FINAL REPORT EXECUTIVE SUMMARY
PRIME Technologies, LLC
April 2001
South Dakota Governor's Office of Economic Development
VASF Grant #00-24-AG

DAKOTA AG ENERGY (DAE)

After evaluating its six-month long study effort, the PRIME Technologies consortium has unanimously concluded that the proposed commercial demonstration complex is both technically and economically feasible. PRIME Technologies is committed to proceeding with Phase III, and to contributing its share of the funding and expertise that will be required to secure the needed equity and debt funds for construction, startup, and operations. As the reports that follow shall show in greater detail, the studies confirm that the primary challenges can be satisfactorily addressed:

- Adequate and competitively priced raw materials (grain and cattle) exist in the surrounding area.
- The technology's capital and operating cost advantages provide "lowest quartile" competitive cost advantages, and hedging strategies are available to limit downside risks.
- The intermediate products (biogas and biofertilizers) will become increasingly valuable as conventional natural gas fuels and fertilizers become more costly.
- The finished products (ethanol and fat cattle) can be profitably marketed, and the prospects for significant growth in demand for both—particularly "value capture" for specialty beef products—are excellent.
- The complex can be built at a competitive price, using well qualified and "bankable" vendors.
- The complex can be fully permitted, and it can be operated in an environmentally safe and acceptable manner, including odor and water pollution control. (In the future, as environmental regulations and community opposition to conventional cattle feeding become more rigorous, the PRIME concept may be one of the only ways to secure permits for new cattle feedlots.)
- The project can be structured in a way that is compatible with both South Dakota's Amendment E, and Federal cooperative tax law, in a way that is also commercially realistic, and attractive to both equity and debt providers.
- The integrated technology complex has good potential for replication throughout South Dakota and other Northern Great Plains states, and it offers alternatives for rural communities that may not have the rail and natural gas services required by conventional ethanol facilities.
- PRIME complexes will generate hundreds of millions of dollars in new economic activity in rural America, create hundreds of quality jobs (direct and indirect) per complex, and provide substantial "value-add/value-capture" earnings to farmers and ranchers.

- PRIME complexes will represent the most environmentally benign, and economically efficient, means of producing ethanol and feeding cattle, and will generate millions of dollars annually in the future as credit trading regimes are established for reductions in greenhouse gas emissions linked to global warming.

Specific Issues for DAE Commentary

Consistent with the initial PRIME proposal to the GOED, in its report DAE provides specific comments below on the following issues:

1) Optimal business structure that complies with all relevant State and Federal laws and regulations.
2) Preferred relationship between the farmer-owned cooperative, and PRIME consortium, along with a preliminary startup and operations plan.
3) Refined economic analyses for the individual units and integrated complex as a whole.
4) Preliminary financial projections and identification of primary "financial engineering" options.
5) Federal regulatory and policy trends that could impact—either positively or negatively—the project's future, particularly trends impacting the markets for the finished products.

As previously reported, DAE has taken the lead in securing additional public funds to advance the PRIME Technologies project to final project closing. With Senate Democratic Leader Tom Daschle's leadership, the 106th Congress approved an $800,000 grant to support the final engineering and development of Phase IIIA of the project, which will occur between May and August, 2001. DAE has also taken the lead in researching the various legal and business structure alternatives available to PRIME in order to comply with all state and federal laws and regulations, as well as to maximize the project's chances of successful financial closure. Please see the Appendix for the complete DAE report.

KATZEN INTERNATIONAL

Katzen International is currently working on integrating the ethanol unit with the cattle facility. In addition, they have prepared the design of the project utility system (boiler/electrical). The results of a preliminary engineering evaluation of an integrated feed lot, dry mill, motor fuel grade ethanol production facility planned for Sully County, South Dakota are provided in the Appendix.

The facility will be designed to produce 15.75 million gallons per year of denatured motor fuel grade ethanol (MFGE) in compliance with ASTM D-4806-99. In addition the facility will produce approximately 110,200 tons per year of wet distiller's grain with solubles at thirty-four percent dry matter. To produce these products the facility will consume 5.3 million bushels per year of No.2 yellow dent corn at 15% moisture content and containing a minimum of 71% starch on a DM basis.

