COMMERCIALIZATION OF CORN TO ETHANOL IN NEW YORK STATE

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Final Report

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ABSTRACT

The Commercialization of Corn to Ethanol in New York State (NYS) study was conducted by the New York Corn Growers Association (NYCGA) to determine if fuel-grade ethanol production in New York State is economically feasible under various circumstances. Key aspects of the study include:

- Determination of feedstock quantities and locations,
- Assessment of the availability of technology as it relates to targeted feedstocks,
- Selection of potential plant sites based on feedstocks and associated transportation costs,
- Identification of capital costs and operating costs, and
- Completion of a financial pro-forma (including sensitivity analysis) for business-plan development.

The study involved direct research and process consulting. It also incorporated the advice of individuals with expertise in various aspects of the project. Tasks were conducted by NYCGA staff and by the New York State Technology Enterprise Corporation (NYSTEC). A literature search of NYS agricultural statistics and U. S. Department of Agriculture (USDA) Farm Service Agency statistics was completed to determine feedstock production statewide and by county. Working with county industrial development agencies (IDAs), potential plant sites and existing infrastructure were identified. Vogelbusch USA, as the study's technology-engineering company, provided information on ethanol production technology and provided estimates for constructing the physical plant. George Proakis of Fenmore Consulting Services (a NYSTEC consultant) and Jackie Moody, NYCGA Project Manager, participated in the feedstock assessment, site-specific data collection, the financial pro-forma development, and the sensitivity-analysis process.

Dr. Jean Hunter of Cornell University and Dr. Thomas Hirasuna of Creative Design Technologies also participated in the study — serving as the technical review panel. They advised the NYCGA as to the potential mix and composition of feedstocks and evaluated the recommendations of the technology providers.

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SUMMARY

The New York State Corn Growers Association (NYCGA) Commercialization of Corn to Ethanol in New York State project studied the feasibility of building a plant to produce fuel-grade ethanol in New York State. Fuel-grade ethanol is used as an alternative fuel for light-duty vehicles and as an oxygenate in conventional gasoline. Co-products from the ethanol-production process, such as Distillers Dried Grains and Solubles (DDGS), used as a high protein cattle feed additive, and carbon dioxide (CO_2), used to carbonate beverages and to flash freeze meat, offer additional profits. This report summarizes the engineering requirements and feasibility activities required to undertake constructing and operating an ethanol-processing plant.

NYCGA considered many candidate sites for locating an ethanol facility and identified site requirements for locating such a plant. These requirements included available acreage, proximity to feedstock, access to rail and other transportation, existing structures, utilities, and wastewater treatment. The NYCGA also considered plants of various production capacities. The three sites used as examples in this report illustrate what was determined to be typical for meeting the criteria set forth. Next, the NYCGA identified the appropriate feedstock (or mix of feedstocks) and the best technology to process the feedstocks into fuel-grade ethanol.

Feedstocks for the ethanol plant could potentially include farm products, such as corn, and wastes from food-processing facilities. Biomass feedstocks were reviewed, but not used due to the technical and cost limitations of biomass-to-ethanol processing. For this report, on-farm feedstock data was collected from county and State statistics. Processing-waste feedstock quantities were estimated using county and State statistics and a formula applied to determine the amount of processed product. Feedstock availability and cost were dependent upon market factors and fluctuations and on historic trend data.

A technology-engineering company recommended the design technologies and specifications for constructing an ethanol-production facility, quantified the capital and operating costs for both a baseline plant and three example sites, and determined the optimum characteristics for a profitable ethanol-production plant using criteria and operating costs appropriate to New York State. An independent technical review panel examined the potential mix of feedstocks and evaluated the recommendations of the technology providers.

Three sites were reviewed for this study. One site was scoped for a 5-million-gallon-per-year (5-MGPY) facility, and another site for a 29-MGPY facility. Both sites would require all new construction. A third site, also representing a 29-MGPY facility, was that of a former brewery, with benefit of existing infrastructure. The plant location decision will require further examination beyond the scope of the present study.

The first example, a 5-MGPY plant, using all new equipment, would not produce a profit. Moreover, by the end of this tenth year, an accumulated $37.2 million loss was projected, with further losses in future years. The up-front capital investment of $19.7 million cannot be justified.

The second example is a 29-MGPY plant using all new equipment and purchasing steam from a steam generator already at the site. The plant would begin reporting an annual profit during year 11 and would, at the end of the twentieth year, have offset its cumulative losses. However, the justification of the large up-front capital investment required is questionable if the cost of steam from the local producer remains high. An alternative for the second site featured constructing a new steam plant in conjunction with the ethanol facility. The plant would begin reporting yearly profit in year 5; by the twentieth year, the profits would accumulate to $25.9 million.

The third example assumed a 29-MGPY plant that utilized the existing infrastructure of a former brewery and supplied its own steam. This plant would start reporting an annual profit in year 2; would have offset all losses by year 9. At the end of the twentieth year, cumulative net profits would be $33 million.

Sensitivity analyses for the three example sites reviewed the effect of construction issues, loan and debt issues, feedstock costs, fuel and transportation costs, state taxes and incentives, product sale price and demand, and site-specific issues. In particular, reduced interest rates and state producer credits create significant opportunities to boost the profitability of the ethanol facility. The cost of feedstock and the price of ethanol also have significant effects on profit. The study concludes that ethanol production in New York State is feasible and should be pursued further.

Team members for this project included the New York State Technology Enterprise Corporation (NYSTEC), Vogelbusch USA, George Proakis of Fenmore Consulting Services, and independent review consultants Dr. Jean Hunter (Associate Professor, Department of Agriculture and Biological Engineering, Cornell University) and Dr. Thomas Hirasuna (of Creative Designs Technology).

