include: site investigations on potentially contaminated property; design and oversight of remediation projects; due diligence analysis to support acquisitions of property or businesses; site development support; air quality; subconsultant management and oversight; in-house client support; forensics; environmental database management; EMS development and maintenance, environmental permitting, and construction administration and quality control.

Profiles of two projects that ERG is working with that closely relate to Red Trail Energy are the VeraSun Fuel Ethanol Plant, Brookings, South Dakota, and Alchem Ltd., L.L.L.P., Grafton, North Dakota. Details follow:

- **VeraSun Fuel Ethanol Plant, Brookings, South Dakota**

The VeraSun Corporation has begun construction of a dry-mill fuel ethanol plant near Brookings, South Dakota. Construction is 80 percent complete with start-up planned for early November 2003. ERG is providing continuing services related

to the air and water quality permitting for the facility. The facility began construction in November 2002. ERG prepared the Part 70 air permit application for the facility leading to a Title V permit authorizing construction and operation. The facility will be capable of producing up to 100 million gallons per year of fuel ethanol. By-products of the facility will include dried spent grain for animal feed and liquefied carbon dioxide for the beverage and food industries. The facility will have a two thermal oxidizer/heat recovery steam generators (TO/HRSG) capable of generating over 200,000 pounds of steam per hour total. The TO/HRSG provides particulate and volatile organic compound (VOC) control for the spent grain drying emissions. The thermal oxidizers will be fired on natural gas.

The project included several applicable New Source Performance Standards including 40 CFR 60 Subpart Db for steam generating units (the TO/HRSGs) over 100 MMBtu/hour, 40 CFR 60 Subparts Kb and VV for organic liquid storage and leak detection for equipment in VOC service. Permitting strategy was intended to keep the facility minor with respect to PSD to assist the construction schedule, avoid air dispersion modeling for NAAQS compliance and any BACT analysis. However, because South Dakota does not have a minor source state permit option, the facility is a major emissions source under the federal Title V Operating Permits program (40 CFR 70). ERG responded to significant EPA Region 8 comment on the permit application and the proposed air permit for the project prior to final permit issuance.

ERG has also been involved with the following permitting tasks associated with the project.

1. USEPA 401 Water Quality Certification
2. USEPA 402 National Pollutant Discharge Elimination System (NPDES) Permits

ERG has also assisted two other South Dakota fuel ethanol projects in obtaining construction and operating Title V air permits, the 50 MMgal/year Glacial Lakes Energy facility in Watertown and the 50 MMgal/year Dakota Ethanol facility near Madison. Dakota Ethanol began production in 2001 and Glacial Lakes Energy began production in October 2002. ERG provides continuing environmental services to both facilities. The emission units at these facilities are similar to the Brookings facility described above with both plants using natural gas as the fuel source for steam.

All three of these facilities may be candidates for lignite coal firing if natural gas costs continue to rise, especially the Watertown and Brookings facilities given their proximity to North Dakota. In addition, another 50 million gallon ethanol plant has begun construction near Groton, South Dakota, and will start-up with natural gas in late 2004.

- **Alchem Ltd., L.L.L.P., Grafton, North Dakota**

The Alchem facility, is a 15-million-gallon-per-year dry-mill fuel ethanol plant near Grafton, North Dakota. Construction. ERG provided air permitting

environmental services related to the conversion of the plant's steam and drying heating units from natural gas to sub-bituminous coal.

The air-permit application was reviewed by the North Dakota Department of Health (NDDH). During completion of the application, ERG completed multiple iterations of potential to emit calculations and made several recommendations for pollution control and fuel-use scenarios, that included the option of North Dakota lignite. One suggestion, lime injection followed by baghouse control was eventually implemented using Montana sub-bituminous coal. The air permit was issued in March of 2002. The new coal-fired units are still under construction.

Due to the size of the facility, it was possible to permit the coal conversion as a minor source of pollutant emissions with respect to prevention of significant deterioration (PSD) review using low sulfur and ash sub-bituminous coal compared to lignite options. The facility was also able to use relatively simple lime injection with bag house control for sulfur and ash emission control.

8. Background:

ICM, Inc.
310 N. First St.
PO Box 397
Colwich, KS 67030
316.796.0900
www.icminc.com

ICM Inc. is an ethanol process engineering and design company with the following experience in work related to the Red Trails Energy project:

ICM Inc. has designed and started up nine (9) existing operating dry mill fuel ethanol plants in the United States. ICM also has seven (7) plants currently under construction, all of which will be starting up over the next several months. Engineering and design work is currently underway at ICM for an additional ten (10) new projects now under contract. On staff engineering personnel have ethanol process experience dating back to the late 1970s in addition to recent engineers joining us from Cargill and Williams Bio-Energy. The ICM design has successfully reduced the energy needs of the modern plant by several thousand btus per gallon of ethanol produced, reduced downtime and eliminated thousands of feet of plant piping which helps contain the cost of construction.

ICM is the industry leading manufacturer of rotary-drum dryers utilized in most ethanol plants to dry the distillers grain, and ICM-sister-company, Phoenix Biosystems is the industry leading manufacturer of anaerobic digester water treatment systems used in nearly all ethanol plants. These digesters eliminate the need to discharge process water unlike older plants. Including plants under

construction, ICM has 38 dryers in service in the industry and bio methanators in 24 ethanol plants.

ICM Inc. has a strong emphasis on plant employee training, start-up services and ongoing plant support services, all centered on aiding in the profitability of the ethanol plant. These include ongoing training and testing of current operators and superintendents in addition to new hires well after startup. Benchmarking services are also offered whereby your plant operation is ranked with other ICM plants relative to fuel and power use, ethanol yield, personnel turnover, up time, etc. and to focus efforts on optimizing the operation. ICM environmental engineering can continually assist plant personnel and owners regarding emission rules and new breakthroughs or EPA revisions. Group purchasing advantages of yeast, enzymes and equipment with affiliated plants is also a service advantage offered. ICM Marketing is successfully expanding in the areas of feedstock procurement, ethanol and distillers grain sales and trading in addition to risk management tools. Risk management assistance is through a partnership with the brokerage firm of R.J. O'Brien. The risk management group emphasizes margin management and can provide interactive tools to assess and protect margins 12 months out. Plant management and operation services can also be provided by ICM should the owners desire. These tools are also proving beneficial in developing project debt financing.

The mission of ICM is to improve plant profitability by creating tools to mitigate risk and processes to reduce plant operations costs in order to make ICM plants continue to be the lowest cost producers of fuel ethanol in the country.

9. Qualifications

9. Qualifications
Red Trail Energy, L.L.C.
Richardton, N.D. 58652

Principal Investigator
Project Coordinator
Frank Kirschenheiter
322 12th Ave. West
Richardton, ND 58652
701.290.3953

Mr. Kirschenheiter is a lifelong resident of the Richardton-Taylor community in southwest North Dakota. He has been involved in the farming and ranching industry all of his life, including the dairy and cattle feeding industries.

Mr.Kirschenheiter was involved in the North Dakota Farm Credit Counseling Program for more than five years. His duties within this program were first as a credit counselor, and for the final two years, as the programs interim director. In this position Mr. Kirschenheiter's duties included, management of the programs 40 to 55 employees, creating and perfecting the annual budgets, monitoring the programs growth and productivity, and acting as the program's liaison with the legislative, financial and agricultural communities.

Mr. Kirschenheiter worked with the North Dakota Credit Review Board for a period of seven years. At the Credit Review Board, Mr. Kirschenheiter's position was that of senior negotiator. In this position he was in charge of reviewing the work of eight other negotiators, and monitoring their effectiveness within the lending and agricultural communities

Mr. Kirschenheiter was the chairman of the Credit Review Board for a period of three years. During that period, his duties included, furthering agricultural issues at a state and federal level in the Legislature and Congress. He was responsible for the review of all annual employee evaluations, creating and implementing policies to govern negotiators and mediators, and being the public spokesman for the Credit Review Board in regard to agricultural issues.

Mr. Kirschenheiter is currently the president of the Richardton City Commission, a position that he has held for the past seven years. In this position he is responsible for the oversight of all city activities, such as preparation of the annual budget, yearly reviews of employee performance, and liaison with the public.

As a board of directors member of Richardton Development Company, Mr. Kirschenheiter has been involved with every aspect of the Red Trail Energy, L.L.C. project. He has been involved with the gathering and preparation of information for the feasibility study, working with the attorney in the formation of Red Trail and as the Richardton Development Company spokesman on this issue.

9. Qualifications
Red Trail Energy, L.L.C.
Richardton, ND 58652

Ambrose R. Hoff
President
Richardton, ND 58652
701.974.2149

Ambrose R. Hoff has been a lifelong resident of Richardton, North Dakota. He graduated from Richardton High School and furthered his education in Anniston, Alabama. Pattern making became his trade while he worked for FMC as a steel analyst.

Later Ambrose moved back to Richardton to marry Charlotte Hauck, also a lifetime resident of Richardton, North Dakota. At that time they began their farming and ranching operation. By 1978 Ambrose added a career in steel fabrication and manufacturing to his pursuits. Designing and manufacturing agricultural equipment as well as custom welding for the oil industry became his primary objectives. The business took on the name Hoff Machine & Weld Mfg. After several years of operations, the oil industry and agricultural economy began to sag, at which time Ambrose refocused his company to reflect the changing times. He ventured into specialty crop processing, which makes up the bulk of his current family-owned company, Stone Mill Inc. Along with seed processing this company also deals with domestic and foreign trade of garbanzo beans,

finch safflower seed, brown and golden flax, along with numerous other specialty commodity markets.

Ambrose still remains in the heart of the agricultural industry, raising on his own farm more than eleven different specialty crops. Using research and development he introduces new commodities to his operation. Through his own experimentation, he offers consulting to growers from his local area who are interested in diversifying their operations.

In 2002 when Richardton Manufacturing Company closed its doors Ambrose saw an opportunity for a new venture. Ambrose along with three other family investors purchased the building and equipment and reopened the facility under the name Amber Waves Inc. They currently manufacture hopper-bottom bins, cattle panels and gates, as well as other agricultural equipment.

Ambrose has been extremely involved in the economic development of his rural community. Through his business endeavors, he currently employs more than 20 people in the Richardton area. Several of his employees are college graduates who were able to move back to the Richardton area. Ambrose also encourages economic progress as an active member of the Richardton Development Company and as the president of the board of Red Trail Energy, L.L.C. Ambrose and other developers have volunteered numerous hours establishing an ethanol plant in the Richardton community. Upon completion,

this plant will serve as another important value-added venture that will undoubtedly enhance the corn and livestock industries of western North Dakota.

Ambrose and his wife, Charlotte, are an active, community-oriented couple. Charlotte has served on the St Mary's Church board in the restoration and renewing of the Assumption Abbey Church, in addition, she currently serves as a member of the Catholic Daughters and Christian Mothers associations. Ambrose and Charlotte are also members of the Richardton Saddle Club and the Richardton Business Association. Ambrose is presently a Knights of Columbus member as well.

Ambrose and Charlotte have two sons, two daughters and four grandsons. Their businesses are very family centered. Currently they employ two of their children within their business ventures. As a central theme, family and community are two elements that Ambrose has devoted his life to developing.

9. Qualifications:

Greenway Consulting, L.L.C.
227 South Country Road 22
Morris, MN 56267
320.589.2931

Gerald Bachmeier, Chief Manager

Gerald Bachmeier grew up on a diversified farming operation in southwestern North Dakota. He is a graduate of Bismarck State College and holds a degree in process plant technology. Gerald has been involved in the ethanol industry for the past thirteen years. He has served as plant manager of Morris Ag Energy and chief marketing manager of United Ethanol Sales. Gerald was instrumental in the formation of Diversified Energy Company, L.L.C., and was the major role player for the purchase of Morris Ag Energy. He was also instrumental in the design and construction of DENCO, L.L.C. as it stands today. He is currently the chief manager of DENCO, L.L.C.; Greenway Consulting, L.L.C.; Golden Lyk, L.L.C. and DENCO Producers Association, L.L.C. Gerald also sits on the boards of directors for Renewable Products Marketing Group, Renewable Fuels Association, and Minnesota Coalition for Ethanol, and he is chairman of the board for the Minnesota Livestock Development Authority.

Jason Carter, Senior Vice President of Operations

Jason Carter, a native of North Dakota, has more than ten years of experience in the ethanol industry. He received his associate degree in process plant technology from Bismarck State College, and in 1992 he accepted a job in Morris, Minnesota, as a process operator. Jason was promoted to shift supervisor in 1994 and then to operations supervisor in 1995. Jason served in this position until 1999, when Diversified Energy Company purchased Morris Ag Energy. At this time, Jason was hired as the plant manager. He held this position from 1999 until May 2002. During this time period, Jason was responsible for the overall management of the plant operations.

When Greenway Consulting formed, he was transferred to this company to run the field operations portion of the company. Jason has been instrumental with new plant start-ups in Lena, Illinois; Russell, Kansas; Monroe, Wisconsin; Galva, Iowa and Rosholt, South Dakota. Jason has also been involved with the project development of Illinois River Ethanol in Rochelle, Illinois.

Mick Miller, Vice President of Operations

Mick Miller, originally from Mandan, North Dakota, entered the ethanol industry in 1999. Mick has associate degrees in business management and process technology, and is currently pursuing a bachelor of manufacturing management degree from the University of Minnesota. As plant manager of Diversified Energy Company, L.L.C. in Morris, Minnesota, Mick's responsibilities include management of all personnel in operations, maintenance, lab, safety, electrical and instrumentation. Mick was also very instrumental in project over sight, employee training and plant start-up at the DENCO facility in 1999. Mick's operational experience is a vital part of Greenway Consulting, L.L.C. He has been involved in process training and start-up in Lena, Illinois; Russell, Kansas; Watertown, South Dakota; and process evaluation and design in Rosholt, South Dakota, and Galva, Iowa.

Operations Support Staff

- Mike Opdahl — Plant Engineer
- Jade Gehrke — Instrumentation
- Dori Coler — Lab/Quality Control
- Larry Heintzelman — Construction Management
- Duane Rixe — Safety

Administrative Support Staff

- Jim Highum — Controller
- Kathi Biesterfeld — Accounting/Permitting
- Deb Taylor — Coordinator

Greenway Alliances

- Agri Source Consulting, LLC — Daryl Gillund
- Northland Securities — Mark Fisler
- Environmental Resources Group
- ICM Engineering

9. Qualifications:

Environmental Resource Group, L.L.C.
1000 IDS Center
80 South Eighth Street
Minneapolis, MN 55402

TABLE OF CONTENTS

OUR SERVICES

ERG provides a full array of services

Environmental Resource Group (ERG) is a professional service firm offering environmental consulting services to private industry and governmental agencies. Our clients' projects range from small, specially focused tasks to strategic environmental management systems. Services provided to our clients include: site investigations on potentially contaminated property; design and oversight of remediation projects; due diligence analysis to support acquisitions of property or businesses; site development support; air quality; subconsultant management and oversight; in-house client support; forensics; environmental data base management; EMS development and maintenance, environmental permitting, and construction administration and quality control.