The cost of constructing the ethanol production facility is estimated at $19.6 million including a 15% contingency. The construction period is estimated at 18 months. The ethanol production facility will have annual sales of $23.1 million with 81.2 % derived from motor fuel grade ethanol sales and 18.8 % from WDGS sales. The annual cost of operations, excluding debt service and depreciation, is estimated to be $16.3 million with variable costs comprising 85.5 % or $13.98 million and fixed costs comprising 14.5 % or $2.38 million. The major variable costs per gallon of denatured MFGE include corn at $0.785, enzymes at $0.042, denaturant at $0.036, steam at $0.031 and power at $0.026. Other variable costs including chemicals and yeast are estimated at $0.012 per gallon of denatured MFGE. Feedstock cost is based upon a delivered corn price of $2.12 per bushel. The primary source of energy for steam generation will be biogas produced in the anaerobic digester with natural gas serving as an alternate energy supply. It is estimated that as much as 80% percent of the boiler fuel demand will be met with biogas with the balance supplied by natural gas at $5.0 per million Btu's. The facility will require a staff of fifteen operators, management and clerical personnel. The annual cost of labor is estimated at $698,000 per year including a 30% overhead loading. Based upon the installed cost, annual maintenance costs are estimated at $750,000. All other fixed costs including insurance, administrative, contract labor and services are estimated to be $929,000 per year.

AGRICULTURAL ENGINEERING ASSOCIATES (AEA)

General design analyses were completed after viewing and considering several possible site choices. The proposed site for the integrated feedlot and ethanol plant complex was selected as the NW/4 of section 29 and the NE/4 of section 30, both in Township 113 North, Range 79 West, Sully County, South Dakota. The proposed site lies adjacent to a major county road and is adjacent to the existing grain storage facility for JES Farms and is one half mile West of the headquarters of JES Farms. The Site is a gentle South facing slope and receives only limited drainage from the North of the serving county road. The resident soils on the proposed site are of the Agar-Onita Association and are characterized as deep well drained silty and loamy soils formed in loess, glacial drift, glacial till, or glacial outwash. There do not appear to be any wetlands within the bounds of the proposed construction footprint. The site is in the interior of JES Farms and is remote from any surrounding residences not belonging to JES Farms.

Topographic mapping was completed on this site in October of 2000 using computerized total station survey systems. The resulting topographic contour map serves as the basis for design layouts developed to date.

Preliminary soil borings and soil tests were also completed at the same time and are reported in the accompanying report. Borings were progressed to depths in the range of thirty to thirty-five feet at various locations throughout the site. The soils encountered are generally characterized as lean clay, lean clay with sand, and sandy lean clay. Water levels appear to be highly variable on the site with some holes filling with water to depths as shallow as 8.5 and 11.5 feet, but other holes showing water at depths or 30 feet or no water at all to depths of 35 feet.

The site contains approximately 320 acres and provides more than enough room to accommodate the proposed confinement feedlot with the associated anaerobic digester and ethanol plant with supporting facilities including an office, maintenance shop, high moisture grain storage, fiber stacking/composting pad, and filtrate storage ponds.

The feedlot provides space for a nominal design capacity of 25,000 head at 30 square feet per head and a bunk space allocation of approximately 7 inches per head. A typical pen is designed to accommodate 80 head, but can easily be split to accommodate two drafts of 40 head each. If stocking densities are adjusted for a maximum occupancy approximating 30,000 head, the square footage will be reduced to 25 square feet per head and bunk space will be reduced to 5.75 inches per head.

The feedlot building design utilizes a mono-slope roof such that sunshine extends to near the back of the pens during the peak of winter but the roof overhang precludes sunshine into the pens during the warm months. The roofline is insulated to limit solar heat gain during summer and heat loss during winter months. Structurally, the building is designed and assembled of pre-engineered metal building components meeting snow and wind load code requirements for this location. Insulation, vapor barrier, and corrosion protection options are selected specific to use in a confinement beef barn application with a high degree of environmental control specific to optimum animal performance.

Electronic monitoring and control systems are included in this facility to allow a high degree of environmental control specific to the optimum performance of feeding beef cattle as well as operational security and dependability of all components of the system.