Section 1

INTRODUCTION

BACKGROUND

Increasingly, ethanol is being viewed as a preferred fuel and fuel additive to help New York and other northeastern states comply with the spirit and the intent of Federal Clean Air and Clean Water acts. In 1996, more than 100 million gallons of ethanol were used by northeastern U.S. fuel companies as a fuel oxygenate or additive in gasoline. While New York State consumed 28.5 million gallons of ethanol that year, none of that ethanol was produced from corn grown within New York State. New York's interest in alternative fuels, such as ethanol, is accompanied by an interest in rural economic development. As the agricultural industry continues to increase in productivity but decrease in production acreage and number of farming operations, the importance of stimulating rural economies increases. New York-based ethanol production promises to enhance New York's agricultural industry, the lifeblood of many local communities, and to create an economic resurgence in rural regions throughout the State.

Ethanol is advantageous as an alternative fuel because it is domestically produced from renewable resources and emits fewer pollutants. Ethanol is a liquid alcohol made from ethylene derived from the fermentation of grains and sugars. Ethanol fuel systems give off lower levels of sulfur dioxide (SO_2) and nitrous oxide (NO_X) emissions than systems using petroleum products alone. Production of ethanol also helps remove carbon dioxide (CO_2) from the air through the beneficial effects of photosynthesis associated with additional amounts of corn being grown to serve as feedstock.

In the United States, approximately 95% of ethanol fuels are derived from corn. Moreover, ethanol production is the third largest[1] use of corn in the United States. Using approximately 7% of the nation's corn crop, ethanol production increases farm income and generates economic activity nationwide.

Nationally, according to ethanol-industry estimates, the growth of corn for ethanol:

- Increases annual net farm income by more than $4.5 billion,
- Boosts total employment by 192,000 jobs,
- Improves the balance of trade by more than $2 billion,
- Adds more than $450 million to state tax receipts, and
- Results in net federal budget savings that exceed $3.5 billion.

[1] Behind use as food/feed and as an export.

The U.S. Department of Energy (DOE) foresees a sharp rise in the use of ethanol as an oxygenate, additive, and alternative fuel. Annual usage of more than 1.5 billion gallons of ethanol per year is expected by the end of the next decade, with projected annual usage of 600 million gallons by the northeast states alone.

The New York Corn Growers Association (NYCGA) has been working in close partnership with the New York State Technology Enterprise Corporation (NYSTEC) to promote and establish a commercially viable ethanol industry in New York State using corn as the primary feedstock. A preliminary assessment, performed by NYSTEC for the NYCGA, demonstrated the economic impact associated with establishing an ethanol industry in New York State. It showed that a plant large enough to satisfy current in-state demands would create more than 600 new jobs.

The present study, undertaken by the NYCGA, addresses issues associated with creating an ethanol industry in the Northeast. Sources of feedstock in New York are geographically dispersed across the State. Furthermore, New York State's large and diverse agricultural and food system generates other wastes that have potential as supplemental feedstocks. For example, while corn is the primary focus of this study, the use of cheese-whey and food-processing wastes could potentially be extremely beneficial in New York, because many of these wastes are currently disposed of in landfills or spread on fields. Furthermore, the smaller-volume, more-distributed Northeast corn production and processing industry means that the optimum design and siting of an ethanol plant will be less dependent upon any single-site feedstock source and processor and more sensitive to other factors like transportation, energy, and storage considerations.

BENEFITS

New York State imports 92% of its energy fuels at a cost of more than $30 billion per year. Production of ethanol using New York-produced corn and other feedstocks will improve both the environmental health of the State and the economic condition of northern New York rural communities.

Ethanol production fulfills many economic-development objectives. The production of ethanol not only gives the farmer/grower an additional market for corn, but also enables capturing the increased value of a further-processed product. The demand for corn as a feedstock will increase, stimulating production and the reuse of presently idle farm acreage. Agricultural service industries, such as equipment manufacturers and crop-input providers, will benefit from an increase in activity surrounding crop production. Employment will increase in the transportation industry and in the staffing of the ethanol-processing plant.

OBJECTIVES

The NYCGA undertook this study in conjunction with NYSTEC, and with the support of NYSERDA, to assess the feasibility of an ethanol-production industry in New York State.

The objectives of this study were to:

- Identify the location and quantity of corn available for grain, land that can be used to grow additional corn, and suppliers of alternative feedstocks;
- Quantify the capital and operating costs of ethanol plants by size, location, and feedstock mix;
- Develop technology and feedstock combinations that will produce and deliver ethanol at or below the current price in the Northeast, thereby making it appealing to the Northeast fuel market as an additive, oxygenate, and alternative-fuel source; and
- Develop a financial model to use in conjunction with other data and documents to justify financial support for designing and building an ethanol production facility in New York.

STUDY TEAM

The study team brought together agricultural, engineering, and technology talent to assess the feasibility of a New York-based corn-to-ethanol production facility. The NYCGA, a major corn/grain farmer member organization, established the goals of increasing the amount of corn utilized in New York State and securing projects that enhance the economics of agriculture in the state. NYCGA provided oversight and management to the Commercialization of Corn to Ethanol in New York study and, in the process, gained a first-hand look at the technical and economic feasibility of ethanol production and its potential to expand the use of New York State corn.

NYSTEC, a not for profit corporation that fosters economic development through the transfer of technology from the laboratory and academia to the commercial sector, coordinated the engineering and ethanol process analysis, and served as a resource in the area of alternative fuels and associated technologies.

Mr. George Proakis of Fenmore Consulting Services served as a consultant to NYSTEC. He was experienced with analyzing State economic-development incentives, and had developed models for the economic feasibility of the New York State biomass-to-electricity industry. Mr. Proakis coordinated the analysis of financial pro-formas and the development of the sensitivity analysis phase of the study.

Vogelbusch USA, the technology-engineering company for the study, quantified the capital and operating costs for a non-site-specific baseline plant and for the three example plant sites reviewed in depth.