AIR QUALITY

- Regulatory Assistance
- Permitting
- Emissions Determinations
- Impact Analysis
- Emissions Control

ERG understands air quality

Facility operators face increasing challenges in keeping pace with new technologies and market pressures while maintaining compliance with the Clean Air Act and other Federal, state, and local air quality regulations. ERG's air emission management experts work with industry and government clients to develop innovative and cost-effective compliance options that reduce regulatory burdens and their impacts on facility operations.

ERG has completed many types of permit applications for several industries. Applications types have included construction, registration, major source (Part 70/Title V), and minor/synthetic minor source permits.

ERG maintains constructive working relationships with regulatory agencies

ERG applies the most current agency-approved methods for compiling emission inventories from which applicable regulatory requirements are identified. We also develop permit strategies, establish baseline data for air emission dispersion modeling, and conduct air pollution control equipment studies. ERG helps clients by integrating innovative permit strategies into clear and comprehensive permit applications that gain prompt agency approval. Our clients benefit from the constructive working relationships that we have developed with regulatory agency staff, secure in the knowledge that ERG will always negotiate to represent its clients' interests. Our clients protect themselves from inappropriate enforcement actions by relying on ERG to interpret complex regulations and legislation and assess their

compliance status. ERG helps clients control their on-going compliance costs by developing testing, monitoring, and reporting procedures that satisfy regulatory requirements without unnecessary effort and capital cost.

ENVIRONMENTAL ASSESSMENTS

- Environmental Assessment Worksheets
- Environmental Impact Statements
- Natural Resource Impacts
- Third Party Review

ERG assists with community issues

Environmental permitting coordinated through an environmental assessment worksheet (EAW), an environmental assessment (EA), or an environmental impact statement (EIS), is often a complex and critical step. Environmental laws from multiple jurisdictions must be satisfied. Soils, water resources, threatened and endangered species, wetlands, cultural resources, and residential impacts must be addressed. The number of regulatory agencies having jurisdiction over a single project can number into the dozens. An oversight can significantly delay the overall project schedule. The challenge is to move quickly, thoroughly and intelligently.

ERG staff have experience preparing EAW's, EAS's and EIS's on a wide range of projects that have to meet state and federal regulatory requirements. These documents serve as the skeleton for the range of environmental permits that may be necessary to obtain project approval. These permitting processes require numerous applications, forms, reports, and supporting documentation. Attention to detail is critical.

We work hard to meet timetables, construction schedules, and delivery commitments; our clients depend on us to add value, from preliminary site surveys through construction. We do this through knowledge, foresight, creativity, quality assurance, and hard work. Our specialized skills, experience, and objective perspective help clients cut through the clutter. Clients benefit from our streamlined organization, diverse resources and faster turnaround.

Our affiliated firm, Natural Resource Group (NRG), has a staff of 60 professionals who specialize in providing environmental evaluation and permitting services to the energy industry. Our clients will benefit from ERG having immediate access to these additional resources and capabilities.

Managing information increases efficiencies

ENVIRONMENTAL COMPLIANCE

- Permitting, Monitoring and Reporting

Personnel Training
Assessments/Audits
Refrigerant Management

Environmental compliance involves the management of a company's environmental affairs to meet a broad array or regulatory responsibilities. ERG Staff can assist clients in organizing data and preparing the necessary documentation in a clear and concise manner. Our range of expertise includes: SARA Title III analysis and reporting, Clean Air Act section 112(r) analysis and PTE calculations, storage tank requirements, NPDES wastewater discharge, water appropriation, NPDES Stormwater permits, Process Safety Management/Risk Management Plans, Spill Prevention, Control and Countermeasures (SPCC) Plans, USDOT HazMat requirements, and a variety of health and safety compliance issues.

ERG staff can assist clients with training programs related to hazardous waste inspections, hazardous waste emergency response, USDOT HazMat, SPCC plans, SWPP plans and a variety of health and safety compliance requirements. ERG can develop training matrices for all employees to determine requirements for specific training and a system for documenting the training provided.

Environmental compliance assessments and audits serve as powerful management tools for companies requiring a profile of their compliance status. Compliance assessments are conducted for many reasons ranging from proactive environmental programs and violation citation response, to property transfer transactions. Whatever the impetus, ERG staff can map out a strategy for success early in the process. The goals of a compliance assessment should be identified and understood by all parties involved. Environmental compliance assessment activities usually include the following elements:

Assess compliance with applicable federal, state, and local air, water and waste regulations.

Assess the potential for present or future liabilities that may arise from environmental practices.

Isolate and identify processes and practices which have a high level of environmental liability associated with them.

Provide an assessment of present pollution control programs and equipment.

Identify opportunities for cost savings through waste minimization programs.

Assess future regulatory trends for potential effect on facility operations.

Taking proactive steps to ensure environmental compliance can deliver substantial savings. Confirming or modifying environmental compliance activities can lower the potential for citation of noncompliance, improve employee and regulatory interactions and have a positive effect on the company's bottom line.

To assist firms with EMS and environmental compliance issues, ERG has developed industrial compliance teams. The industrial compliance team is a coordinated group of professionals who are experts in their individual fields. A team leader will be the single connection to any of the services required. With one telephone call, you can be assured that whatever compliance needs your company may have, ERG can provide the answer.

DATA MANAGEMENT

- GIS
- Historical Monitoring Data
- Geology and Chemistry
- Compliance Information
- MSDS Inventory

The use of environmental information impacts virtually every aspect of a site or facility. As the importance of digital information to corporate operations increases, so does the need for effective and efficient means for generating, storing, retrieving and utilizing data. Database management services support, enhance, and streamline environmental services for our clients.

ERG assists clients in database management built specifically to the client's needs. ERG Staff utilize a conglomerate of leading industry software programs that coordinate soil, water and groundwater samples (historic to present) with current facility and topographic maps, dependent on the requests of the client. ERG utilizes Arc View as a GIS interface to create and manipulate maps, displays, charts, tables, drawings, photographs and video. These programs can be customized at the client's location, enabling the client to work directly with the data, geographically viewing patterns and hidden trends and distributions that may not otherwise be possible with common charting programs.

ERG can customize programs to map facilities, identifying actual views from various locations of the site with photographs or video. Wells and soil borings are electronically accessible revealing data for all constituents that have been historically investigated. ERG can provide the initial software framework to the client and follow up with training for internal use as the database grows, or maintain the database within ERG. As future analytical work is completed, ERG will coordinate with the analytical laboratory, to request the appropriate electronic version of analytical data directly from lab. Comprehensive online assistance from ERG and EQuiS Chemistry and Geology, in combination with an easy-to-use interface, allow the client to create maps and charts that display customized information about the site. ERG offers unique possibilities to express data on a site-by-site basis, assisting clients in managing chemicals.

ERG offers custom designed databases

We employ state-of-the-art hardware and software to create superior quality data products. We pride ourselves on producing exceptional maps and graphics for all phases of a project; from planning to post-construction regulatory reporting. Working closely with various environmental agencies and private vendors, we are able to obtain crucial information in fast, efficient and economical formats.

On a smaller scale, ERG can manage other types of data within a facility. MSDS management, facility compliance information and scheduling are some examples requested by clients in the past. Database set-up can be custom-designed to the needs of the client.

ENVIRONMENTAL RESTORATION

- Remedial Investigations/Feasibility Studies
- Remedial Design and Remedial Action Work Plans
- CERCLA/RCRA Projects
- Risk Based Assessments

Throughout the U.S., the issues associated with restoring contaminated, mostly industrial properties are moving beyond just meeting the regulatory requirements to include business decisions based on the economic cost and benefit of proposed alternatives. As an example, many businesses consider it prudent to conduct voluntary self-audits to evaluate the status of compliance. Compliance audits, with the appropriate response, can enable businesses to proactively correct areas of noncompliance, minimizing the risk of unexpected cleanup costs or enforcement penalties. Risk screening can be used to limit site investigation scope and costs. Future land use scenarios can be evaluated and appropriate clean up levels identified using risk assessments.

ERG knows the best investigative techniques

ERG's solutions are end-focused. At the beginning of the process we look at the big picture, identifying the technical needs, the design options, and operations and maintenance needs of the response system. It is our experience that as the project proceeds, the ability to influence and control the costs decreases. Consequently, at key steps throughout the project, ERG reevaluates the direction the project is proceeding and suggests appropriate modifications.

ERG staff have performed investigations at sites throughout the U.S. and internationally. Various drilling, soil and waste sampling, and monitoring well installation techniques have been utilized throughout these investigations. These techniques are conducted in combination with a strong working knowledge of rules and standards in order to ensure their proper completion. Detailed designs are prepared for remedial action projects, such as excavation, bioremediation, air sparging/soil vacuum extraction systems, phytoremediation and related projects including, but not limited to, brownfield sites, waste disposal facilities, industrial landfills and wastewater treatment. Our design experience includes the technologies listed below:

GROUNDWATER EXTRACTION AND TREATMENT
- Single and Multiple Well Extraction
- Interceptor Trenches
- Vacuum Enhanced Extraction
- Free Product Recovery (Active and Passive)
- Oil and Water Separation
- Air Stripping
- Activated Carbon Adsorption
- Phytoremediation
- Air Sparging

SOIL AND SEDIMENT/SLUDGE TREATMENT
- Excavation and Off-site or On-site Disposal
- Dredging
- Soil Vapor Extraction
- Stabilization/Treatment
- Insitu Biological Treatment
- Biopile Stimulation and Treatment

OTHER
- Landfill Gas Extraction
- Impermeable Caps
- Slurry Walls
- Composting

ERG prepares designs that work

Our staff hydrogeologists have the experience and state-of-the-art

software to perform groundwater modeling for both transient and steady state conditions. The state-of-the-art models used have been applied to measure the influence of pumping wells, and other changes induced in aquifers by human or natural events. Our staff has also designed and utilized custom models for several sites.

DUE DILIGENCE/COMPLIANCE AUDITS

- Phase I and Phase II Site Investigations
- Compliance Reviews and Audits
- Restricted Waste Surveys
- Waste Disposal Assessments

Environmental liability, real and perceived, can dramatically impact real property and project financing, influence the course and success of construction and site redevelopment, and potentially expose project stake holders to regulatory, civil and criminal penalties. Therefore, thorough due diligence is critical to identifying and managing the environmental risk which may be associated with property and business acquisition/divestiture, facility expansion, site redevelopment, and financial transactions.

We identify and manage environmental risk

ERG has evaluated environmental risk associated with a wide variety of projects including never-developed land, residential and commercial sites, single manufacturing facilities, and large industrial complexes. Our due diligence experience has included corridor studies, portfolio examinations, third-party reviews, multi-site and multi-state acquisition programs, and expert witness testimony. We have also conducted due diligence internationally, including projects in Canada, Central and South America and Asia.

Unlike many consultants, ERG does not view environmental due diligence as a commodity. Rather, we approach each project individually, working closely with the client from the start to design the appropriate level of investigation to meet their specific project and risk tolerance needs. Our basic Environmental Due Diligence Services include ASTM Phase I Environmental Site Assessments, Phase II investigations, transaction screenings, restricted waste surveys, waste disposal assessments, regulatory compliance reviews, health and safety reviews, wetland delineation, regulatory file reviews, and development of mitigation options and costs.

The goal of our Environmental Due Diligence Services is to provide our clients with appropriate, reliable information on which to base their business decisions. The results of a due diligence analysis also form a solid basis for planning successful solutions

to the environmental challenges that may arise.

ENVIRONMENTAL MANAGEMENT SYSTEMS

- Process Review/Material and Waste Inventories
- ISO 14001 Gap Analysis
- ISO 14001 EMS Development
- EMIS Development/Implementation
- EMS Auditing

An environmental management system (EMS) is an organized approach to integrating the methods for maintaining environmental compliance into the core process of a plant or company. The EMS can be developed as part of the overall operations to assist in achieving financial goals of the company. An EMS approach to business and environmental issues can yield sustainable, long-term rewards such as optimal process efficiency, improved environmental citizenship and reduced cost of dealing with undesirable by-products.

The regulatory system is currently in a state of flux and the command and control approach focusing on inspection and enforcement is shifting toward education/assistance related to pollution prevention. Regulatory agencies with limited financial and human resources are recognizing that the promotion of EMS concepts is an alternative technique for achieving the goals of environmental protection. There are numerous state and federal programs that support the implementation of EMSs in the regulated community. These include laws relating to reducing or mitigating liability and civil penalties for companies who have developed EMSs to detect and correct environmental problems within the framework of business operations.

The International Organization of Standardization (ISO) finalized new standards, ISO 14001, for the development of EMSs in 1997. The format for the new standards is similar to the ISO 9002 product quality standards, however the implications of implementing an ISO 14001 compliant EMS are far more reaching. ISO 14000 Environmental Standards are becoming a requirement for conducting business on a global scale. As an example of the impact of these standards, Ford Motor Company announced the requirement that suppliers must develop EMSs compliant to ISO 14001 standards by year 2001 to be consistent with the overall goals for environmental performance. This will effect more that 5000 businesses in the United States. Several other major U.S. automakers issued similar environmental policy statements which will effect an additional 2000 businesses.

ERG staff has developed the expertise to assist clients in a business systems approach to environmental issues. We have worked with our clients in developing comprehensive internal guidance manuals. This technique is used to simplify procedures involving many different departments of a given organization. ERG staff has worked in developing an EMS based on ISO 14001 standards for a client with facilities at multiple locations. Staff has received auditor training and achieved certification by the Registrar Accreditation Board for EMS auditing to ISO 14001 standards.

SOLID WASTE

Site Selection/Investigation
- Hydrogeologic Evaluation
- Regulatory Permitting
- Design and Engineering
- Contract Administration/Construction QC

The development or expansion of solid waste management facilities requires project personnel who are skilled in broad range of environmental and engineering areas. ERG staff has an extensive background in the siting, design and permitting of landfills, transfer stations, composting operations and materials recovery facilities. Many of the solid waste management facilities employ a combination of management techniques to optimize the capabilities of a facility and extract the beneficial characteristics of a waste stream. ERG has worked to develop integrated facilities to meet client objectives.

ERG staff has prepared complete engineering plans for landfill leachate collection systems from the development of conceptual design and MPCA permitting through construction. Economic analysis for alternative landfill liner materials and soil borrow studies for landfill sites have been conducted to meet facilities site-specific needs. ERG's scope of involvement includes revising engineering plans for currently operating landfills to maintain and update MPCA permit compliance status. Closure plans and reports including design of landfill gas-venting systems, terraces systems for erosion control and drainage control structures have been prepared and implemented. ERG has conducted studies to define landfill leachate quality and quantities for on-site treatment by aeration lagoons and off-site treatment by publicly owned treatment works and performed economic analyses of leachate treatment alternatives to identify the most cost-effective techniques. Leachate collection and treatment systems for a solid waste landfills including spray irrigation systems for volatile organics removal have been designed and implemented.