Manure will be collected under the slatted sections that comprise over 60% of the floor area. There is a solid slab behind the bunkline and a similar solid floor at the back of the pens, both of which slope to and step down to the slatted section. Manure will be drained by gravity to the ends of the barns where it will enter a large diameter pipeline that will carry it down-slope to the collection and agitation pits from which it will be pumped to the anaerobic digester. Normal operation of the reception pits requires capacity for one days manure production. For redundancy and security of operation, the reception pits are sized at nominally three days capacity.

Drover's alleys will provide access to move cattle into and throughout the feedlot. Drover's alleys are located to the South of each feedlot building and connect to a central drover's alley running North to South through the center of the feedlot. Overhead supported trolley gates are located at each crossing of the feed lanes and the drover's alley. Cattle will access the pens through gates at each end of the bunk in each pen and cross the feed lane to or from the drover's alley.

Hospital pens are provided to accommodate up to 4% of the feedlot capacity. The roof design in the hospital areas is similar to the other feedlot buildings. The hospital areas will use a bedded pack manure handling system.

The Receiving, Processing, and Shipping area is located at the East center of the feedlot for ease of truck access. Pen geometry and space is provided for receiving, sorting, and processing cattle. There will be significant capacity for truckload sized receiving, holding, feed and water pens in conjunction with this area. Scales will be located in conjunction with the receiving and sorting areas. Specific attention will be paid to cattle movement safety and efficiency in the design and construction of all cattle facilities.

Site roads and utilities are laid out for simple and functional efficiency in operation and maintenance. The roads and parking areas are primarily of compacted gravel aggregate construction except for heavy use areas that will be concrete paved. Three-phase electricity runs by the site at the county road and will be extended into the site and can be distributed as needed using appropriate combinations of overhead, underground, and conduit runs.

Water quality is reasonably good and quantities are not significantly limited at the appropriate locations within the bounds of JES Farms. The best water quality and quantity appears to reside at a location two miles South and two and one half miles West from the feedlot site. It is proposed to refurbish an existing well at that location and drill a new second well in the same general location. From that location water will be brought to the site and distributed throughout the feedlot as well as to the ethanol plant, the digester, and the office. An elevated storage stand-pipe, ground level storage system with pressure distribution pumps, or other water supply and pressure control systems will be provided in conjunction with appropriate backup power supplies to assure maintenance of adequate water supply and pressure at all times. Potable water for human consumption will be provided from the existing rural water district.

Feed and grain handling, storage, and processing requirements are addressed in conjunction with the requirements of the ethanol plant. Dry grain storage for the ethanol plant is embodied within the footprint and design of the plant. The primary storage for feed components and the simple commodity bunker feedmill are also embodied within the footprint and design of the ethanol plant. A grain probing station and large capacity truck scales to handle the largest legal grain hauling vehicles are located at the site Office.

Maintenance shop facilities will be shared between the ethanol plant and the feedlot. The proposed maintenance shop is located between the ethanol plant and the feedlot. Space is provided to house large equipment such as front-end loaders and feed mixer trucks for routine maintenance and repair. Space is also provided for a well-equipped machine shop, parts, and supplies storage.

Recycling and land utilization of nutrients from the manure are characterized in the format of overall digester and solids / liquids generation and handling parameters. The land utilization requirements including nutrient consumption, the mechanics, infrastructural requirements of transport and land application have been evaluated and developed into a proposal specific to this site and available proximate farm land. The specifics of nutrient quantities and land utilization are detailed in the attached Nutrient Management Plan submitted by JES Farms.

Nutrient conservation and reduction or elimination of greenhouse gas escape from all manure collection, transport, treatment, storage, and land application operations is a priority in the design

and operation of this project. The manure is collected under slatted floors and isolated to the maximum extent possible from significant degradation and stripping of nutrients from airflow over the manure.