Dr. Jean Hunter, Associate Professor, Department of Agricultural and Biological Engineering, Cornell University, and Dr. Thomas Hirasuna, Creative Design Technologies, served as the technical review panel. Dr. Hunter's expertise in fermentation and enzyme technology was complemented by Dr. Hirasuna's knowledge in food and bioprocess engineering. The panel provided unbiased third-party assessments of the feedstock composition data and the cost and process recommendations of the technology provider. The panel also assisted in selecting the technologies that were used in the example-site-specific analyses.

SCOPE AND LIMITATIONS

This study assesses the feasibility of producing ethanol at three different sites in New York State. The scope of this project allowed the NYCGA to identify three sites and to analyze the feasibility of producing ethanol at these sites, using empirical data when available. Some details (e.g. interest rates) have been estimated (and have been noted as estimates) and need to be adjusted during the next phase of business development. Thus, this study is a valuable first step in detailing the circumstances under which ethanol production would be feasible within New York State.

As a secondary research feasibility analysis, this study had certain limitations. Economic data was based upon the best information available at the time of publication. As with all studies, the analysis of ethanol production involves some level of risk. The NYCGA has done everything possible — including performing a detailed sensitivity analysis — to limit the likelihood of unforeseen issues surfacing.

Section 2

FEEDSTOCK AVAILABILITY

FEEDSTOCKS CONSIDERED

Ethanol is usually produced from one of many agricultural products or from food-processing-waste products. The feedstock most commonly used to produce ethanol is corn, and this study focused on corn for ethanol production. However, the NYCGA team also assessed various alternative feedstocks, including waste products from the processing of agricultural crops and cellulose biomass feedstocks. This section reviews the results of this feedstock analysis.

RESEARCH METHODS

For each feedstock, NYCGA examined a number of factors, including quantities available, purchasing costs, transportation costs, and feedstock composition. Additionally, NYCGA studied the availability of former agricultural lands that have reverted to forests or open fields since 1969. These lands might be available to grow additional corn or other feedstocks for use in producing ethanol.

Data was collected from a wide variety of sources. Data on feedstock quantities was mainly gathered from New York State agricultural statistics. The data on the composition of processing wastes was gathered through literature review and telephone interviews with knowledgeable sources. Composition data was collected from various sources, including textbooks and research reports. Some composition data was also collected through telephone interviews. Cost data for farm feedstocks is based on discussions with local farmers, backed up by some data from New York State agricultural statistics. Transportation costs for some feedstocks are included in feedstock costs. For other feedstocks, transportation costs were estimated based on data provided by farmers and by the U.S. Department of Agriculture.

Data on agricultural land availability was based on the New York State Census of Agriculture and on a Cornell University report, The Return of Agricultural Lands to Forest. Based on extrapolation of data from these sources, the NYCGA team created reliable estimates of land that reverted from agricultural production between 1969 and 1997.

Feedstocks are generally supplied to ethanol plants from within a 35- to 75-mile radius of the plant. For this study, the NYCGA limited feedstock usage to feedstocks found within 50 miles of its chosen plant sites. For the area contained within a 50-mile radius, mathematics calculates the average trip as being 35 miles. NYCGA identified three regions, encompassing eleven counties, as candidates for ethanol-plant sites. Those regions and included counties were:

- North Region: Jefferson, Lewis, Oswego, and Saint Lawrence counties;
- East-Central Region: Madison, Oneida, and Onondaga counties; and

- West-Central Region: Cayuga, Ontario, Seneca, and Wayne counties.

Further analysis of corn, other feedstocks, and available land encompassed a 22-county area that included all the land within a reasonable transportation distance of proposed plant sites in the three regions. In addition, for comparison purposes, production of these feedstocks was quantified on a statewide basis.

Appendix A provides, for each feedstock, a two- or three-page data sheet. These data sheets identify the sources of all data and contain information about production by region and the feedstock's composition and cost.

Feedstock information was reviewed by the technology-engineering company and by the technical review panel to determine if alternative (to corn) or supplemental feedstock sources would be feasible and/or needed. The feedstocks were evaluated based on the following criteria:

- Calculated feedstock cost/gallon of alcohol produced (where possible including byproduct credit),
- Technical requirements beyond those for processing corn,
- Storage characteristics, and
- Overall process effects (e.g., negative downstream impact).

The technical review panel analyzed the feedstock data sheets, assessed alternative feedstocks, and provided additional composition data for many of the feedstocks. The updated data was then used to reassess the initial economic projections.

CORN

Corn is the primary feedstock for an ethanol plant, and the study team reviewed the production of corn in the 22-county study area that surrounded locations of the three potential plant sites. Table 2-1 summarizes corn production, by bushels, in these counties in 1996 and 1997. Most of these counties increased their corn production (as shown by positive values in the far-right column) during this period.

At the statewide level, shown in the first row in Table 2-1, New York's corn-for-grain production in 1997 totaled 75.4 million bushels, up 22.78% from the 1996 level. The State ranks seventeenth in the nation in corn-for-grain production, but had a feed-grain surplus in 1997 after running deficits for many years. Changes in the State's dairy industry (declines in the number of grain-consuming animals and in the quantity of grain fed per animal) have created a need for new markets for corn (or farmers will need to reduce production and suffer reduction in income). Ethanol production within New York State would increase the demand for corn, provide a promising new market, and stimulate farm income.

For the three regions, the feedstock data sheets in Appendix A provide detailed analysis of corn production, corn costs, and chemical composition. As the primary feedstock for any ethanol plant, corn is a commodity whose price variations must be carefully monitored. NYCGA studied the price of corn over the past five

years based on data from New York State agricultural statistics. Corn prices spiked significantly in 1995 due to worldwide shortages. After interviews with the corn growers and detailed study team discussion, a corn price of $2.35 per bushel was chosen as the baseline price for the ethanol plant. Although this price is higher than the price offered for Midwest corn (the New York price generally incorporates an additional transportation cost reflecting the cost of moving corn from the Midwest to New York), it is lower than the five-year average corn cost derived from analysis of the agricultural statistics. This price reflects a realistic assessment of the prices that corn growers expect to receive for their crop in the foreseeable near term. The effects price spikes would have on the cost of ethanol are covered by sensitivity analyses in Section 5.