Facility site plans and permitting documents for composting projects with various types of feedstocks including source-separated food waste, source-separated produce waste, biosolids and yards wastes have been prepared for a wide range of clients. ERG staff has worked extensively with aerated in-vessel composting and other passive techniques. We have assisted a client with procuring an OEA grant for a composting project

ERG staff has prepared Management Plans for Industrial Solid Wastes received at numerous types of solid waste processing facilities. These plans typically involve the characterization, evaluation and treatment/disposal/processing recommendations for paint wastes, ashes, resins, PCB wastes, food processing wastes, empty containers, asbestos, demolition wastes, brownfield reclamation wastes, paper mill sewage sludge and low level radioactive wastes.

ADDITIONAL SERVICES

ENVIRONMENTAL PERMITTING
- Clean Water Act
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- State Water Quality Requirements
- State Environmental Regulatory Agencies
- Corridor Studies/Assessments
- Land Development Support

RESOURCE ASSESSMENT & SURVEY MANAGEMENT
- Threatened and Endangered Species Surveys
- Wetland Delineations
- Sensitive Area Delineation
- Cultural Resources

SITE REDEVELOPMENT
- Local, state, and federal Brownfield Initiatives
- Community and Regulatory Liaison
- Regulatory Negotiations
- Funding Sources and Grant Applications

CONSTRUCTION IMPLEMENTATION
- Erosion Control and Restoration Plans
- Stream and Wetland Crossing Plans
- Residential Construction Mitigation Plans
- Pre-Construction Site Documentation
- Construction Administration and Quality Control

Ethanol Experience

ERG continues to provide environmental services to the ethanol fuel industry. Our staff have worked on 35 facilities in 16 states, including two in North Dakota, either for the owners or the process engineering firms, providing expertise in the environmental review and permitting process.

One of the 35 facilities is Diversified Energy Company (DENCO) in Morris, Minnesota. ERG staff managed a series of subsequent air permit expansions from 3.75 to 21.5 Million gallons per year production. ERG also performed an air emissions analysis, advised the facility on stack height determinations and managed over 6 rounds of stack testing. ERG has assisted on air quality and total environmental compliance for the facility, ranging from storm water and surface water discharge to land application of various spent grain by-products.

From the staff of DENCO and their expertise, Greenway Consulting was formed. Greenway Consulting is a premier provider of ethanol process operations, plant start-up and trouble-shooting services to the ethanol industry. ERG has teamed with Greenway to provide environmental services to Greenway's clients as appropriate.

Todd A. Potas, P.E., Q.E.P.
Principal

Areas of Expertise

- Air Quality/Chemical Engineer
- Air Emission Permitting / Regulatory Negotiations
- Process Engineering / Air Pollution Control Technology
- Continuous Emissions Monitoring
- Air Emissions Estimating / Process Evaluation
- Project / Environmental Compliance Management

Experience

Mr. Potas has been working in air quality and environmental compliance for 13 years. He manages four engineers and an environmental scientist for ERG. His primary responsibilities include project management, air permitting, compliance management, alternative fuel source and process engineering evaluations, control equipment system design, air emission source test planning, and ambient air monitoring. His experience includes investigating emissions, control and permitting strategies for industrial and municipal solid waste landfills, hauling companies, material recycling facilities, and transfer stations. He has performed similar services for chemical manufacturing plants, gray iron foundries, and power generation plants. He manages ongoing total environmental compliance for eight fuel ethanol production plants and has managed the construction air permits for over thirty new and expanded ethanol production facilities. One of these facilities located in North Dakota is permitted to utilize Powder River Basin sub-bituminous coal.

Mr. Potas has also served as Principal investigator for several coal beneficiation projects for coal companies, public utilities, and the U.S. Department of Energy. Technologies included high temperature and pressure drying, oil agglomeration, and conventional physical cleaning of various coals, primarily lignite and sub-bituminous coals. Related projects included management of pilot-scale combustion testing of the beneficiated coal and coal-water fuels. He managed the operation of a continuous hydrothermal treatment pilot-plant to produce over 20,000 gallons of hydrothermally treated coal water fuel. He is familiar with the unique properties and challenges concerning utilization of North Dakota lignite.

Education and Training

M.E., Chemical Engineering, 1987
University of North Dakota, Grand Forks, North Dakota

B.S., Chemical Engineering, 1982
University of North Dakota, Grand Forks, North Dakota

Presenter, Annual Fuel Ethanol Workshop, Bryan and Bryan International, Air Emissions from Ethanol Plants, June 1999 and 2001

Facilitator/Instructor, Broin and Associates, Environmental Compliance Seminar for Ethanol Plants, July 1998

Instructor, Executive Enterprises, Inc., Air Quality Compliance Case Histories, Chicago, Illinois, 1997; Cincinnati, Ohio, 1997; and Farmington Hills, Michigan, 1997

Session Chairman, AICHE Conference, Twin Cities Section, Minneapolis, Minnesota, 1995

Title V Air Permit Workshops I and II, Minnesota Pollution Control Agency, Minneapolis, Minnesota, 1994

Facilitator for Air Quality Awareness Seminar on the proposed NSPS for New & Existing Landfills and Clean Air Act Amendments Applicability, Waste Management Environmental Learning Center, Oak Brook, Illinois, 1993 and 1994

Measurement of Toxic and Related Air Pollutants International Symposium and Short Courses on Basic and Advanced Methods for Monitoring Air Toxics, presented by EPA and the Air and Waste Management Association, Durham, North Carolina, 1992

Prevention of Significant Deterioration/New Source Review Workshop, presented by EPA and the Air and Waste Management Association, Denver, Colorado, 1992

Session Chairman, Coal Beneficiation, 15th Biennial Low-Rank Fuels Symposium, St. Paul, Minnesota, 1988

Consultant on Preparation and Combustion of Low-Rank CWF, Saskatchewan Energy & Mines, Tests conducted at the Energy, Mines, and Resources CANMET Combustion Laboratory, Ottawa, Canada, 1988

Guest Visitor and Lecturer on Low-Rank Coal Technology to Yugoslavia, University of Novi Sad, Novi Sad, N. Vlahovica, Yugoslavia, 1987

Professional Affiliations

American Institute of Chemical Engineers

Air and Waste Management Association

Professional Registration

Professional Engineer No. 24016, Minnesota, 1995

Professional Engineer No. 55205, Florida, 1999

Qualified Environmental Professional, Certificate No. 12000060, IPEP, 2000

Presentations / Publications / Patents

Potas, T.A., "Specification of Air Toxics in Landfill Gas", 91st Annual AWMA Meeting, San Diego, California, 1998.

Potas, T.A., "Ethanol Plant Air Quality Compliance", 10th Annual American Coalition for Ethanol Conference, Fargo, ND, November 1997.

Potas, T.A. "Defer Landfill NSPS Control Requirements by Tier II Testing, 90th Annual AWMA Meeting, Toronto, Canada, June 10, 1997.

Potas, T.A. "Applicability of NSPS Regulations to the Fuel Ethanol Industry," National Fuel Ethanol Workshop, St. Paul, Minnesota, June 18-21, 1996.

Potas, T.A. "Air Emissions from Gas Recovery and Utilization at Municipal Solid Waste Landfills," 203rd American Chemical Society National Meeting, Fuels Division, Chicago, Illinois, August 22-27, 1993.

Potas, T.A. & Blair, L.N. Particulate Air Toxic Characterization at a Gray Iron Foundry, Paper 93-TP-50.01, 86th Annual Air & Waste Management Association Meeting & Exhibition, Denver, Colorado, June 13-18, 1993.

Ljubicic, B.; Bukarov, Z., University of Novi Sad, Yugoslavia; Potas, T.A. "Assessment of Yugoslavian Lignite for Coal/Water Fuels," Proceedings of the Opportunities in the Synfuels Industry International Symposium, Bismarck, North Dakota, August 1988.

Potas, T.A.; Miller, B.G. "Preparation and Combustion of Low-Rank Coal-Water Fuels," Coal Utilization and Environmental Control Contractors Review Meeting, Pittsburgh, Pennsylvania, July 7-9, 1987 (presenter).

Potas, T.A.; Chapter 12, Gas Recovery and Utilization from MSW Landfills, published in the book *Conversion and Utilization of Waste Materials*, edited by M. Rashid Khar, Taylor and Francis Publishing Office, Washington, DC, 1996.

Potas, T.A.; Baker, G.G.; Maas, D.J.; Farnum, S.A. "Pilot-Scale Preparation of Lignite and Subbituminous Coal/Water Fuels," 8th International Symposium on Coal Slurry Fuels Preparation and Utilization, Orlando, Florida, May 27-30, 1986, (presenter), published in the *Journal of Coal Quality*, April 1987.

Potas, T.A.; DeWall, R.A.; Maas D.J. "CWF Rheology at Elevated Temperatures for Gasification," Electric Power Research Institute Research Project 2470-1, Final Report – Amendment 4, Palo Alto, California, January 1987.

Potas, T.A.; Sears, R.E.; Maas, D.J.; Baker, G.G.; Wilson, W.G. "Preparation of Hot-Water Dried LRC-Water Fuel Slurries," AICHE Spring National Meeting, Houston, Texas, March 24-28, 1985 (presenter), published in *Chemical Engineering Communications*, volume 44, 1986.

U.S. Patent. “Methods to Enhance the Characteristics of Hydrothermally Prepared Slurry Fuels”, Patent Application No. 60/019/780, Filing date: June 12, 1997.

U.S. Patent. "Low Coal Rank Oil Agglomeration Product and Process," Patent No. 5,032,416. Filing date: July 12, 1991. Date issued: November 17, 1992.

Previous Employment

1999 – Present, Environmental Resource Group

1992 – 1999 Earth Tech, Inc./Rust Environment and Infrastructure

1991 – 1992 PACE Laboratories, Inc.

1983 – 1991 Energy & Environmental Research Center, University of North Dakota

Todd A. Potas
Selected Project Experience

Broin & Associates, Sioux Falls, South Dakota. Managed preparation of Title V air emissions permit application and Construction Air Permit applications for three 20 MMgal/yr ethanol production facilities in Minnesota, two 20 MMgal/yr facilities in Missouri, one in 50 MMgal/yr plant in South Dakota, and one 50 MMgal/yr plant in Michigan. Manages ongoing air quality compliance of seven affiliated facilities.

Major Minnesota Manufacturing Company. Preparation of several air emissions permit applications, air toxics emission inventories, and BACT analysis for fluorocarbon emission control for a leading specialty chemicals and film manufacturing company. Process evaluation for air emissions included both batch and continuous chemical processes. Prepared a solid waste permit for land application of industrial process sludge.

Minnesota Brewing Company, St. Paul, Minnesota. Managed preparation of Title V air emissions permit application and environmental assessment worksheet (EAW) for a 18-million-gallon per year ethanol production plant expansion and a total facility air permit application for a 1.5-million-barrel per year existing brewery. Managed air quality compliance for the facility.

LTV Steel Mining Company, Minnesota. Project engineer for design and specification of source continuous emissions monitoring system for coal-fired boilers, including planning and installation of an ambient monitoring network to analyze the impact of the boiler sulfur dioxide and particulate emissions. Responsible for project management and reporting for the ambient air monitoring network supporting a PSD Model Evaluation Study.

Central Minnesota Ethanol Cooperative, Little Falls, Minnesota. Managed preparation of a Bureau of Alcohol, Tobacco, and Firearms (BATF) permit application for an 18.4-million-gallon per year ethanol production plant. Project included management of a process and non-process water treatment evaluation and feasibility study and a Title V major amendment air permit application. Managed air quality compliance for the facility.

Heartland Corn Products, Winthrop, Minnesota. Managed preparation of an air permit application and an EAW for a production increase from 10 million gallons per year to 19 million gallons per year and 19 million gallons per year to 35 million gallons per year. Managed environmental compliance for the facility.

Waste Management, Inc. Air Quality Work. Preparation of over 15 Title V air permit applications for landfill gas flare systems and landfill gas-fired turbine generators. Preparation of air quality training manuals, Title V emission inventory guidance for landfills, and preparation of over 20 Title V air emission assessments for landfill facilities in eight states. Presenter at four air quality seminars. Project manager for NSPS Subpart WWW compliance for applicable WMI sites in Michigan, Ohio, and Kentucky including design capacity, reports, Tier I emission estimates, and Tier II sampling at over 25 facilities. Conducted emission inventories for over six transfer stations, hauling companies, and material recycling centers

Al-Corn Clean Fuels, Claremont, Minnesota. Managed preparation of an air permit application for production expansion from 10 million gallons per year to 19.25 million gallons per year and subsequent expansion to 30 million gallons per year. Managed emission source testing, including process evaluation on fermentation, distillation, and DDGS drying. Managed environmental investigation, testing, and clean-up confirmation of a denatured ethanol spill, and obtained an NPDES water discharge permit modification. Managed air quality compliance for the facility.

Adkins Energy Company, Lena, Illinois. Managed preparation of major source PSD and Title V air permit application for a 30-million-gallon per year ethanol production plant and cogeneration power plant facility. Included Best Available Control Technology evaluation.

Major Midwestern Gray Iron Foundry. Project manager for a series of multi-emission point source testing studies for a gray iron foundry, including development of an air emissions database management system; these projects totaled over $700,000 in six years. Control equipment included baghouses, cartridge collectors, and Venturi scrubbers. Software included Paradox and Mapinfo for Windows.

Western Ethanol Corporation, Glidden, Iowa. Managed preparation of water use and air construction permit applications for a 30-million-gallon per year ethanol production facility.

Major Minnesota Pulp and Paper Company. Prepared an air toxic emission inventory and process evaluation for an oriented strand board (OSB) and pulp and paper manufacturing company. This included the waste wood and natural gas steam generating units for these facilities.

Diversified Energy Company, Morris, Minnesota. Preparation of air emissions permit applications and air quality services consulting for a 21.5-million-gallon per year ethanol production facility, including ethanol recovery condenser design, boiler fuels feasibility analysis, and control equipment specification for sulfur dioxide and ethanol control. Managed facility emission source testing, process evaluation, and emissions control equipment optimization.

American Disposal Services, Inc. Prepared seven Title V air permit applications and four emission inventories for landfills in Kansas, Missouri, Pennsylvania, Ohio, and Illinois. Performed Tier II sampling projects at five facilities. Managed air emissions permitting and emissions inventories for five hauling companies and solid waste transfer stations.

Chippewa Valley Agrafuels Cooperative, Benson, Minnesota, and Renewable Oxygenates, Inc., Madison, Minnesota. Managed preparation of EAWs and Title V Air Permit Applications for two 15-million-gallon per year ethanol production facilities. Managed air permit application projects to increase permitted production to 20 million gallons per year and to add an industrial alcohol purification system. Managed emission source performance testing and pollution control process evaluation on fermentation scrubber and DDGS dryer.

Major Ohio Chemical Manufacturing Facility. Managed preparation of a Title V Air Emission Inventory for a chemical manufacturing facility with over 1500 emission points, including a RACT NO_x Emission study for a 120 MMBtu/hour boiler.

Johnson City, Tennessee. Project engineer for an odor characterization study and odor control technology investigation for a rubber vulcanizing facility, including specification and installation of a natural/gas fired thermal oxidizer.