Odor control achieved by the design of the feedlot and all associated manure collection, transport, treatment, storage, and land application operations are considered to be one of the most exemplary aspects of this facilities contribution to agriculture and the local environment. Only the limited amount of manure required for routine transport to and charging of the digester is ever accumulated within the beef confinement barns. The manure collection and transport system is below slats and substantially isolated from the outdoor environment. Both the filtrate and the filterable solids will have achieved high enough degree of stabilization while in the digester that they will be very low odor emitters even when left open to the environment. The filtrate will go to storage in a geo-textile covered storage pond which will both limit nutrient losses and reduce even further any potential odor escape. The separated solids consist mainly of highly stable fiber that is not subject to putrefaction and high rate degradation. As such, they are a very low odor material. Any composting or further processing that we choose to apply will render them even further stabilized. Considering the siting of this facility in the interior of JES Farms and the very high level of odor control implicit in the design of the overall system, there should be essentially no noticeable odors emanating from this facility to off farm receptors. In result, this facility should constitute an example of low odor design and operation that would represent a model for the rest of the beef feeding industry to emulate.

Environmental Permitting and approvals have been explored with the South Dakota Department of Environment and Natural Resources. A preliminary review of their requirements and expectations in permit applications has been made and all aspects of conceptual facility design and operations have been formatted to assure that all required permits can be procured for the project as envisioned and planned. There is a broad array of potential permits required in order to build and operate the proposed facility.

Archaeological and biological surveys have been addressed preliminarily to assess whether any historic, scientific, or threatened and endangered species issues require significant evaluation and mitigation. To date, no detailed or extensive studies have been found to be required.

Cost estimates of all aspects of facility design and construction are provided in the complete AEA report provided in the appendix.

SCHLESINGER CONSULTING

The ValCap Cooperative and PRIME, LLC site is 320 acres located on an east/west Sully County road. The road is two miles north of the Hughes and Sully Country line, is four miles long, is currently sand and gravel serviced, and connects Grey Goose Road and SD 1804.

The project is expected to attract approximately 9,750 inbound semi-truck loads of raw materials annually. This includes approximately eight million bushels of corn (8,000 loads), 62,500 head of feeder cattle (1,450 loads), 725 loads of feed ingredients, 100 loads of gasoline denaturant and 75 loads of chemicals and other operating supplies. Most of the inbound trucks will exit the

project site empty. Outbound truckload shipments will include 1,450 loads of fat cattle, 2,075 loads of fuel ethanol, 375 loads of field compost and 50 loads of wet distillers feed products. Total outbound truck shipments should be approximately 4,000 loads.

In addition, small vehicle traffic for employees, service and maintenance equipment, public service providers and guests are expected, totaling at least 50 vehicles/day. This small vehicle traffic will exceed 15,000 vehicles/year, however, the overall industrial transportation and traffic plan will have to accommodate approximately 30,000 vehicle trips annually.

Grey Goose Road in Hughes County is paved to the Sully County line. It is two miles north to the Sully County Road that parallels the ValCap Co-op site. It will be necessary to pave the six miles from the Hughes country line to its intersection with SD 1804. In addition, Grey Goose Road from the projects intersection gong north to SD 1804 in Sully Country should be upgraded and paved for heavy truck usage, amounting to approximately 10 miles. By paving Grey Goose Road most of the heavy truck traffic can be diverted from the Oahe Lake public use and recreation area, as the heavy use times for this project and outdoor recreation areas near the lake are the same.

Public safety is a paramount issue. Local residential, business, mail, school bus and flow through traffic should not be integrated with this new industrial transportation system. A majority of the projects traffic will traverse SD1804 and Grey Goose Road from the north and intersect with US 14 and 83 to the east.

Utilities

The operating utilities required by the PRIME facility are water, natural gas, electricity and communication including both phone and fiber optics for information transmission.

Water

The Sully County Rural Water District has agreed to bring potable water to the project location that will be used for drinking, laboratories, restrooms and shops. Water for the feedyard and operating units will be supplied from inground wells. One idle irrigation well has acceptable water quality and will be also be utilized. A second well will be drilled and both wells will be used to supply the entire project. Either one will feed the project while the other will be provide backup service. Both wells will be capable of supplying 800 gallons/minute and will use the same pipeline to the project, which is approximately two miles from the site property.

Approximately 1,800 feet below the surface of the project site is a formation that contains hot water. This water is approximately 100 degree Fahrenheit, is under pressure and will free flow to the surface at approximately 80 pounds/square inch. This artesian water supply is not expected to be used at this time, yet may be in the future.