Table 2-1, Bushels of Corn for Grain Harvested Statewide and in Selected Counties

County	Corn in 1996	Corn in 1997	Increase
Statewide	61,410,002	75,400,000	13,989,998
Cayuga	7,045,100	7,852,900	807,800
Chenango	643,800	713,000	69,200
Cortland	556,200	648,000	91,800
Fulton	155,400	137,800	-17,600
Hamilton	unavailable	unavailable	unavailable
Herkimer	767,200	777,000	9,800
Jefferson	1,069,200	1,100,000	30,800
Lewis	440,200	454,000	13,800
Madison	1,524,400	1,724,800	200,400
Monroe	2,169,200	2,617,600	448,400
Montgomery	1,575,500	1,409,200	-166,300
Oneida	2,305,600	2,586,400	280,800
Onondaga	2,912,900	3,396,000	483,100
Ontario	4,180,700	4,954,600	773,900
Oswego	567,000	642,600	75,600
Otsego	644,800	699,300	54,500
Schoharie	631,300	575,700	-55,600
Seneca	2,918,800	3,325,400	406,600
St. Lawrence	582,000	568,000	-14,000
Tompkins	2,033,300	2,387,900	354,600
Wayne	3,642,700	4,028,800	386,100
Yates	1,687,400	1,867,200	179,800

Production of ethanol from corn leaves behind two valuable co-products. The grains that are left from the ethanol process are dried and become Distillers Dried Grains and Solubles (DDGS). DDGS is accepted worldwide as a high-quality dairy feed. DDGS is sold in New York, but often is of poor quality. NYCGA believes that DDGS will increasingly gain acceptance by the New York dairy industry when produced by a properly managed, quality-controlled system. (A similar dairy feed product, solids from local brewing operations, is currently used by New York dairy farmers.) The other valuable co-product is carbon dioxide, used for beverage carbonation and for flash freezing meat. With a properly co-located plant to purchase carbon dioxide, a corn-to-ethanol plant can make a profit selling this co-product.

PROCESSING WASTES

NYCGA considered various residual solids from food processing. Table 2-2 lists estimated statewide quantities of food-processing wastes. As an alternative or supplement to corn as a feedstock, these wastes could not only help an ethanol operation reduce its outlays for feedstocks, but also help alleviate environmental impacts of waste disposal. These wastes are available for short seasonal periods of time when specific crops are harvested and processed.

Table 2-2, Statewide Food-Processing Waste Quantities

Type of Waste	Available Quantity
Fruit Pomace	
Apples	75,000 tons
Cherries	2,000 tons
Grapes	31,000 tons
Vegetable Waste	
Snap beans	23,000 tons
Beets	33,000 tons
Cabbage	28,000 tons
Carrots	7,000 tons
Sweet Corn	75,000 tons
Peas	1,500 tons
Cheese Whey	3,200 tons
Brewery Solids	TBD

The study team evaluated wastes from the processing of many farm crops in New York State and selected those that were the most appropriate feedstocks for ethanol production. The agricultural processing wastes that NYCGA studies included corn silage; brewery and winery waste; cheese whey; apple, grape, and cherry pomace; and waste from processing sweet corn, cabbage, beets, snap beans, carrots, and peas. NYCGA addressed the amount of crop waste that is generated based on the amount of feedstock crops that are harvested from farms in each of the three study regions.

The processing wastes reviewed are usually dumped in landfills or land spread. Regulatory requirements placed on the disposal of these wastes, and a shortage of space and locations for land spreading wastes may enable ethanol processors to purchase wastes at low prices or receive compensation for removing them from processing plants. Estimates of processing-waste composition are provided on the feedstock data sheets in Appendix A.

Based on the initial composition, cost, and usage data, the technical review panel analyzed the composition of the processing wastes in detail. After careful study of the numbers provided by the technical review panel, the wastes in Table 2-3 — snap beans, apples, cabbage, carrots, peas, beets, and grapes — were selected to be processed at two of the three example/potential ethanol facilities. Wastes were chosen based upon composition, availability, and lack of alternative markets. The apple waste consists of apple pomace, which has had a significant amount of sugar removed for the juice. The cabbage waste consists of leaves

and cores. Carrot waste is approximately 40% tops and peelings and 60% root; beet wastes are approximately 50% tops and 50% roots. The waste from peas consists of skins, fragments, and immature or damaged peas. Table 2-3 shows the amounts of wastes available for the potential Griffiss site, the months in which they are available, and the percentages of dry substance, carbohydrates, and fermented sugars in the wastes. Price/Credit, a standard rate for tipping fees/ton, would be adjusted in the Sensitivity Analysis.

Table 2-3, Processing Wastes Near the Griffiss Site

Waste	Total Annual (tons)	Months (1-12) Available	Dried Substance	Carbohydrates	Amended Fermented Sugars	Price/ Credit
Snap Beans	1200	7, 8, 9	9.7%	7.1%	4.5%	-$50.00
Apples	750	1, 2, 3, 8, 11, 12	34.0%	15.7%	2.0%	-$50.00
Cabbage	300	1, 2, 9, 10, 11, 12	7.9%	5.4%	5.4%	-$50.00
Carrots	50		11.0%	9.7%	6.7%	-$50.00
Peas	30		22.0%	12.0%	6.9%	-$50.00
Beets	30		10.2%	6.8%	3.5%	-$50.00
Grapes	30	9, 10	50.0%	13.5%	13.5%	-$50.00

Processing wastes are a potential supplemental feedstock for ethanol largely because they have economic advantages. These alternative wastes could not, however, replace corn as the main feedstock, and their use would require a minimum capital cost ($96,355) for a separate storage system. It would be relatively straightforward to provide a separate storage system and feed any combination of fruit and vegetable wastes into the system as part of the "corn slurry." The limited ability to store these materials for long periods would be addressed in the design (i.e., heated tanks) of the storage system. The alternative feedstocks could be a credit, not a cost, for the ethanol plant if the food-processing plants currently have to pay to dispose of these wastes.