Frigidaire Freezer Products, St. Cloud, Minnesota. Prepared emissions estimates for PSD impact review of a powder painting process addition to a freezer manufacturing facility.

International Paper, Mansfield, Louisiana. Project task manager for installation and operation of a PSD pre-construction ambient air monitoring network for sulfur dioxide and MET parameters near a pulp and paper manufacturing facility.

9. Qualifications:

ICM, Inc.
310 N. First St.
PO Box 397
Colwich, KS 67030
316.796.0900
ww.icminc.com

Company Profile

ICM, Inc. and ICM Marketing, Inc. serve the agricultural and ethanol industry by developing and implementing innovative and practical processing and marketing solutions. Today, ICM employs more than 100 high quality people in cash commodity trading, marketing, process consulting, engineering, equipment fabrication, field installation, and start-up combining in more than 230 years of experience. The company is located on a 10-acre tract and operates out of a 55,000-square-foot industrial park near Wichita, Kansas.

Dave Vander Griend formed ICM after 15 years of professional experience in the ethanol industry. During his nine years as Vice President for High Plains Corporation, Dave led that company through the startup of a non-operational 20 MGY facility in Colwich, Kansas. He also constructed a profitable 30 MPY facility at a new site near York, Nebraska from two defunct ethanol plants.

ICM provided engineering, fabrication, and installation services for plus five other recent plants in the United States. By observing, investigating, planning, and calculating, ICM is removing bottlenecks and increasing capacity at very low incremental costs. In the past, ICM has also provided design services for plant expansions at the Wyoming Ethanol and Al-Corn ethanol plants. The company also provided design, engineering, and start-up services for a 10 MGY ethanol facility in El Salvador and an alcohol system for a beverage alcohol yeast processor.

Recently, ICM completed the engineering, construction management, and startup of the 40 MMGPY US Energy Partners Ethanol plant in Russell, Kansas. This major project resulted in a quick start up and has a production rate exceeding 40 MMGPY. ICM, Inc also provides engineering and dryer systems for numerous plants in the United States. ICM provides distillation, evaporation, and molecular sieve design; reviews of other plant systems; and provided major startup assistance with Badger State Ethanol, Monroe, WI; Midwest Grain Processors, Lakota, IA; and Glacial Lakes Ethanol, Watertown, SD.

Additionally, ICM has designed, fabricated, installed and started distillers' dried grain drying systems for ethanol plants since 1995, including single dryer systems in Russell, Kansas; Craig, Mo; Macon, MO; and Winnebago, Benson, Bingham

Lake, Preston, Luverne, Albert Lea, Morris, St. Paul and Winthrop (All Minnesota). ICM dual dryer systems are located in Hastings, NE; Wentworth, SD; Big Stone City, SD; Coon Rapids, IA; Watertown, SD; Lakota, IA; and Monroe, WI. ICM has several projects currently in the fabrication or installation stages, including a single dryer system in Plainview, NE; dual systems in Marcus, IA and Robinson, IL; and ICM's first four dryer system, located in Brookings, SD. The company also has supplied dryers designed to be integrated with existing single dryer systems in Chatham, Ontario and Claremont, MN.

ICM's dryers feature more durable construction and refactory lined inlet chambers, as well as an improved cyclone design for self-cleaning. ICM dryers operate at lower temperatures to produce the golden color distillers' grain demanded by marketers.

As a recent option available with the dryer system, ICM has also begun designing, fabricating, and installing Thermal Oxidizer systems to reduce dryer emissions. Currently, ICM Thermal Oxidizers are in use with dual dryers in Claremont, MN; Watertown, SD; Monroe, WI; and Lakota, IA. ICM's in-house fabrication shop is also working on Thermal Oxidizers for its dryer systems located in Plainview, NE; Robinson, IL; and Brookings, SD.

Ken Ulrich, a Professional Mechanical Engineer who holds Masters of Engineering and Masters of Business Administration degrees, manages the engineering team. A team of drafters connected to a state-of-the-art networked computer system utilizing AutoCad 2000 and Pro-Pipe supports ICM designers and engineers. The engineering division employs Dennis Vander Griend (BSME), who has over 20 years of professional ethanol plant design and operations experience, in both wet and dry mill facilities. The division has an Electrical Engineer and an industrial control specialist with 15 years of experience in process control design, layout, programming, startup, and troubleshooting.

ICM Marketing, Inc. markets course grains and processed agricultural commodities in the cash market. ICM Marketing purchases commodities from over 50 Mid-Western grain elevators and products from ethanol plants and then resells them to feedlots and cash commodity customers. The division also arranges shipping in the Continental U.S. via truck, rail or barge.

The office of Dr. Joe Ruocco and Pheonix Bio-Systems in located within ICM's office complex in Colwich. Dr. Ruocco holds a U.S. patent for high performance fixed-film bioreactor for treating wastewater. Since Joe worked as a Senior Research Associate with Coors Bio-Tech, Inc. in the early 1980's, he has serviced as an industry consultant and promoted the bio-reactors. In addition to the Biotechnology work, Joe assists ICM on the scientific and biological portions of design and engineering.

Welcome

From the President and CEO:

ICM, Inc. wants to be your full-service engineering company. Whether you are in the process of learning about the ethanol industry, or have years of operating experience, ICM, Inc. has the resources to provide practical and innovative solutions to your current and future needs.

ICM, Inc. personnel has over 230 combined years of professional experience in the ethanol industry. That means know-how. We know how to get started. We know how to thrive. We know how to survive. We know how to build and operate profitable plants. We have the resources to put this experience and knowledge to work for you.

And we believe there is more work to do. ICM, Inc. is developing processes and equipment to enhance the profitability of today's processing plants. Should you want to do due to diligence to innovative designs or processes, ICM, Inc. has the facilities and personnel to verify process technology. Plants of the future will have additional high value products.

We also add value to distillers grains. ICM, Inc. designs, fabricates, installs, and starts up Distillers Grains dryers. ICM, now has 32 dryers installed in the Midwest and Canada. This broad industry acceptance provides the desirable golden distillers grains for our customers and uniform product for the industry. If you have a drying need, I would be happy to discuss with you the reasons that plants and design engineers have recently changed from their former vendors to purchase ten ICM, Inc. dryers.

Recently, Phoenix Bio-Systems joined forces with ICM, Inc. to provide solutions to waste water problems. While we know there are many who claim to provide solutions, ICM, Inc. Phoenix focuses on practical, effective, and low cost water treatment solutions. In some cases, running your wastewater through our Methanator treatment system can actually add cash flow to your processing plant!

In short, we believe that our operating and engineering experience is second to none. We would appreciate the opportunity to discuss your situation. Stop by or call us to see how we can help you.

Thank you for your interest in ICM, Inc. We trust that this is the first of many pleasant experiences with us. We have been in the ethanol industry for nearly two decades and are looking forward to supporting you in the future.

Dave Vander Griend
President and CEO

BIOGRAPHIES OF KEY ICM PERSONNEL

Dave Vander Griend-President and CEO

Dave has designed and construed numerous ethanol production plants across the Midwest. With a strong design/fabrication background in his hometown of Sheldon, Iowa, and with a strong interest in ethanol productions, Dave worked in the early stages of fuel ethanol plant development in the late 1970s and early 1980s.

In 1985, he joined High Plains Corporation of Colwich, Kansas, to rectify design and solve operational problems of a newly erected 10-million-gallon-per-year plant. After numerous upgrades and improvements, the capacity of the Colwich facility reached 20 million gallons per year without any loss of production time. In 1994, High Plains management agreed to construct the 30-million-gallon-per-year facility in York, Nebraska. As Vice President of Operations, Dave directed on-going production operations, engineering design, demolition and relocation, construction, and startup of the $30 million facility.

Dave has more than 20 years experience in system design and construction. With a strong business and technical background in the fuel ethanol industry, Dave was able to successfully lead a public company through one of the most difficult times for the ethanol industry.

At ICM, Dave develops new business, along with providing design oversight, construction management and operations troubleshooting services.

Jeff Roskam-Senior Vice President

Jeff is the Senior Vice President for ICM and is responsible for business development. He has ten years experience in project development and management in the ethanol industry. Jeff is the Vice Chairman of the Board of Badger State Ethanol, LLC, a 40-million-gallon-per-year dry mill ethanol plant in Monroe, Wisconsin, and Secretary of the Board for U.S. Energy Partners, a 40-million-gallon-per-year ethanol plant and 4-million-bushel-per-year wheat gluten facility in Russell, Kansas.

He has been a key player in the organization and development of two ethanol plants and has advised or assisted on more than a dozen other plants. Jeff assists ICM in strategic planning and negotiates technology license agreements with design build, EPC contractors and international project delivery companies. The company currently has technology license agreements in the USA, Australia and India. He has been a speaker at the World Fuel Ethanol Congress in Beijing, China and the Ethanol Banking seminars in Chicago and New York City.

Before working in the ethanol industry, Jeff was the key player in a West Coast bottle water company, lead the marketing of a new reverse osmosis product line for an Ohio water equipment manufacturing company and worked as a loan officer in the secondary loan market.

Jeff grew up on a northwest Iowa grain and livestock farm and holds a B.A. Finance degree from Iowa State University. He and his family live in Wichita.

Randy Ives-President/Commodities

As President of ICM Marketing, Inc., Randy is intimately familiar with nationwide agricultural processing co-product markets. Randy and his team of merchandisers have developed an extensive book of animal feed ingredient business in regional U.S. markets.

ICM Marketing, Inc. has developed into a high-volume retail merchandising operation with services ranging from grain procurement, feed ingredient sales, logistics, fleet management, quality control to risk management through hedging, market forecasting, inventory management, and the carrying of accounts receivable.

After receiving his B.S., Agriculture from the University of Illinois, Urbana-Champaign, Randy joined AG Processing, Inc., a major soy processing company. Experiences gained during those eight years have been highly useful in developing a winning marketing strategy for Ethanol Co-products. Randy began his Ethanol career in 1994 with High Plains, and was strategic in the start up of ICM in 1995.

Randy is married with two teen-age children, and resides in Wichita.

Dennis Vander Griend – Senior Process Engineer

Dennis is ICM's Chief Process Engineer and has technical roots in the ethanol industry dating back to 1979. As a native of Sheldon, Iowa, Dennis attended South Dakota State University, Brookings, to study under the prolific ethanol researcher and industrial microbiologist, Dr. Paul Middaugh, and he received his B.S. in Mechanical Engineering. Dennis has more than 20 years of experience in wet and dry mill design and operations.

Representing SDSU at the 1979 Appropriate Community Technology (ACT-79) energy fair in Washington, D.C., Dennis designed and demonstrated a skid-mounted 30-gallon per hour distillation column. The Bureau of Firearms, Alcohol and Tobacco issued the first fuel ethanol plant license (number 0001) for this fuel ethanol distillation column. For this work, Dennis was awarded the SDSU Engineering Energy award and developed a national reputation for developing practical and efficient fuel ethanol processing.

Dennis has provided many other technical contributions to the fuel ethanol industry. Most notable and significant among these is the distillation design - placing a thermo-compressor-driven evaporator before the 190-proof distillation column - which provides significant steam energy savings. A U.S. patent application has been filed for this process. It has also been used in nearly every new dry mill ethanol plant constructed in the Midwest since 1992.

Brad Box - Vice President / Electrical Division

Brad Box has over 18 years of experience in process plants, power distribution, process control systems design, installation, startup and maintenance. Fifteen of these years were in the dry mill fuel ethanol industry.

Brad's experience and education contributed to his success as an Electrical Project Manager for High Plains and to ICM projects large and small, from El Salvador to Nebraska, Kansas and Minnesota. On all projects, Brad was the person responsible for detailed electrical and instrumentation designs, control system

specifications and programming, cost estimating, and bid package preparation. While the engineering knowledge and experience is highly valuable, Brad's largest contributions combine this knowledge with control philosophy based upon operating knowledge.

Ken Ulrich – Vice President of Engineering, ICM, Inc.

Ken Ulrich is the Engineer in responsible charge for ICM to offer the practice Professional Engineering. Originally from Louisville, Kentucky, he earned his B. S. and Master of Engineering, Mechanical Engineering from the University of Louisville. He also earned a Masters of Business Administration from the University of Iowa. In addition to his formal education, Ken has taken numerous related continued education courses required to maintain his Professional Engineer's License.

While Ken's education is a major asset in its own right, his strength lies in his 23 years of plant operations experience. At ICM, Ken is able to draw on this experience while developing plant, process and equipment designs, as well as in training professional staff.

As the Engineering Manager for Penford Products, a Cedar Rapids, Iowa, corn-wet miller, he directed projects to double the plant grind from 35,000 to 70,000 bushels per day. He prepared, executed, and managed annual capital budgets to $24 million and gained valuable experience drying corn co-products. Ken has gained valuable power generation experience with tie-ins of a new co-generation system at Penford Products and at a Portsmouth, Virginia, 60-MW-trash-to-steam co-generation plant.

Ken is a Registered Professional Engineer, originally licensed in the state of Kentucky. He has a NCEES record and is currently registered in all states in which ICM conducts business. He is a member of the American Society of Mechanical Engineers and the National Society of Professional Engineers.

Astra Lavezzi – Director of Engineering

Astra's career in the ethanol industry began in 1989 when she pulled up her Chicago roots and moved to central Illinois to work as a mechanical engineer for Pekin Energy Company (now Williams Bio-Energy). In 1981, the Pekin corn wet milling starch/syrup refinery was converted to produce ethanol.

In the role of project engineer and later as project manager, Astra was involved in numerous projects in grain receiving, steeping, milling, separation, and co-product drying that helped to expand ethanol production from 75 to 100 million gpy. Her responsibilities included process design, process troubleshooting, equipment sizing and procurement, contractor supervision, and start-ups, while fulfilling the main objective of providing low-cost, highly efficient, and operator & maintenance-friendly processes. In the early 1990s, Astra began working with R&D staff on the development of a yeast recovery process, the success of which culminated in a greenfield plant adjacent to the ethanol facility capable of processing 36 million ppy of spray-dried brewer's yeast.

As a native of Illinois, Astra received her Bachelor of Science degree in Mechanical Engineering from Illinois Institute of Technology and will receive her Master of Business Administration in 2003 from Illinois State University. At ICM, Astra is utilizing her experience as a project engineer and manager to streamline and develop a customer responsive engineering department.

Patrick Lahmon-Structural Engineer

Patrick has spent more than twenty years in the agri-processing industry, designing, operating, and managing various processing facilities. His specialization is in the design of structural buildings, ranging from production facilities to office and commercial buildings. Patrick has held numerous positions in his career, having spent time in both industry and private practice. He has been involved in the design and operation of more than 30 grain processing plants.

Patrick received his BSCE from Tri State University and his MBA from Emporia State University. Patrick is originally from Ohio. He has lived in several locations throughout the country, most recently northern Indiana.

Mr. Lahmon currently resides in Wichita.