Natural Gas

Montana Dakota Utilities (MDU) will contract with PRIME to provide all natural gas to the project. MDU has agreed to install a 15.5-mile new steel four-inch gas line from their system in Pierre, SD to the project site and provide the gas at competitive local rates. PRIME's anaerobic digestion system will produce biogas (at 70% methane) that supplement the natural gas from

MDU and fire the project's boiler systems. The PRIME biogas can provide from 50%-90% of the boiler gas requirements. The average price for MDU gas has been approximately $3.50/decatherm over the past 60 months. The price projection for the next 60 months is $6.10, delivered to the site.

Electricity

Oahe Electric Coop will contract with PRIME to provide the project with all required electrical demand. There are currently two 13.8 kV lines that can feed the site; one is located at an substation less than three miles west of the site. All of the electricity supplied by Oahe Electric is generated by seven hydroelectric turbines located less than 10 miles from the site. The 13.8 kV system is backed by a system of interconnected outlying substations.

Telephone

Telephone service will be supplied by Quest, formally of the Bell Telephone system in South Dakota. Quest has agreed to provide fiberoptic connections for both voice and data transmission to the site. In addition, cellular phone and microwave information services are available at the site. PRIME also anticipates installing a radio that will allow for mobile communications between employees.

Fire Protection and Public Safety

Local volunteer fire departments and PRIME's onsite fire protection system will both be available. PRIME will install a fire loop with hydrants as needed which will be supported by the project's pressurized water storage and backed up by jockey pumps if required. The Sully Country sheriff's office will provide outside public safety services and PRIME will provide an onsite security system for its own protection.

Local Feedstocks and Their Supply Reliability

The U.S. currently produces approximately 8.5 billion bushels of corn annually. Around 2 billion bushels of this crop are exported. If only the exported bushels were available for conversion to value-added PRIME products, they would be sufficient to provide the equivalent of 5.5 billion gallons of new ethanol production capacity annually. With a total installed capacity of around 2 billion gallons, this represents a potential increase around 275% to current domestic ethanol production. If corn stover—cobs, stalks, and leaves— produced from the corn now destined for the export market was also recovered and converted into ethanol, another 1.6 billion gallons could be produced. Additionally, the U.S. could produce between 13 and 15 MM head of beef annually. Instead of being the world's largest cattle importer, the U.S. could become its largest exporter.

State-Wide Feedstock Resource Availability

During the 5-year period between 1995-1999, an average total of slightly more than 336 million bushels of corn was produced in South Dakota1. The lowest production year was 1995 with 245 million bushels of corn and the highest production year was 1996 with 365 million bushels of corn. It is estimated that roughly 75% of this grain is exported from the state. More than 30

1 South Dakota Agricultural Statistics Service. 2001. South Dakota Agricultural Statistics Crop Data Downloads. Available at http://www.nass.usda.gov/sd/dnlds/dnld_c.htm

PRIME facilities, each with 15 MM gallons/year of ethanol capacity, would be needed in South Dakota alone to use all the corn grain currently estimated to be exported from the state.

Local Feedstock Resource Availability

As already mentioned, the ValCap Cooperative and PRIME, LLC site is two miles north of the Hughes and Sully Country line. Assuming corn is the carbohydrate feedstock of choice, it is estimated that a total of almost 8.2 million bushels of corn would be required annually.

Regarding corn supply at the proposed site, the purchasing area will likely cover a 60-mile radius that includes all or parts of counties shown in Table I.1. During the past 60-month period2, these counties produced more than 81 million bushels of corn, sufficient to produce more than 220 million gallons of ethanol with a conversion efficiency of 2.75 gallons per bushel. Including the demands of both the feed yard and ethanol plant, the projected demand for corn at the proposed commercial-scale demonstration facility is around 10% of the corn produced in this area.

Please see the Appendix for the complete Schlesinger Consulting report.

UNIVERSITY OF NEBRASKA-LINCOLN

In the process of producing alcohol from corn, the starch is removed (converted to alcohol) and the other nutrients are concentrated in the resulting byproducts. The wet distillers byproduct (WDB) is higher in protein, fat and phosphorus (P) then corn. In order to save drying costs the WDB can be fed as an energy source replacing corn. The critical issue then is the energy value of WDB relative to corn.