A concentrated form of cheese whey, known as "cheese whey permeate concentrate" (CWPC), may be another appropriate feedstock for ethanol. Additional research is necessary to assess its suitability. The economics of acquiring CWPC seem promising. For example, one of the many cheese plants in upstate New York is faced with disposing of 15 million pounds of whey solids and 250 million pounds of liquid at a cost of $500,000 annually just for trucking the CWPC away.

Use of CWPC as a feedstock would provide a waste-disposal credit (revenue) for the ethanol plant. This credit probably would be exceeded by the cost of additional equipment and operating expenses ($1,000,000 one time and $250,000/year, respectively) required because the type of yeast used to ferment lactose is different than that used for corn.

Wastes from sweet corn production, although adequate in quantity, require a more expensive form of cellulosic biomass processing and, so, were not included in the study. Wastes from cherry processing were likely not available in adequate quantity. Brewery solids, although processed in significant quantity, are

currently used as agricultural feed products; therefore, they are not likely to be available for use in ethanol production at competitive prices.

Unlike high-grade corn DDGS, which can be exported as a high-quality feed supplement, DDGS that is produced from mixing corn with processing-waste feedstocks cannot be exported due to international trade regulations. However, because DDGS from mixed feedstocks can be sold in the United States, the inability to export is not a problem for a New York State plant. Moreover, the use of processing-waste feedstocks does not affect the quality of carbon dioxide produced as a co-product.

CELLULOSIC BIOMASS

Another group of alternative feedstocks reviewed for this project included corn stover, straw, grass, paper sludge, and dedicated feedstock willow biomass. Production levels for these feedstocks were reviewed statewide and in the three previously cited regions of New York State.

Straw and grass are grown in abundant quantities in upstate New York. Grasses include timothy hay and broome hay. Straw includes barley straw, wheat straw, oat hay, and oat straw. These feedstocks are currently low-cost products in New York State. Some of these products are grown on land that once grew corn and other higher-value agricultural products. But, with the decline of demand for these products in New York, more marginal lands have been converted into grass and straw farmland.

Straw and grass feedstocks present two options. If biomass feedstocks are feasible, the grass and straw may provide a low-cost input to the ethanol plant. If the biomass feedstocks are not feasible as inputs to the ethanol plant, the farmer may still raise the value provided by some of this land by converting back into corn production. This land converted back from grass and straw to corn production would be in addition to the available land addressed in Table 2-4.

Corn stover consists of the parts left over from corn harvesting. Corn stover is a potential biomass feedstock that has no current economic value. Most stover is left in the field after corn harvesting. Some of this stover could be collected and shipped for producing a low-cost ethanol fuel. Some corn stover may need to be left to provide nutrients back into the land.

Paper-mill waste is rich in cellulose and has a potential for ethanol production. A Wisconsin study determined that pulp and paper-mill sludge have an ethanol-yield potential of 51 to 74 gallons of ethanol per dry ton. Paper-mill wastes have traditionally been disposed of in landfills or spread on fields. Besides producing ethanol (a beneficial commodity), use of this feedstock yields the environmental benefit of saved landfill space and the economic benefit of reduced waste-disposal costs. Paper-mill waste is composed of a number of types of waste streams. In 1993, the National Council of the Pulp and Paper Industry for Air and Stream Improvement (NCASI) classified the solid waste streams into: primary sludge, secondary sludge, combined sludge, flume grit, screen rejects, wood waste, pulper rejects, lime mud, lime grit, and

green liquor dregs. The sludges and the wood wastes from these processes show the most potential for conversion to ethanol. Studies have shown that primary clarifier sludge has high cellulose content. But overall, paper-mill wastes result from a variety of different processes and, therefore, have varying contents of ash, inorganic material, and cellulose. To use a paper-mill waste stream for ethanol would require a very detailed analysis of that waste stream to assess its suitability for a cellulose-to-ethanol conversion.

Dedicated feedstock willow biomass is a new agricultural crop being researched by the State University of New York, College of Environmental Science and Forestry. Willow biomass is a clean, versatile wood-energy source that is being grown generally as a fuel for generating electricity. It also has the potential for use as an ethanol crop. Willow biomass plantations in New York are adapted from a commercially operational system in Sweden, where more than 35,000 acres of willow energy plantations have been established. Such plantations plant double rows, approximately 6,200 trees/acre, following complete site preparation, including herbicide application, plowing, and disking. Trees are planted in spring as unrooted, 10-inch-long cuttings (sticks), using planting machines developed in Sweden and modified for local conditions. Weed control, using a combination of mechanical and chemical techniques, is essential during the first year of establishment. Trees are cut after the first year to promote sprouting. Harvesting occurs every three to four years in the winter, after leaves fall from the trees. Following each harvest, the plants re-sprout. The perennial nature of the crop means that erosion potential and pesticide application are reduced compared to standard (annual) agricultural crops. Although only small test plantations now exist, and although they are quite expensive, the dedicated feedstock willow operations have future potential for producing ethanol and electricity and thus adding value to upstate New York farming operations.

After a substantial review, the study team decided that the use of biomass feedstocks was not feasible at this time. The capital cost to construct a cellulose-processing facility is approximately $3.50/annual capacity gallon, and the technologies are not quite to the commercialization stage. When the technology is available for commercialization, ethanol-processing plants will probably need to be large — producing more than 50 million gallons per year (MGPY) — to be economical. These issues are reviewed in more detail in Section 4. When the technology is commercially viable, these cellulose feedstocks may provide the largest-quantity, lowest-cost opportunity for large-scale ethanol-processing facilities in New York State.

AVAILABLE LAND

New York has abundant land resources that could easily be brought into feedstock production. Increased efficiency and a shrinking dairy industry in New York State have caused a decrease in acreage planted with crops. For example, New York State corn acreage in 1997 was 1.2 million acres — down from a high of 1.4 million acres in 1981.