Greg Loest – Process Engineer

Greg has seven years experience in the corn milling industry. He started his engineering career with a three year assignment at ADM in Decatur, IL, the world's largest corn wet milling plant. His main responsibilities were production and startup of new plants/processes ranging from fructose, crystalline sorbital, vitamin E and co-generation systems. In North Dakota he helped startup the new Pro Gold corn wet milling plant. He was involved directly in the training of the technicians, refinery production and optimization. After startup, Greg was moved into the plant/project engineering role for this Wahpeton, ND, facility. He was instrumental in reducing overall utility costs within the plant by more than 30 percent and continued to oversee the capital expenditures and projects throughout the plant. After Cargill became involved with Pro Gold, Greg also traveled to Dayton, OH, Turkey and Canada to assist Cargill with projects and startups.

As a native of Colorado, Greg attended the University of Colorado at Boulder, received a Bachelor of Science Degree in Chemical Engineering and was a member of the 1990 National Championship football team. Currently he is working with Dennis Vander Griend on the design of the 20- and 40-MM GPY plants.

Mark McCorkle – Project Manager

Mark is an ICM Project Manager with 20 years of engineering, manufacturing and product development experience including 15 years in the plastic industry.

As president of McCorkle Design, Mark maintained a client base that included Coleman, Pizza Hut, Boeing and several other clients with a need for engineering design services. He designed the product of the year for the food services industry

in 2000. As Chief Design Engineer at CAC Mold Corporation in Wichita, he managed the engineering department and was responsible for all of the customer contact.

Mark was the president of the Wichita chapter of the Society of Plastic Engineers for 1999-2000 and has been a scoutmaster for the Boy Scouts of America for three years.

A native of Wichita, Kansas, Mark has completed a major portion of the work toward a BA in Mechanical Engineering from Wichita State University. Currently he is responsible for managing the 100-million-gallon-per-year ethanol projects.

Cheri Duxbury – Process Engineer/Permitting

Cheri has more than seven years experience in the corn milling industry. She started her engineering career at Cargill Inc.'s largest wet corn mill in Eddyville IA. She was responsible for supervising fructose plant operations with a focus on quality control, production rates and operating cost reduction. She also served as a lead member for the Corn Milling Best Practice Team focusing on enzyme efficiency, filtration, ion exchange and adsorption-separation chromatography. Cheri was later promoted to the Corporate Research and Development Team where she worked on the separation and purification of lactic acid for the Cargill-Dow Polymers facility in Blair, NE.

As a native of South Dakota, Cheri attended the South Dakota School of Mines and received her Bachelor of Science Degree in Chemical Engineering. Currently she is working with plant permitting and assisting the engineering department.

Bernie Hoffman-Project Manager

Bernie has over 20 years of engineering, business and commercial banking experience. Much of his experience involves all aspects of the oil and gas industry. In addition, Bernie has extensive project management and finance skills. He has been involved in projects of all types and sizes throughout the gulf coast, mid continent and Rocky Mountain regions from both the perspective of operator and lender.

Bernie has functioned as General Manager of three different companies spanning the refined products, logistics, and ethanol industries. He has been responsible for a commercial load portfolio and problem load department for a large Houston

based bank and has managed the energy load department for the largest Kansas based bank.

Bernie is a native of Overland Park, Kansas. He has a Bachelor of Science Degree in Petroleum Engineering from the University of Kansas combined with three years of graduate studies in banking and finance at Southern Methodist University. He has also attended numerous industry specific, management, and safety related courses. Bernie has sat on the board of several businesses, non-profit organizations, and a county economic development corporation.

Joe Ruocco, Ph.D. – Principal / Phoenix Bio-Systems, Inc.

Joe Ruocco is the principal of Phoenix BioSystems, Inc., a company with principle offices located in the ICM office complex at Colwich, KS. Phoenix and ICM jointly developed and continue to market the Phoenix/ICM Bio-Methanator, which is technology for treating organic laden wastewater. Joe also consults with ICM and manages various ethanol related projects and development activities.

Joe Ruocco has more than 30 years of professional experience, 20 of which are in the ethanol and alcohol production industry. After leaving his hometown of Staten Island, New York, Joe received his B.S. in Chemistry from Emporia State University, his M.S. from Seton Hall University, S. Orange, New Jersey, and his Ph.D. in microbiology from the University of New Mexico, Albuquerque.

Joe has extensive fermentative experience beginning with the Adolph Coors Company and continuing to ethanol production from potato and other feedstocks.

Joe is a member of the American Chemical Society, the American Water Works Association and the Water Environment Federation.

John Caffrey-Engineering Manager/Dryer Group

John has nine years of professional experience in areas of manufacturing, construction, maintenance, and mechanical design. At ICM, John continues to develop the Dryer Group by creating new business relationships with new and

existing customers in the ethanol DDG drying industry as well as other markets. His primary focus at ICM is handling new dryer business, including contracts, installation and construction management, design oversight, dryer start-up and training services, and follow-up service and operational support. Since John has joined the company, he has been an integral part of the design, construction, installation or start-up of 34 DDG dryer systems installed in the U.S. and Canada.

A native of Newton, Kansas, he has a B.S. in Agricultural Technology Management from Kansas State University. After graduating from K-State, John joined the Bradbury Companies, a manufacturer of steel processing equipment as Facilities Maintenance Manager. His major contributions with Bradbury were the electrical and mechanical layout to increase manufacturing efficiencies during a $1.4 million facility expansion and implementing a total preventative maintenance system for company-wide production equipment.

John is a Licensed Professional Journeyman Electrician and has been involved with numerous manufacturing and management related courses ranging from Aubrey Daniels Performance Management, HAZ MAT training, OSHA, KDHE, and Employment law. He and his family live in Hesston, Kansas.

10. Value to North Dakota

10. Value to North Dakota

Red Trail Energy L.L.C. is a cutting edge ethanol facility that will use North Dakota lignite as its energy source. We will use lignite to fire our boiler, to heat our air, to make our steam, to dry our co-product, and to generate our electricity. We will develop partnerships with North Dakota's lignite industry, transportation industries, and the agricultural industry.

Red Trail Energy, L.L.C. will demonstrate the use of fluid-bed combustion, highlighting the technology with North Dakota lignite. This process is cost effective and has little environmental impact.

What parts of the public and private sector will likely make use of the project's results? What is the potential for commercial use of the project's results?

With the rising cost and unpredictability of natural gas, both the public and the private sector will be seeking ways to reduce the cost of operations for heating and production. For North Dakota's public sector, this technology could be applied to the university system and government complexes throughout the state. Right now, North Dakota schools have an opportunity to convert to similar biomass heating systems under the Forest Service's "Fuels for Schools" grant program. A brochure on this program is included in Appendix B.

Manufacturers will have a living model in fluid-bed technology at Red Trail Energy, L.L.C. Conversion to lignite as an energy source for manufacturing throughout the state would have far reaching effects on stabilizing production costs, job retention and job creation in the manufacturing world and in the lignite

field. In addition, as stated in Section 5, North Dakota has an incredible opportunity to build identical ethanol plants and extend lignite uses to existing ethanol plants in neighboring states.

How will this project enhance the use of North Dakota lignite & lignite products?

Fluid-bed combustion puts North Dakota lignite into the energy game as a fuel of choice for energy consumers. No longer do the insurmountable problems of air emissions apply. The high cost of installation or conversion can be recovered in only a number of years in comparison to long-term use of more expensive fuels like natural gas.

How will this project preserve existing jobs or create new ones?

Companies can reduce cost of production using North Dakota lignite with fluid-bed technology. Companies will see the advantage to locating in North Dakota near the lignite fields. This will create jobs and secure existing jobs. As stated above, reducing production costs also secures existing jobs and makes room for expansion in manufacturing.

It is important to note here, as in Section 5, that the feed by-product of Red Trail Energy, L.L.C. will also decrease production costs for the beef and cattle producers by providing a stable, nutritional feed source. Availability of a low-cost feed supplement should spur the livestock industry and increase livestock numbers. This has a ripple effect to agri-businesses such as livestock hauling, veterinarian services and supplies, local feed and supply stores, livestock yards, and feedlots.

In addition to the direct truck and rail hauling, the ethanol industry also has suppliers that will benefit including yeast, enzyme, and chemical suppliers.

Does it satisfy the priorities of North Dakota Century Code 54-17.5-03?

This section of the Century Code states priority is given to proposals that (1) preserve existing jobs and production, (2) create the greatest number of new jobs, (3) create the most additional lignite production, (4) has economic growth potential for lignite producing counties or counties with recoverable coal reserves, (5) attracts matching private industry investment of at least 50 percent, and (6) results in development of demonstration of a marketable lignite application.

Red Trail Energy, L.L.C. preserves jobs through lignite and corn consumption. It creates new partnerships in agriculture, reclamation and lignite hauling industries. It creates 36 long-term jobs and has an estimated annual payroll of $1.4 million. It creates 200 – 400 short-term jobs in plant construction. The plant consumes 400 tons of North Dakota lignite per day and sets the stage for addition North Dakota ethanol plants to consume lignite. It will serve as an demonstration model for the conversion to lignite in existing industries or new industries using North Dakota lignite.

The economic potential is good to great for lignite producing and lignite reserve counties using fluid-bed technology. Although tax information for this project is not available, the recently announced 17-million-gallon Williston ethanol plant is estimated to have state tax revenues of $4.5 million and $1.5 million in

local tax revenues according to Lee Peterson, director of the North Dakota Department of Commerce.

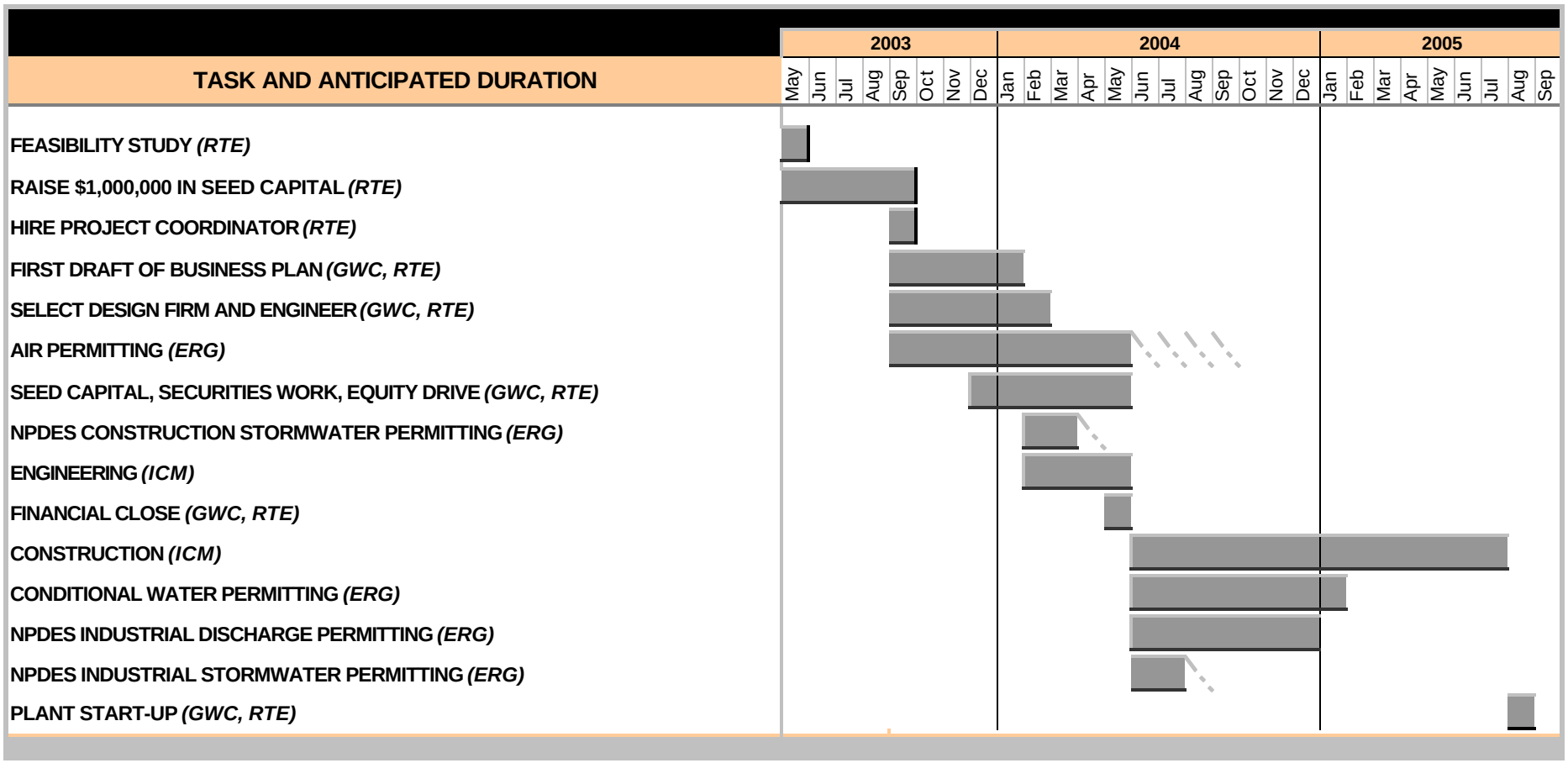
Red Trail Energy, L.L.C. completed its initial capitalization drive with $1.2 million of subscriptions.