Eleven experiments were summarized where WDB was compared to corn as an energy source for finishing cattle. The WDB replaced 12.6%-50% of corn in the diet on a dry matter (DM) basis. At low levels of WDB feeding, averaging 17.4% DM, its energy value was shown to be 152% greater than that of corn. At higher levels of feeding (50% DM), the energy value decreased to 136% of the value of corn. Based on this research, it can then be calculated that the value of the WDB was 124% to the value of corn when fed between 17.4% and 40% of the diet.

Dr. Klopfenstein also made a recommendation regarding diet formulation for the PRIME facility, where the WDB level can be varied between 15% and 45%, which concluded that no diet changes other than adding additional corn will be needed if WDB is reduced to as low as 15% of the diet. Suggestions regarding a how cattle can be stepped up to the final finishing diet were provided. It was assumed that the majority of the cattle will come from backgrounding operations where the cattle were accustomed to WDB. With respect to backgrounding, calves weighing between 450-600 pounds can use WDB. These calves require bypass protein in order to make efficienct gains. WDB has been shown to be an excellent source of bypass protein, with twice the bypass protein of soybean meal. WDB could also be used as an energy source in the backgrounding diets.

2 South Dakota Agricultural Statistics Service. 2001. South Dakota Agricultural Statistics County Profiles. Available at http://www.nass.usda.gov/sd/cp/cp.htm

A lamb digestion study with diets similar to that proposed was also conducted. The analysis of the samples helped determine the design of the manure collection and movement system from the feed yard to the AD plant.

Please see the Appendix for the complete report from the University of Nebraska-Lincoln.

SAUNDERS COUNTY FEEDERS

Saunders County Feeders worked on developing a feedyard operations plan, which includes a specific emphasis on maintaining high cattle occupancy levels, and a plan for cattle marketing. Saunders County Feeders also worked extensively with AEA on the feedyard design.

The feedyard is to be a custom or commercial yard. Within the industry, custom and commercial are interchangeable terms referring to a feedyard that feeds cattle for other people. It is important to realize that this yard is set up to be both custom and commercial as defined by Webster. It is commercial in the sense that it is concerned with commerce. The feedyard is in the business of feeding cattle. It is custom in the sense that it will feed cattle separate to private owners.

Regardless of where the emphasis is placed in terms of general commerce or custom, the feedyard business is still centered in its customers. From the production standpoint, the cattle are the customers. If we do everything that is in the best interest of the cattle, we've done our job. Feedyard clients tend to be reluctant to change feedyards when they are happy with the performance of their cattle. The initial challenge is to court the clients first, get the cattle, work in the best interest of the cattle, and keep the client.

In the operation of a feedyard, there are three basic inputs. Those inputs are cattle, feed supplies, and support supplies. The cattle should be self-explanatory; these will be feeder cattle from various sources coming into the yard to be finished for slaughter. The feed supplies include corn, protein, hay, minerals, medications; anything that will be administered directly to the cattle. Support supplies are such things as diesel fuel, oil, and parts for feedtrucks, loaders, and other vehicles. Pest control products, welding supplies, and water tank parts are other examples of support supplies.

The outputs of any feedyard are finished cattle and manure. In the strictest sense, this feedyard is no different. The exception, of course, is that the manure from this feedyard goes to a digester, on site, to be treated.

To learn how this feedyard will operate we'll follow each of the inputs through the feedyard gate. We'll touch on how each product is received, logged into inventory, accounted for, and ultimately used in the mission of adding value to cattle. Along that path, we'll demonstrate the roles that will have to be filled by personnel. As we go, some roles will be defined in detail, others will be defined later as we tie everything together.

Marketing ties together all the loose ends of cattle feeding. In production we do everything thinking first of what is in the best interest of the cattle. By thinking from the cattle back to the

mill, from the cattle to the hospital, and from the cattle to the office, we make sure that everything we do is in the best interest of the cattle. If we do that, the cattle will perform as best they possibly can and we'll have done our job in the production category. From a public relations standpoint, the most important person on the yard is the visitor. Whether the visitor is a customer, tourist, or a salesman, they are our guest and treated accordingly. If everyone in the employ of the entire complex makes every visitor feel welcome and encouraged; we've done our job of customer relations. Having done all that, we have top-notch cattle performance and everyone likes us. If the marketing is not done correctly, the polished job we've done gets tarnished.