Table 2-4, Farming Land Lost to Reforestation, Statewide and by County, 1967 - 1997

County	Total Acres in County	Active Crop-lands in 1997	Reduction in cropland from 1969 to 1997	Reforested Factor	Estimated Reforested Acres 1969 - 1997
Statewide	24,600,000	4,722,143	1,358,000	0.699	948,964
Cayuga	445,000	192,590	0	0.909	0
Chenango	576,667	104,034	28,600	0.953	27,257
Cortland	322,500	66,864	23,500	0.921	21,645
Fulton	320,000	21,623	7,800	0.916	7,142
Hamilton	1,090,000	unavailable	unavailable	unavailable	unavailable
Herkimer	916,667	90,171	31,600	0.826	26,088
Jefferson	827,000	193,684	66,300	0.919	60,939
Lewis	827,000	101,521	18,500	0.880	16,284
Madison	422,500	120,577	20,700	0.919	19,022
Monroe	432,500	89,730	34,000	0.530	18,007
Montgomery	260,000	104,553	13,500	0.911	12,302
Oneida	784,000	138,645	53,500	0.819	43,823
Onondaga	508,000	111,557	29,500	0.713	21,020
Ontario	417,500	153,765	24,300	0.903	21,941
Oswego	617,500	59,069	28,100	0.924	25,960
Otsego	650,000	116,366	51,700	0.922	47,645
Schoharie	400,000	70,120	28,800	0.956	27,545
Seneca	210,000	97,052	0	0.908	0
St. Lawrence	1,770,000	220,183	84,300	0.888	74,881
Tompkins	307,500	63,961	17,500	0.920	16,092
Wayne	387,500	125,278	37,300	0.860	32,095
Yates	220,000	77,370	8,800	0.952	8,382

In 1945, farm operators in New York owned or leased 17.6 million acres. In 1992, that figure had declined to fewer than 7.5 million acres. The 1959 Federal Census of Agriculture figures for New York State showed farmland (all uses) at 13,480,000 acres and cropland (the portion of farmland planted with crops) at 7,120,000 acres. New York State Department of Agriculture and Markets statistics indicate that, in 1997, total farmland acreage had decreased to 7,700,000 acres and cropland to 4,910,000 acres. While some of this out-of-production land has been developed for other uses, most remains open and available for new feedstock production.

Table 2-4 lists the result of NYCGA's analysis of farmland lost to reforestation in the 22-county study area from 1967 to 1997, based on data from the Census of Agriculture and a Cornell University report, The Return of Agricultural Lands to Forest. The second column of the table shows the total acreage of land in each of the counties. The third column shows the active crop acreage in 1997, while the fourth column shows the difference between the total acreage that was available in 1969 and that available in 1997. All of the acreage from this fourth column is no longer farmed, and some of that land is now developed as commercial or residential property. To account for this loss to non-farm development, data was scaled based upon a ratio of reforested land to total land made available. Because this ratio was not available for the

selected time period (1969 to 1997), a ratio was created for each county from development rates between 1910 and 1992. This ratio (fifth column) was then applied as a factor to the data on farmland reduction to create the estimated reforested acreage that is presented in the final column of Table 2-4.

Table 2-4 is meant to serve as a guide to land available for growing corn and other feedstock resources within the 22-county study area. However, it does not account for land in use for marginal farm crops that could be used for corn if the market were provided. Further, it does not report the quality of land that is out of production. Although corn yields on this inactive land may not be high as on actively farmed lands due to quality problems, corn for ethanol processing could most likely be grown profitably. Finally, this data does not account for the land currently enrolled in federal protection programs such as the conservation reserve program (CRP). For the purpose of this study, idle-land data is used only as an indirect indicator of potential feedstock quantities that could be made available near various plant sites. The team believes these estimates show an abundant supply of land and that they will be valuable for comparing the availability of idle land near different sites.

Section 3

ETHANOL FACILITY LOCATIONS

LOCATIONAL CONSIDERATIONS

Based on the technology-engineering company's expertise, the study team identified several factors to be considered in choosing the site for a plant. Basic requirements for a 29-MGPY plant were identified as:

- At least 20 acres of land (10 acres for initial plant, 10 acres for expansion),
- Power in the range of 4300 kw/hr for 350 operating days a year,
- Process water supply of 646 gallons per minute,
- Access to either:
  - A municipal wastewater facility that can handle pretreated effluent, 69,000 lbs/hour total water and 100 ppm Biochemical Oxygen Demand (BOD), or
  - A discharge location for fully treated effluent, 69,000 lbs/hour and 10 ppm BOD, and
- Finished-product transportation consisting of on-site rail and road access for trucks.

Other site characteristics noted as optional — but beneficial in reducing the capital and operating costs of a plant — included: access to steam and natural gas, water-borne transportation for inputs/finished products, and the availability of on-site industrial equipment and grain storage. The study also considered avoiding (due to noise and odor) proximity to residential neighborhoods.

SITE REVIEW

A list of potential sites was then generated via interactions with the county industrial-development agencies (IDAs) in the central, northern, and western parts of New York State. Special note was taken of economic opportunities associated with the IDA sites, including economic-development zones, low labor utilization areas, and industrial parks.

The NYCGA reviewed 13 candidate sites. A preliminary review of the sites revealed that all 13possessed the basic requirements for an ethanol plant and had feedstocks available. The study team chose three representative New York State sites: one in Evans Mills, one on the Griffiss Business and Technology Park, Rome, and one at the former Miller Brewery site near Fulton.

The study team then selected plant-capacity sizes and feedstock types to evaluate in conjunction with the three sites. The resulting example ethanol plants to be studied were:

- A 5-MGPY corn-processing ethanol plant located in Evans Mills;

- A 29-MGPY corn-processing and vegetable-waste-processing ethanol plant located at the Griffiss Business and Technology Park, Rome; and
- A 29-MGPY corn-processing ethanol plant at the former Miller Brewery plant near Fulton.