11. Management

PROJECT MANAGEMENT SCHEDULE

RED TRAIL ENERGY, LLC

GREENWAY CONSULTING, LLC



ERG	ENVIRONMENTAL RESOURCE GROUP, LLC
ICM	ICM, INC.
GWC	GREENWAY CONSULTING, LLC
RTE	RED TRAIL ENERGY, LLC
	TASK COMPLETED

12. Timetable

PROJECT TIMELINE

RED TRAIL ENERGY, LLC

GREENWAY CONSULTING, LLC

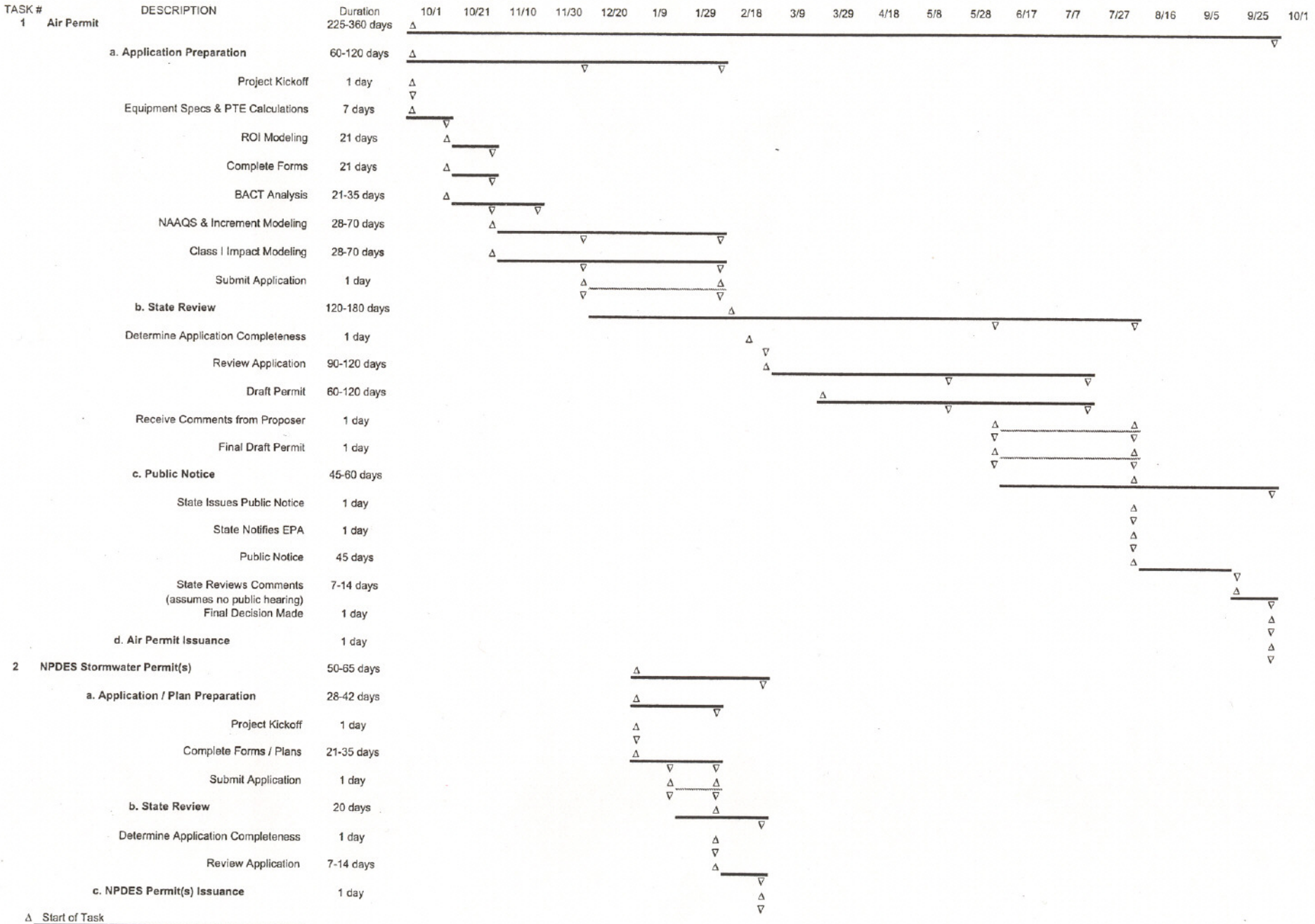
TASK AND ANTICIPATED DURATION	2003				2004												2005							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
AIR PERMITTING *(ERG)*																								
SEED CAPITAL, SECURITIES WORK, EQUITY DRIVE *(GWC, RTE)*																								
NPDES CONSTRUCTION STORMWATER PERMITTING *(ERG)*																								
ENGINEERING *(ICM)*																								
CONSTRUCTION *(ICM)*																								
CONDITIONAL WATER PERMITTING *(ERG)*																								
NPDES INDUSTRIAL DISCHARGE PERMITTING *(ERG)*																								
NPDES INDUSTRIAL STORMWATER PERMITTING *(ERG)*																								
PLANT START-UP *(GWC, RTE)*																								

ERG	ENVIRONMENTAL RESOURCE GROUP, LLC
ICM	ICM, INC.
GWC	GREENWAY CONSULTING, LLC
RTE	RED TRAIL ENERGY, LLC

LEGEND

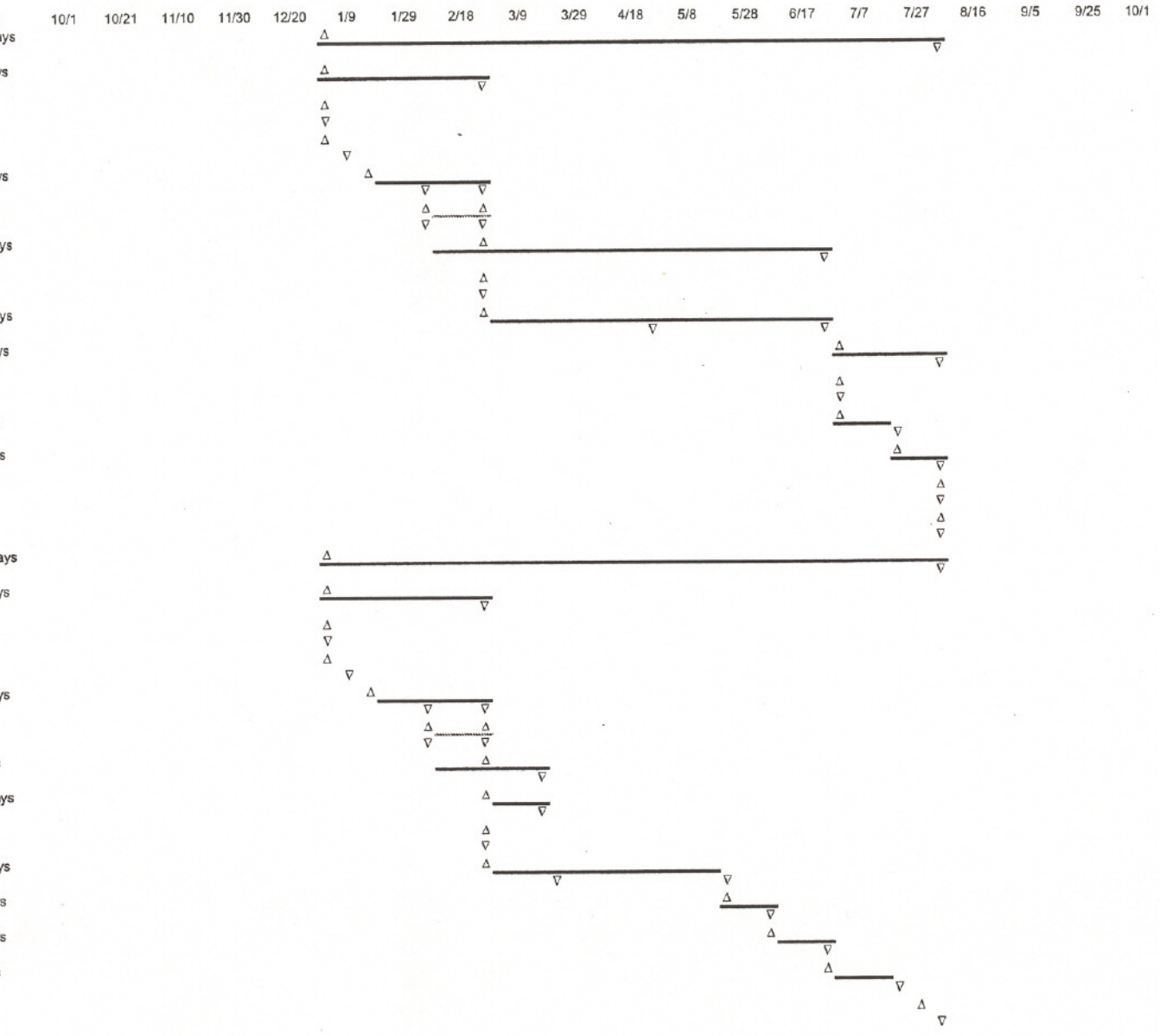
- PERMITTING TASK
- EQUITY TASK
- CONSTRUCTION TASK
- OPERATIONS

RICHARDTON, NORTH DAKOTA ETHANOL PROJECT ESTIMATED TIMELINE



RICHARDTON, NORTH DAKOTA ETHANOL PROJECT ESTIMATED TIMELINE

TASK #	DESCRIPTION	Duration
3	**NPDES Industrial Discharge Permit**	210-225 days
	a. Application Preparation	28-42 days
	Project Kickoff	1 day
	Equipment Specs & Water Balance	7 days
	Complete Forms / Plans	21-35 days
	Submit Application	1 day
	b. State Review	60-120 days
	Determine Application Completeness	1 day
	Review Application	60-120 days
	c. Public Notice	30-45 days
	State Issues Public Notice	1 day
	Public Notice	30 days
	State Reviews Comments	7-14 days
	Final Decision Made	1 day
	d. NPDES Permit Issuance	1 day
4	**Conditional Water Permit**	120-245 days
	a. Notification Preparation	21-35 days
	Project Kickoff	1 day
	Equipment Specs & Water Balance	7 days
	Complete Forms	21-28 days
	Submit Application	1 day
	b. Publication	30 days
	c. State Review	30-150 days
	Determine Application Completeness	1 day
	Review Application / comments	30-90 days
	Write Permit / Recommendation	7-14 days
	Notify Commenters	1-14 days
	d. Comment Response	30 days
	e. NPDES Permit(s) Issuance	1 day



Δ Start of Task

∇ Completion of Task

13. Budget

13. Budget Narrative

This request is asking the North Dakota Lignite Council to pay for the costs of the lignite steam and handling equipment for the Red Trail Energy L.L.C. ethanol plant.

Lignite-Fired Fluid Bed Boiler	$12,000,000
Steam Turbine	$2,000,000
Steam Driven Dryers	$5,200,000
Pollution Control System	$5,000,000
Coal Handling Equipment	$2,000,000
Ash Handling Equipment	$1,000,000
Lime Handling Equipment	$1,000,000
Total NDLC Request	$28,200,000

Funding to cover the cost of the lignite handling equipment is necessary to bring the construction costs in-line with normal ethanol plant construction costs. This levels the playing field for the equity drive and the investors.

The project may go forward with a lesser amount of funding from the North Dakota Lignite Council. However, having to capitalize the additional expense of the lignite handling equipment in the plant would delay the project significantly and perhaps to the point where it would not be possible to meet the deadlines involved in the equity drive.

It is important to note here that the Richardton Development Company Feasibility Study confirmed that a 30-million-gallon natural gas-fired facility *would not be feasible* and stated only that a 60-million-gallon natural gas-fired facility

"may be attractive to investors". Without North Dakota lignite, the project doesn't move forward.

Description of Items Requested

The **lignite-fired fluid bed boiler** is a key piece of equipment for the proposed project. The boiler is where the lignite is consumed. It produces the steam which is necessary to drive the **steam turbine**. The turbine produces the electricity to provide electrical power for the plant. Any excess electricity will be sold back into the local grid. In addition, the ethanol producing process requires a significant amount of heat in the form of steam, which will be produced by the boiler.

One of the co-products produced by an ethanol plant is a relatively high value animal feed used primarily as a beef and dairy cattle feed. In order to ship the product efficiently, it has to be dried to approximately a 10% moisture content. The **steam driven dryers** will accomplish the task of drying the feed to produce the DDGS that can be sold as cattle feed. This co-product usually represents about 20% of the revenue stream for an ethanol plant. A "normal" ethanol plant uses direct fired natural gas dryers to accomplish this drying.

The **pollution control system** is a very important part of the project. In order to operate the ethanol plant, the production of certain air pollutants must be maintained below the prescribed limits. Without the pollution control system, the project would not be granted the necessary permits to proceed. Once operating, without the pollution control system, the plant would not be allowed to continue operations.

A “normal” ethanol plant utilizes natural gas to produce steam and to dry the DDGS. The natural gas is delivered to the plant via pipeline. Red Trail proposes to substitute lignite as the energy source. The **coal handling equipment** is a necessary component of the plant so that the lignite can be delivered and handled on site, moved efficiently, and delivered in the correct quantities to the fluid bed boiler.

By contrast to clean burning natural gas, the lignite that will be consumed by the plant will create a waste stream of ash. The **ash handling equipment** is necessary to efficiently deal with the ash created by the consumption of the lignite.

The use of lime is required to neutralize one specific pollutant, sulfur dioxide (SO_2) produced by the consumption of the lignite. The **lime handling system** is used to introduce lime, which neutralizes the sulfur dioxide. The neutralized SO_2 is then typically collected in a bag type filter.

13. Budget 10/2003 - 7/2005

Red Trail Energy, L.L.C.		Funding Sources			
	Sub Total	Lignite Council	APUC	Red Trail & Equity Drive	Total
Capital Costs	**$78,200,000**				
Design & Construction				$44,000,000	$44,000,000
Land Acquisition				$500,000	$500,000
Rail Construction				$1,500,000	$1,500,000
Utilities				$1,000,000	$1,000,000
Lignite & Ash Handling Equipment		$28,200,000			$28,200,000
Construction Contingency				$3,000,000	$3,000,000
Indirect Costs	**$958,700**				
Capitalized Interests				$600,000	$600,000
Financing Costs				$250,000	$250,000
Organizational Costs				$50,000	$50,000
Business Plan			$15,000	$15,000	$30,000
Feasibility Study				$28,700	$28,700
Direct Costs	**$6,097,000**				
Permitting				$150,000	$150,000
Preproduction & Inventory				$2,200,000	$2,200,000
Underwriting Costs				$3,250,000	$3,250,000
Consultant Fees			$37,500	$162,500	$200,000
Construction Mgr Salary				$80,000	$80,000
Business Mgr Salary			$35,000	$57,000	$92,000
Accountant			$12,500	$12,500	$25,000
Legal			$50,000	$50,000	$100,000
Total Project Costs		**$28,200,000**	**$150,000**	**$56,905,700**	**$85,255,700**

14. Matching Funds

14. Matching Funds **57,055,700**

Red Trail Energy, L.L.C. as of October 1, 2003

Committed Funds		
Richardton Development	$40,000	Direct & Indirect Costs
Southwest Rural Economic Area Partnership	$40,000	Direct & Indirect Costs
Red Trail Energy Membership	$1,120,000	Capital, Indirect and Direct Costs
Prospective Funding		
APUC	$150,000	Direct and Indirect Costs
Equity Drive	$13,077,850	Capital, Indirect and Direct Costs
Loans	$42,627,850	Capital, Indirect and Direct Costs
Total	**$57,055,700**	

15. Tax Liability

STATE OF NORTH DAKOTA)
ss
COUNTY OF STARK)

AFFIDAVIT OF AMBROSE HOFF

Ambrose Hoff, being first duly sworn, deposes and states as follows:

1. I am the President of Red Trail Energy, LLC, and have the authority to execute this Affidavit.

2. Red Trail Energy, LLC, does not have any outstanding tax obligations to the State of North Dakota or to any political subdivision of the State of North Dakota.

Dated this 24 day of September, 2003.

Ambrose Hoff

STATE OF NORTH DAKOTA)
ss
COUNTY OF STARK)

On this 24 day of Sept., 2003, before me personally appeared Ambrose Hoff, known to me to be the President of Red Trail Energy, LLC, and known to me to be the same person described in and who executed the within and foregoing instrument and acknowledged to me that Red Trail Energy, LLC, executed the same.

SUSAN J. HOFF NOTARY PUBLIC (SEAL) STATE OF NORTH DAKOTA

Susan J Hoff
_____, Notary Public
State of North Dakota
My commission expires:

SUSAN J. HOFF
Notary Public
State of North Dakota
My Commission Expires Mar. 8, 2007

Appendices

SOUTHWEST FEEDERS PROJECT: FINAL REPORT

Mission:

The mission of Southwest Feeders is to promote value-added economic development in southwestern ND through education and research programs involving production systems that utilize locally-produced feedstuffs, calves and lambs.