Marketing must be considered prior to the purchase of cattle. It is fair to assume that the coop will be involved with most if not all of the cattle in some manner. If the coop is not partnered in an interest on a pen, it is likely the coop will finance the feed of the cattle at the very least. It is from this level, as the coop, we must consider our stake in the cattle. From the customer's point of view, they will look to us to do the best job of marketing possible. This may include advice in taking price protection via contracting or hedging. Marketing is also of course, simply selling the cattle in a manner that maximizes revenue back to the owners.

Please see the Appendix for the complete Saunders County Feeders report.

RESOURCE DEVELOPMENT ASSOCIATES (RDA)

As previously reported, a Request for Qualifications (RFQ) was released on behalf of PRIME Technologies, LLC, for selected applicants to submit qualifications for the "turn-key" design and construction of an anaerobic digestion (AD) plant. The selected applicant will have sufficient technical personnel to undertake project management and have complete responsibility for design, engineering, procurement, construction management, and the start-up of individual AD plants or integrated biological complexes. In addition to these attributes, the candidate will also offer performance warranties, performance insurance, or bonded performance guarantees on the Project. A reply to this RFQ was expected to contain two written components, a technical response and a qualifications response.

There were a total of two written responses to the RFQ: Lotepro of Valhalla, NY, and Canadian Composting, Inc. (CCI) of Toronto, ON. RCM Digesters of Berkeley, CA provided a verbal response indicating interest in the RFQ. However, at the time of this report was prepared, no detailed written technical or qualifications response has been provided by RCM.

Canadian Composting is the North American licensee of the Biotechnische Abfallverwertung GmbH & Co. (BTA) anaerobic digestion process developed in Germany. The CCI proposal was based on their owning and operating the facility, or PRIME owning and CCI operating the plant. Based on CCI's owning and operating the plant for PRIME, CCI would charge PRIME an annual fee to cover the cost of financing the plant over a 20-year period, the cost of operating the plant, and CCI's profit. Discussions with PRIME's management indicate their desire is to retain sole ownership and operational management of the facility. As a result, the CCI bid does not appear to be viable.

Lotepro is the North American representative of the Linde-KCA-Dresden anaerobic digestion process developed in Germany. The Lotepro proposal was based on PRIME owning and operating the facility. Extended discussions with Lotepro have been undertaken during the past two months. The cost of Lotepro's AD plant is in the range projected by the pre-feasibility study, and the value offered by their facility seems to indicate the investment would have merit. Discussions with PRIME management indicate their interest in the Lotepro bid, but at the time this report was written no final decision has been made on the system provider for the AD plant.

RDA completed a final "pre-feasibility" study for the PRIME project. Given the 1,007 tons of manure to be processed on a daily basis, the capital investment for the AD plant is in the range of $2.4-$10 million, depending on the type and sophistication of technology to be used. Items such as the type of process control technologies employed and construction materials used will decidedly impact the capital requirement. For example, European technology tends to be much more sophisticated, and the cost estimate probably ranges between $6.8-$10 million. Lower cost AD systems have been developed strictly for agricultural operations in the U.S. that use much less costly construction methods and materials, which will probably cost out in the range from $2.4-$5 million. It is likely that the facilities offered in the lower range of this cost figure will not include necessary equipment such as a monitoring and control system.

RDA also completed a final evaluation on the potential air emissions that might be released by the combustion of biogas manufactured by the AD plant. The objective of this analysis is to present some generalized figures on primary air pollutants, which are carbon monoxide (CO), sulfur dioxide (SO2), oxides of nitrogen (NOx), and particulates.

RDA also assisted J.E.S. Farms in the preparation of the Nutrient Management Plan (NMP), which will be implemented jointly by PRIME Technologies and J.E.S. Farms. The NMP is covered in greater detail in the J.E.S. Farms section below.

Please see the Appendix for the complete RDA report.