Given that the primary feedstock for all three plants was corn, the study team explored the quantities potentially available within a 50-mile radius for ethanol production. In addition to reviewing corn production, the team assessed the amount of land potentially available for expanding feedstock production. By county, the team looked at: 1) the number of acres currently under cultivation, 2) the number of acres available but not currently in use, and 3) the increase/decrease in acres available for cultivation from 1969 to 1997. Corn production and available land within 50 miles of each of the three candidate sites are reported in Appendix B. (Only a portion of the corn production and idle land noted in Appendix B would be needed to produce ethanol at any of the three sites. Accordingly, Appendix B infers strong potential to expand production beyond the studied capacity at any of the three locations.)

PRODUCTION SITE SELECTION

Evans Mills

The Evans Mills location in Jefferson County was selected because of its proximity to large tracts of land that could be used to expand feedstock production, and it being in an area where dairy-processing wastes could potentially be incorporated. The site considered is on U.S. Route 11, just north of the village of Evans Mills. Land requirements for an ethanol plant were more than satisfied (hundreds of acres are available).

The plant proposed for the Evans Mills site was a 5-MGPY corn-to-ethanol facility. Corn availability in 1997 within a 50-mile radius was determined to be 74,617 tons (2,663,840 bushels). Preliminary investigation priced corn as a feedstock at $2.35 per bushel delivered. In addition to producing ethanol, the plant would yield DDGS as a byproduct that could be sold as a livestock feed.

While the Evans Mills site currently has no infrastructure, adequate power and water for a 5-MGPY plant are available nearby at Fort Drum. The study team anticipated the plant would have access to the municipal wastewater-treatment facility.

Transportation for feedstock and other plant inputs, and for the finished product, would be by truck utilizing Route 11 or by CSX Mainline rail. While the transportation cost for corn and DDGS is known (average $7.75 per ton for a typical 35-mile trip), a rough estimate was used of $1150 for a 20,000-gallon load (or 5.75 cents per gallon of ethanol) for delivery by rail to oil refineries on Staten Island via the Mohawk, Adirondack and Northern (MA&N)/CSX.

Griffiss Business and Technology Park, Rome NY

The Griffiss Business and Technology Park site is located at the corner of Otis Street and Ellsworth Road in Rome. At this location, part of the former Griffiss Air Force Base, 71 acres are cleared and available for a production facility. Centrally located in New York State, the Griffiss could receive not only corn from a large corn-production region of the State but also other feedstocks.

The type of plant proposed at Griffiss is a 29-MGPY corn-to-ethanol plant that could be adapted to process vegetable wastes into ethanol. Potential corn availability within a 50-mile radius in 1997 was determined to be 280,393 tons (10,010,041 bushels). Feedstock costs were determined to be $2.35/bu for the corn; the revenue received for processing agricultural wastes (snap bean, apple, cabbage, carrot, pea, beets, and grape) would be $50/ton. Again, DDGS would be a co-product of the production process. The cost to transport feedstocks to the plant and to deliver DDGS from the plant is anticipated to be $7.75 per ton for a typical 35-mile trip. This trucking cost is included in the feedstock costs noted above.

The Griffiss site's extensive infrastructure includes service roads and rail lines. A large steam plant and natural gas supplies are located across the street from the proposed site. Electric power is available for a plant of this size, and water and wastewater disposal is available through municipal facilities. Trucking ingress and egress occurs conveniently via an interchange at the Park's Skyline Gate that connects with Routes 49 and 365. Three NYS Thruway (I-90) interchanges exist within 18 miles of the site, and a fourth interchange is under construction. The Griffiss site is located on a Mohawk, Adirondack and Northern (MA&N)/CSX rail spur. The cost for delivery of ethanol by rail to oil refineries on Staten Island is estimated at $1150 for a 20,000-gallon load (5.75 cents per gallon).

Miller Brewery

Located in the town of Volney, near Fulton, in Oswego County, selection of the Miller Brewery site enabled the study team to examine how the presence of extensive infrastructure affected the economic feasibility of a 29-MGPY corn-to-ethanol plant. The team also included considered the plant's potential for processing biomass feedstocks into ethanol at a later date.

Preliminary investigation found that 623,706 tons (22,266,305 bushels) of corn were potentially available in 1997 within a 50-mile radius. The delivered cost of corn as a feedstock was estimated at $ 2.35/bushel. The cost to deliver corn was estimated at $7.75 per ton for trucking for an average 35-mile trip.

The 406-acre Miller Brewery property contains extensive on-site infrastructure. The 31 buildings on the site offer ample warehouse and packaging space, utilities, and water treatment and processing equipment (including tanks and compressors). Also, ample electric power is available (at 480 volts from an 115,000-volt incoming line), and wastewater can be treated either on-site or at the Fulton City plant at $3 per 1000

gallons. For details on the Miller Brewery infrastructure, including the on-site wastewater treatment facility, refer to Appendix E. Transportation routes include the readily accessible County Route 57 and State Route 481, and a rail spur from a nearby CSX rail line. The cost for delivery of ethanol by rail to oil refineries on Staten Island is estimated at $1150 for a 20,000-gallon load (5.75 cents per gallon).

Section 4

PLANT DESIGN AND COSTS

TECHNOLOGY OVERVIEW

Introduction to Corn-to-Ethanol Process

There are three main uses (industrial, beverage, and fuel) for ethanol. The production processes vary slightly for each of them, but the main steps are the same. The explanation below comes from the American Coalition for Ethanol (ACE), a non-profit membership association devoted to promoting the increased production and use of ethanol. ACE members are the leaders in the ethanol industry.

The vast majority of ethanol produced in the United States is used for fuel. It is blended with gasoline to increase the fuel blend's octane or to produce a cleaner-burning fuel. Most U.S. ethanol plants use a dry milling process, which NYCGA reviewed for this feasibility study. The major steps in dry milling ethanol are outlined, in sequence, below.