Accomplishments:

- The Southwest Feeders Project was successfully launched after receiving funding from 12 different grant sources.
- A coordinator for the project was hired in June 2002.
- Upon completing construction of the research calf backgrounding and lamb finishing pens, the 2002 Calf Backgrounding Test began. Cooperating producers custom fed calves in this demonstration project from November, 2002 to January, 2003.
- Developing the project for the lambs currently being born to be finished in the feeding facility in late spring. Also plan to work with a local co-op in evaluating various feeding scenarios for market supply timing.
- Education programming has begun with on-farm producer consultations, area extension meetings, regional presentations and development of an Annual Feeder's School.
- A number of local, state and multi-state media releases (newspaper, radio, T.V.) have been created discussing the goal of Southwest Feeders and benefits to area producers and businesses.

Statement of Expenditures Relating to SW REAP

Description	Amount
Waterline and Livestock Waterers	$ 9,344.32
Electrical Intstallation	$ 4,521.52
Pen Construction	$ 4,390.00
Gravel and Fill	$ 2,638.44
Continuous Fence	$ 2,150.00
Supplement and Feed Analysis	$ 319.25
Travel	$ 1,276.82
Trucking	$ 398.15
Total	$ 25,038.50

Final Report Submitted to SW REAP on February 24, 2003.

Tim Faller, HREC Director **Leif Anderson, SW Feeders Coord.**

Statement of Funding Sources

Source: Southwestern REAP
Address: c/o Roosevelt-Custer Regional Council, Pulver Hall, Dickinson, ND 58601
Amount: $25,000

Source: USDA, Agricultural Research Service
Address: PO Box 459, Mandan ND 58554-0459
Amount: $62,400

Source: North Dakota Barley Council
Address: 505 40th Street SW, Fargo, ND 58103
Amount: $10,000

Source: Agricultural Products Utilization Commission
Address: P.O. Box 2057, Bismarck, ND 58502-2057
Amount: $35,000

Source: North Dakota State University Extension Service
Address: Morrill Hall 315, Box 5437, Fargo, ND 58105-5437
Amount: $30,000

Source: Beef Line Initiative (SBARE)
Address: North Dakota State University, Morrill Hall 314, Fargo, North Dakota 58105-5
Amount: $25,000

Source: Bowman County Economic Development Corporation
Address: 13 ½ East Divide, Bowman, ND 58623
Amount: $1250

Source: Adams County Economic Development Corporation
Address: 120 South Main Street, Hettinger, ND 58639
Amount: $1250

Source: North Dakota Corn Utilization Council
Address: 1325-23rd Street South, Fargo, ND 58103
Amount: $2,000

Source: Dacotah Bank
Address: 121 North Main Street, Hettinger, ND 58639
Amount: $2,500

Source: Dakota Western Bank
Address: 603 Adams Avenue, Hettinger, ND 58639
Amount: $2,500

Source: Dakota Western Bank
Address: 202 South Main, Bowman, ND 58623
Amount: $2,500

Total Received: $199,400

SOUTHWEST FEEDERS PROJECT: 2002 FINAL REPORT

L.P. Anderson[1], D.J. Nudell[1], W.W. Poland[2], T.C. Faller[1], and D. Stecher[1]
[1]*Hettinger Research Extension Center, Hettinger, ND*
[2]*Dickinson Research Extension Center, Dickinson, ND*

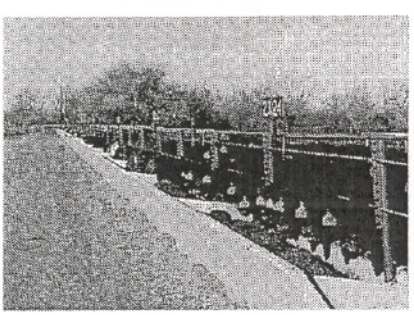
INTRODUCTION

Southwest Feeders…..a whole farm approach. Southwest Feeders is a multi-faceted project designed to enhance value-added economic development in southwestern North Dakota through education and research programs involving production systems that utilize locally-produced feedstuffs, calves and lambs. A new calf background feeding facility (24 pens, 192 head capacity) has been constructed at the Hettinger R/E Center to directly support the educational and research components of this project. This facility will also be used in the summer to augment current lamb finishing research at the center. Lamb finishing work will begin in the research lot during the spring of 2003.

In addition to cattle backgrounding and lamb finishing at the Hettinger R/E Center, producers will have additional educational opportunities and resources available. Throughout the year, Southwest Feeders will host a Feeder's Field Day for producers and offer additional county meetings and one-on-one farm/ranch visits.

There is in excess of $20,000,000 in economic activity available to the agricultural community of southwestern North Dakota associated with beef backgrounding. Statewide the potential level of economic activity exceeds $55,000,000. Lamb finishing would increase the statewide level by $2,100,000. Southwest Feeders is designed to actively engage the agricultural community of southwestern North Dakota in value-added livestock production through a coordinated and targeted research and education program in calf backgrounding and lamb finishing.

2002 CALF BACKGROUNDING TEST



The 2002 Calf Backgrounding Test was structured as a research and education demonstration project allowing producers to evaluate cattle performance in a controlled backgrounding environment. Represented in the test were 192 calves (8 head pen x 24 pens) from 12 different producers from six different counties throughout southwest North Dakota.

PROCEDURE

The test began on November 8th with weighing all animals on-test. This weight was used as the baseline for all performance and economic analysis of the 56 day test. One weigh period at 28 days was used to aid in tracking economic and animal performance while providing report information back to cooperating producers. The test period ended January 3, 2003.

All pens of cattle were independently valued by two qualified individuals based on the following assumptions:

- Weight on-test and the market as of 11/8/02
- Previous management prior to receiving in the yard (weaning, vaccinations, etc.)
- Cattle were representative of larger saleable group
- Independently and anonymously valued
- Weight off-test and the market as of 1/3/03

The backgrounding ration consisted of a barley-pea haylage and whole corn base with a locally produced mineral/protein supplement. Pen feed adjustments were based on individual bunk calls prior to cattle being fed once daily (9:00 am). Upon receiving into the backgrounding lot, cattle were provided a seven to 10 day feed acclimation period before starting the backgrounding test. Custom feeding fees were charged back to the cooperating producers according to a signed custom feeding agreement.

Table 1. Southwest Feeders 2002 Backgrounding Diet.

	Total Diet	Barley-Pea Haylage	Corn	Supplement
% of diet, DM basis	100.00	73.50	21.50	5.50
% DM	45.90	38.90	88.60	91.70
Protein, %	13.60	13.80	11.40	20.00
NEm, Mcal/lb	0.83	0.68	0.99	0.62
NEg, Mcal/lb	0.47	0.41	0.68	0.35
Ca, %	0.72	0.56	0.02	5.50
P, %	0.36	0.33	0.34	0.84
Cu, ppm	21.00	5.00	3.00	308.00
Zn, ppm	82.00	27.00	29.00	1007.00
Mn, ppm	75.00	33.00	11.00	880.00
Deccox[a]	125 mg			125 mg
Rumensin[b]	200 mg			200 mg

[a]Deccox fed from 11/1/02 to 12/2/02
[b]Rumensin fed from 12/3/02 to 1/9/03

Animals were individually weighed prior to the morning feeding for on-test, 28 day interim and off-test weights. A health protocol was established through a local veterinary clinic including a monthly pen walk through by the attending veterinarian.

Data collection and reporting to cooperating producers included:

- Individual calf weights: on-test weight, 28 day interim weight, off-test weight
- ADG for each weigh period and overall
- Pen feed consumption
- Pen feed conversions and cost of gain
- Pen breakeven projections and close-outs based on independent valuation of calves

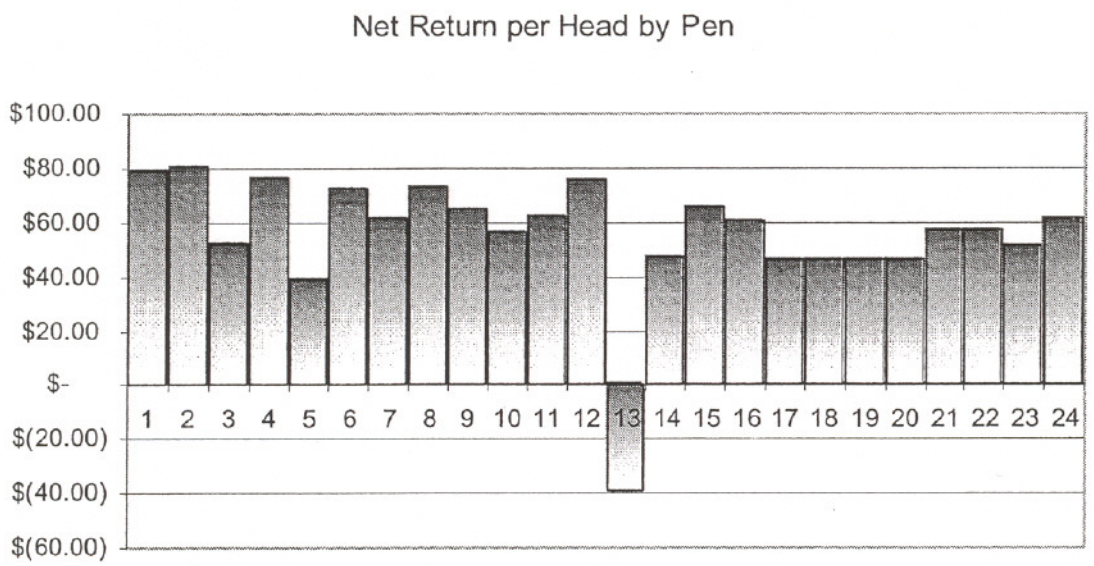
Cattle averaged 583 lbs at the start of the backgrounding test (192 hd). After a 56 day feeding period, average daily gain was 2.76 lbs/d for an off-test weight of 737 lbs. Average daily intake per head was 16.55 lbs (dry matter basis) for a feed conversion of 6.14 pounds per pound of gain (dry matter basis).

Table 2. Feeding performance of all pens combined.

	0-28 d	28-56 d	0-56 d
DMI, lbs	16.03	17.07	16.55
DMI, %BW	2.56	2.42	2.50
F:G, (feed:gain)	5.08	7.66	6.14
Feed cost of gain, $/lb	0.23	0.34	0.28
ADG, lb/d	3.16	2.37	2.76

Overall feed cost per pound of gain was $0.28. Total cost of gain including yardage, processing, death loss and interest was $0.42. Yardage cost was $0.25 per head per day and processing expenses averaged $4.50 per head. Death loss for the whole yard was 0.5% (Pen 13). The average value of all cattle on-test was $83.50/cwt and an off-test value of $82.98/cwt. Calculated net return per head for the overall trial was $54.30 (Table 3).

Figure 1. Net return per head by pen for 56 day backgrounding test.



*Pen 13 negative return due to death loss of 1 head in a pen of 8 head

In addition to the $54.30 per head net return to the overall livestock enterprise, net return per acre of crop ground is important in the analysis of the locally produced barley-pea haylage. Forage production of the barley-pea haylage occurred in 2000 and was stored in haylage bags. Based on a production of 5.9 ton/acre (38.9% DM) and a feed value of $26/ton (as-fed), the barley-pea haylage had a gross return of $153/acre. With production and harvesting costs of $120/acre (based on custom charges), net return per acre for the barley-pea haylage was $33/acre.

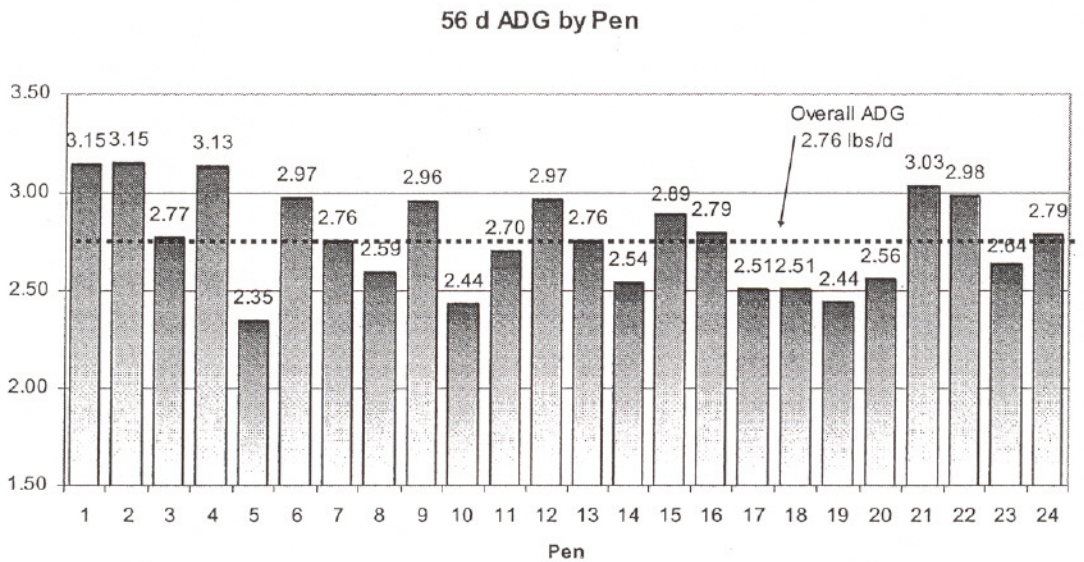
IMPLICATIONS

Results of the 2002 Calf Backgrounding Test provided favorable information to cooperating producers and a successful first year for Southwest Feeders. Opportunities exist for producers interested in backgrounding calves in southwest North Dakota as shown by the overall positive net returns to all producers involved in the test despite death loss in one pen. However, the weather through the feeding test provided above normal temperatures and the cattle market provided for higher than generally anticipated returns. In addition to returns to the livestock operation, added value to forage crops through livestock feeding adds to the income potential in diversified operations. The coming year will provide the opportunity to expose these findings to many more producers in preparation for the 2003 Calf Backgrounding Test.

Table 3. Feeding close-out on all pens for 56 day test.