J.E.S. FARMS

Since January, J.E.S. Farms has worked on the development of the Nutrient Management Plan (NMP) that will be implemented jointly by PRIME Technologies and J.E.S. Farms. The complete NMP is attached as submitted to the state Department of Environment and Natural Resources (DENR). The NMP indicates that adequate land is available for applications of all of the nitrogen from the feedlot on the 10,074 acres of irrigated land connected to the J.E.S. Farms irrigation system that lie east of Hwy 1804, including both the filtrate and the compost. Harvey and Andrea Sheehan own all the land except for 126 acres, which is owned by Charles Thompson that is connected to the J.E.S. Farms irrigation system. Mr. Thompson has agreed to allow application of the nutrients onto his land. This only includes the irrigated land east of Hwy 1804. Additionally there are an additional 2978 acres owned by the Sheehan's that are available to spread the compost materiel. It is anticipated that the NMP will be approved by the DENR during the summer.

Nitrogen
Nitrogen generated from the project roughly will be split between the filtrate and the fiber fractions. At this time, it is estimated that the nitrogen will be equally split (50-50) between each component. The filtrate will be pumped to an entry point located at the J.E.S. Farms lift station located on Hwy 1804. At this point, the filtrate will be injected into the flow water in the irrigation canal. The water will be sampled as it is injected into the canal and also the irrigation pivot points to determine the amount of nitrogen being delivered to the pivot. Applications of nitrogen will be monitored according to the requirements of this NMP. J.E.S. Farms has had a long history of soil testing each year. This soil testing will continue as required under this NMP.

Phosphorous
Soils in South Dakota are normally low in phosphorous. Soil tests on J.E.S. Farms indicate that the phosphorous levels are currently in a 5-15 PPM range based on the Bray P-1 soil test. The average phosphorus soil level is about 10 PPM. The NMP is based on the nitrogen needs; however; phosphorous soil test levels will be monitored until the levels rise to adequate levels. According to experts at South Dakota State University (SDSU), the phosphorous soil test levels will rise 1-3 PPM each year that the filtrate application is made according to the nitrogen rates. At the time of the submittal of this NMP, there have not been any limits set for the maximum allowable phosphorus soil test results. The rates being considered are in the 75-150 PPM range based on the Bray P-1 soil test. It is estimated that 60% of the phosphorous will remain in the filtrate fraction and 40% will remain in the fiber. This will allow J.E.S. Farms the maximum flexibility to move the product to where it is needed for phosphorous application needs. Research will also be done to pelletize the fiber product so it that it may be sold as commercial fertilizer.

Irrigation Management
J.E.S. Farms has extensive management experience in water management and irrigation operations. There will be two stations of gypsum blocks buried in each field. These blocks are read every week during the irrigation season. Weather data is also collected to monitor crop water use rates. Irrigation is scheduled only when indicated by crop use and by soil depletion thereby preventing over applying water to prevent any runoff. Irrigation scheduling also allows maximum use of water and nutrients without risking crop stress and yield loss.

Soil & Manure Testing
J.E.S. Farms has 18 years of soil test records on each quarter for each crop year. This provides an excellent base to work from as we monitor the effects of the application of nutrients recovered from manure. As required, nutrient tests done on the filtrate water and the fiber product prior to their application. Soil tests will continue to be done on each field to the 2-foot level to monitor soil nitrogen levels. Nitrogen application rates will then be based on the soil test levels and yield goals.

GLOBAL BIOREFINERIES (GBI)

A major goal of PRIME Technologies is to accept involved greenhouse gases (CO2, CH4 and N2O) as "out of place" sources of energy and nutrients. Their capture can potentially turn them into additional value-added resources with economic and environmental benefits. In order to develop this plan and maximize the carbon equivalent credits (CEC) from the PRIME

Technologies complex, it is necessary to optimize the efficiency and effectiveness of all facility components in an orderly manner. Incidentally, the development of a NMP with the fertilizers recovered from the operation also offers opportunities to develop CEC by reducing the need for fossil-based agricultural chemicals. The replacement of ethanol for gasoline will generate CEC for the PRIME project.

Since the quantification of CEC generated by the PRIME Technologies complex and their marketplace value is in the developmental phase, it is not possible to be precise in establishing the calculus to determine the value of the CEC generated. Consequently, in all three of these components, initial models are being pursued with recognition that actual information and data must be estimated or left to a later date when estimates will have credibility.

A copy of the report from GBI is provided in the Appendix.