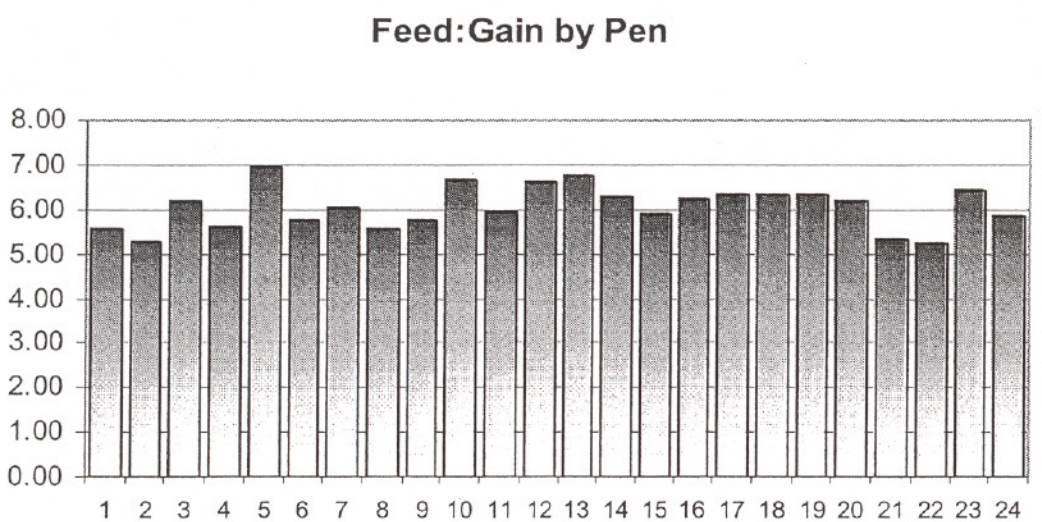
Southwest Feeders Close-Out ALL PENS			
1.) Weighted Average Purchase Price of Cattle ($/CWT):	$ 83.50		Value/Head
2.) Weighted Average Purchase Weight of Cattle (LBS):	583		**$486.81**
3.) Number of Head:	192		
5.) Number of Days on Feed:		56	
6.) Average Daily Gain (LBS/Head):		2.76	
7.) Interest Rate on Borrowed Money (%):		8.00	
9.) Veterinary and Medical Expense ($/Head):		$ 4.50	
15.) Custom Charges ($/Head/Day):		$ 0.25	
16.) Feed Cost per Pound of Gain:		$ 0.28	
17.) Death Loss (%):		0.50	
23.) Selling Price ($/CWT):		$ 82.98	
RESULTS			
Computed sale weight		**737.6**	
Interest charge or opportunity cost per head		**$6.09**	
Total cost of gain/head (excl. purchase cost)		**$70.93**	
Total Cost/Head (Including Purchase Cost)		**$557.73**	
Total cost per head per day of wintering		**$1.27**	
Cost per pound of gain (including interest)		**$0.46**	
Breakeven selling price at given purchase price		**$75.62**	
Breakeven purchase price at given selling price		**$92.81**	
Revenue Per Head		**$612.03**	
Net return per head using Expected Selling Price		**$54.30**	
Total net return		**$10,424.98**	

Figure 2. Average daily gain by pen for total 56 day backgrounding test.



*Max Pen ADG = 3.15 lb/d, Min Pen ADG = 2.35 lb/d, Avg Pen ADG = 2.76 lb/d

Figure 3. Dry matter feed required per pound of gain by pen for total 56 day backgrounding test.



*Highest Pen F:G = 6.97, Lowest Pen F:G = 5.22, Avg Pen F:G = 6.14

GETTING STARTED:

This is where State Foresters and the USDA Forest Service's State & Private Forestry Offices come in.

As part of the Comprehensive Strategy for Reducing Wildland Fire Risks, State and Regional Foresters have dedicated grant funds to begin this effort.

Phase 1 of the program is in progress: our first pilot project in Darby, Montana. Their biomass system will be up and running for the 2003/04 school year.

Phase 2 is beginning this year: feasibility assessments of potential sites in Idaho, Montana, North Dakota, Nevada and Utah. Based on the results of these assessments, we will fund and begin to implement projects in these five states.

Phase 3 will also begin this year. We will design a revolving loan fund to help us bring additional schools on line, while reducing federal and state investments in each project. By 2006, revolving loans will substantially lessen the need for federal dollars.

A State & Private Forestry Partnership

For more information contact:

Dave Atkins, FFS Program Manager
USDA Forest Service, Regions 1 & 4
(406) 329-3134

OR

William Boettcher, State & Private Forestry Director, USDA Forest Service, Regions 1 & 4
(406) 329-3280

OR

Your State Forester

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♦
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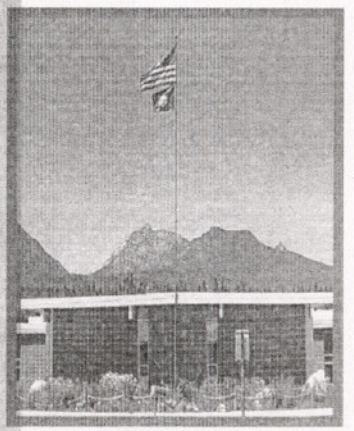
FUELS FOR SCHOOLS



Working together for healthy forests and communities

INTRODUCING... FUELS FOR SCHOOLS

A partnership between State Foresters and Regional Foresters in Regions One and Four, to use small diameter trees removed in fire hazard reduction projects to heat local public schools.

State Foresters and Regional Foresters are excited to present the Fuels for Schools Program!

How it Works:

Step 1: Thin dense, unhealthy forests to reduce fire danger near communities in the wildland urban interface.

Step 2: Grind up small diameter wood and debris removed in Step 1.

Step 3: Haul chips to local schools.

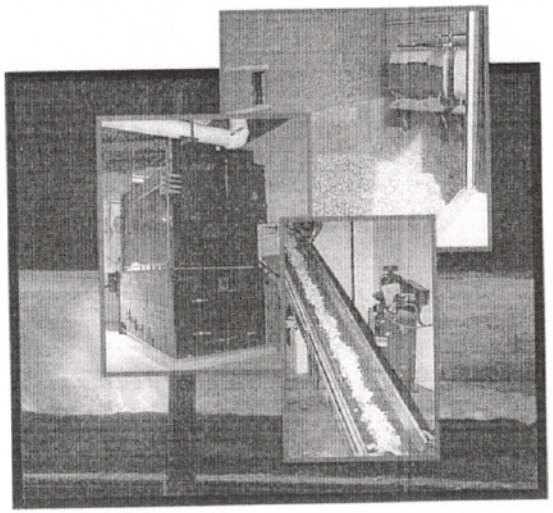
Step 4: Use chips to fuel efficient, clean biomass heating systems!

CLEAN TECHNOLOGY!

This is NOT your old wood stove!

Today's biomass heating systems feature:

- Combustion at temperatures above 1100 degrees Fahrenheit
- A controlled mixture of air and wood
- Water vapor as the only visible exhaust



In comparison to open burning, they produce:

- Less than 3% of the particulates
- Only 5% of the carbon monoxide
- About 3% of the methane
- Less than 40% of the nitrous oxides

WHY FUELS FOR SCHOOLS MAKES SENSE:

- Fire danger and damage are escalating.
- Fire suppression costs are astronomical and risks to firefighters are unacceptable.
- Reducing fuels is typically very costly.
- It also contributes to air quality and health problems via slash burning.
- Public education is important to our states, but funding is tight.
- Wood heat is less expensive than the alternatives available to many rural communities (propane or oil).
- Shifting schools to a local, non-fossil fuel source moves our country toward energy independence.

In short, the multiple benefits of Fuels For Schools include:

- Improved Forest Health
- Lower Fire Danger
- At lower cost to landowners
- With cleaner air
- And lower school heating costs!

Our first pilot project, Darby, Montana's schools, will start heating with biomass this fall! (2003)

Special thanks to our partner in this effort, Bitter Root RC&D!

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July 2003

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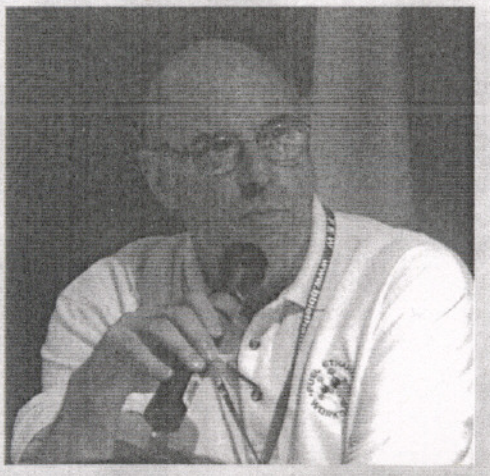

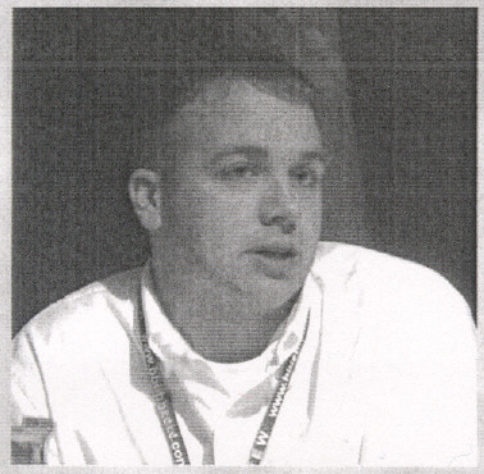

From top to bottom: Ingledew, Heuer, Dunker, Hanson

A Dozen Years Out

How will the ethanol industry change by the year 2015?

On June 19, the 2003 FEW Forum of Futuristic Thinkers panel offered insightful, pragmatic projections for the industry.

By Tom Bryan
EPM Managing Editor

In the year 2015, the U.S. ethanol industry will produce five to eight billion gallons of ethanol per year, rely heavily on genetically modified corn, regularly build and expand plants to well over 100 million gallons per year, embrace the biorefinery concept, and use improved enzyme technology to process cellulosic feedstocks.

These forecasts and others were made during the Forum of Futuristic Thinkers, June 19, at the 2003 International Fuel Ethanol Workshop & Trade Show (FEW) in Sioux Falls, S.D., where a panel of eight industry experts were assembled to hammer out concepts for the future of ethanol production on the final day of the ethanol industry's largest conference.

With BBI International's Mark Yancey, director of consulting services, and Joe Bryan, director of communications, moderating, a select panel of experts explored various topics addressed in the day's earlier session - "The Family Fuel" - a mock game show that pitted ethanol producers against ethanol plant builders and technology providers.

The Forum of Futuristic Thinkers panel was comprised of Ryan Heuer, technical services, Novozymes, North America; Dr. W.M. (Mike) Ingledew, alcohol fermentation specialist, University of Saskatchewan; Ron Lamberty, market development director (and interim executive director), American Coalition for Ethanol (ACE); Mark Luitjens, marketing alliance manager, Aventine Renewable Energy (former-

ly Williams Bioenergy); Mike Knauf, industry manager for fuel ethanol enzymes, Genencor International; Richard Hanson, plant manager, Badger State Ethanol; Klaus-Holger Dunker, ethanol plant project coordinator, Nordzucker AG(Germany); and Brian Duff, biochemical process engineer/project manager, BBI Consulting.

GMO Corn and Cellulosics

When asked about cellulose-to-ethanol conversion, most panelists were optimistic but hesitant to believe corn - specifically genetically modified corn - would not be the feedstock of choice in 12 years.

"[Yellow #2 and GMO corn] I think will continue to dominate the ethanol market for a long time - along with sugarcane overseas," said Knauf. "However, by 2015 we'll start to see the enzymatic process take over."

Luitjens and others agreed that utilization of GMO corn as an ethanol feedstock will only increase, saying, "What's the current percentage of [GMO corn feedstock] being used in the ethanol industry? Around 40 percent. . . I can't imagine that American farmers will back off of the current trend in using GMO corn - unless something [negative is discovered about GMO corn]."

Ingledew and Lamberty both suggested that powerful new enzymes needed to process cellulosic material into ethanol are already being developed. However, they said, more research and development is needed in other areas of the cellulose-to-ethanol process before the technology is commercialized.

"My real hope is that it will take place and cellulosics will be the fuel of the future," Ingledew said. "But we must avoid science that is not accessible by the public. Furthermore, I believe the process itself is not getting enough attention. . . Enzyme development is [the focus of most cellulose-to ethanol R&D] and is the most advanced side of this [process science] - but, in my opinion, other aspects are lacking."

Lamberty agreed, "It seems like the enzyme part is all but done, but [commercialization] is still hard to justify. To make [cellulose-to-ethanol production] more technically viable on a large scale, some form of continued government support will probably be needed - and it should be focused toward specific projects."

Luitjens reminded the audience that, even if the science of turning cellulose into ethanol is advanced, significant barriers to commercialization will still exist. "Collection and storage [of cellulosics like corn stover and waste wood] is a huge barrier to all this," he said.

Optimistically, Knauf and Heuer both expressed confidence in the enzymes being developed for the commercialization of large-scale cellulose-to-ethanol production.

"The cost of enzymes is directly related to the process they are used in," Knauf suggested. "Corn-to-ethanol production process technology was designed around enzymes, but I think enzymes will be designed around the existing process in terms of cellulosics. That's a big difference."

Heuer added, "[Government and private industry] have just devoted $30 million in a high-profile effort to develop enzymes for cellulosic conversion. A lack of optimism in the

promise of the [enzymatic] conversion process [by a small minority of those polled at the event] is somewhat discouraging."

How Much Ethanol in 2015?

Most of the panelists believed that the U.S. ethanol industry's production capacity would exceed five billion gallons per year by 2015, and probably reach eight billion gallons. But U.S. producers will have to contend with an international market, most agreed.

"My prediction is eight billion gallons per year by 2015," Knauf said. "Brazil will be at eight billion gallons per year as well, as will Asia. . . That's 24 billion gallons per year worldwide but still just five percent of the global market."

BBI International's Brian Duff said the industry will far exceed five billion gallons, while pursuing the biorefinery concept and the integration of other renewable fuels technology with ethanol production.

"My best guess," Lamberty said, "is seven to eight billion [gallons per year]," adding. "The real answer [to the future of ethanol production] is probably unknown to us today. . . so it's hard to say what we will achieve."

Luitjens did not make a 2015 prediction, but said the U.S. industry will exceed five billion gallons per year by 2008. "We will eventually be building 100 and 200 [mmgy] plants on a regular basis," he said. "So we could easily grow at one billion gallons a year - or more - if we need to."

Heuer jested to his competitor, "If Genencor [Knauf] says eight, I would have to say at least 8.1 [billion gallons per year by 2015]."

Dunker, of Germany, said Europe will likely be producing 2.5 billion gallons per year by 2015.

Other forecasts made by the panelists included:

- Chemical intermediates will pose great promise by 2015.

- C5 carbon sugars (cooking and fermentation) technology will be developed, but not without also developing starch technology - rate of fermentation and alcohol concentration by 2015. "The best dry mills have simply increased alcohol concentrations," Ingledew said.

- Producers will develop more substrates by 2015.

- Coproduct production will begin to transition from animal feed products to human food products by 2015. Human food supplements [high-volume products] will have a better market than animal protein markets, Heuer proposed.

- Hydrogen fuel cells that use ethanol will be developed by 2015, "but market battles will need to be fought," Lamberty said.

- Distillers grains markets will continue to be strong in 2015. "Ten years ago we thought we would be up to our knees in DDGS," Luitjens said. "But the truth is, we are taking feed off the market by taking corn off the market."

- Steam heat power - and the sharing of power - will become growingly important by 2015, Richard Hanson suggested.

- As the industry evolves, economies of scale will take over; industry consolidation will be largely completed by 2015.

- More plants will be expanded by 2015.

- Sugar cane will be used as a feedstock for production in 2015, not only in South America and Asia, but Europe and America as well.

- Canada will become a major world player in the ethanol industry by 2015. EP