1. Milling: The corn (or barley or wheat) is first passed through hammer mills, which grind it into a fine powder called meal.

2. Liquefaction: The meal is then mixed with water and alpha-amylase, and passed through cookers, where the starch is liquefied. Heat is applied at this stage to enable liquefaction. Cookers with a high-temperature stage (120-150 degrees Celsius) and a lower-temperature (95 degrees Celsius) holding period are used. These high temperatures reduce bacteria levels in the mash.

3. Saccharification: The mash from the cookers is then cooled, and the secondary enzyme (glucoamylase) is added to convert the liquefied starch to fermentable sugars (dextrose).

4. Fermentation: Yeast is then added to the mash to ferment the sugars to ethanol and carbon dioxide. Using a continuous process, the fermenting mash is allowed to flow, or cascade, through several fermenters until it is fully fermented and leaves the final tank. Alternatively, with a batch fermentation process, the mash stays in a single fermenter for about 48 hours.

5. Distillation: The fermented mash (called "beer") contains about 10% alcohol, as well as all the non-fermentable solids from the corn and the yeast cells. The mash is pumped to a continuous-flow, multi-column distillation system, where the alcohol is removed from the solids and the water. The alcohol leaves the top of the final column at about 96% strength, and the residue mash, called stillage, is transferred from the base of the column to the co-product processing area.

6. Dehydration: The alcohol from the top of the column is passed through a dehydration system, where the remaining water is removed. Most ethanol plants use a molecular sieve to capture the last bit of water in the ethanol. The alcohol product at this stage is called anhydrous (pure, without water) ethanol and is approximately 200 proof.

7. Denaturing: Ethanol that will be used for fuel is denatured with a small amount (2-5%) of some product, like gasoline, making it unfit for human consumption.

In producing ethanol, two main co-products are created: carbon dioxide and DDGS. Carbon dioxide is given off in great quantities during fermentation, and many ethanol plants collect the carbon dioxide, clean it of any residual alcohol, compress it, and sell it for use in beverages or in flash freezing meat. DDGS, wet and dried, are high in protein and other nutrients and are a highly valued livestock feed ingredient. Some ethanol plants also create a "syrup" containing some solids that can be a separate production sold in addition to the DDGS, or combined with it. Ethanol production is a no-waste process that adds value to the corn by converting it into more valuable products.

Many large producers, such as Minnesota Corn Processors, make ethanol using a wet-milling process, which yields many additional products, such as high-fructose corn sweetener. Because of the size of the plant required for cost-effective wet milling of ethanol, this technology was not reviewed for use in New York State.

Biomass-to-Ethanol

In addition to considering the corn-to-ethanol process. NYSTEC, on a separate contract, studied the conversion of biomass to ethanol. The separate project was funded by the National Renewable Energy Laboratory (NREL) and included technical support from Raytheon Engineers and Constructors.

The biomass conversion process varies from conventional starch processing because of the need to ferment both six-carbon and five-carbon sugars. The feedstock must be reduced to a small and more homogenous particle size in order to improve material handling and the efficiency of hydrolysis. During hydrolysis, the cellulose fraction is converted to glucose, and the hemicellulose fraction is converted to a mixture of hexoses and pentoses (xylose, mannose, glucose, galactose, and arabinose). The lignin is not very soluble during hydrolysis; consequently, it precipitates and, hence, can be separated from the soluble sugars. Lignin is chemically and structurally different from the cellulosic portion of the biomass and is unchanged during the pretreatment process. The lignin is recovered and used as a fuel to generate steam or electricity.

The two technological barriers to cellulosic biomass conversion have been the lack of an efficient method for hydrolyzing cellulose into glucose and the lack of an effective organism for fermenting the five-carbon sugars (xylose) recovered from the hemicellulose fraction of the biomass. Since the fermentation process

uses only soluble monosaccharides, the cellulose and hemicellulose must be hydrolyzed before fermentation.

Two methods currently are available for hydrolysis of cellulose and hemicellulose: enzyme hydrolysis and acid hydrolysis. The NREL study reviewed the enzymatic hydrolysis process. Enzymatic hydrolysis involves pretreatment steps that allow increased access for enzymes to the cellulose component of the feedstock. Different feedstocks require different degrees of pretreatment, depending on the complexity of the cellulose component. Without some form of pretreatment, the efficiency of hydrolysis is greatly reduced. Enzymatic processing offers a number of advantages for converting cellulosic biomass into fuels. First, the enzymes used in bioprocessing are typically capable of catalyzing only one target organic molecule, thereby obtaining a level of efficiency required for effective hydrolysis. Second, the enzyme activity occurs at near-ambient pressures and temperatures (30 to 60 degrees Celsius). There is also potential for the recovery of unused enzymes. After hydrolysis, the cellulose-based biomass is subjected to fermentation. The fermentation process and separation of ethanol are similar to those for starch-based feed stocks.

Although the NREL study provided a promising analysis of the future use of biomass feedstocks for a large ethanol production facility in New York State, NYSTEC determined that it was unlikely that such a facility would be financially feasible under current conditions. After further research into the lignocellulosic technology, it is likely that production-scale biomass-to-ethanol conversion facilities will become economical. The NREL study confirms information provided to the NYCGA team by Vogelbusch USA about similar work that Vogelbusch has done in analyzing biomass-to-ethanol processing facilities.

Technology-Engineering Company

There are really only a few companies in the world that can build ethanol processing facilities that would be cost-effective, economic, and efficient — characteristics that are needed in order for ethanol to compete as a fuel with subsidized oil and gasoline.

Six companies that belong to the American Coalition for Ethanol have designed and built ethanol production facilities. These companies have a track record in the industry and have been responsible for the continuing effort to improve the efficiency of the ethanol production industry. One of those companies, Vogelbusch USA, was the technology-engineering company for this project.

SELECTED TECHNOLOGY

Technology and Appropriate Feedstocks

Vogelbusch USA reviewed technologies for their applicability to NYCGA's ethanol-production project. Feedstock considerations played the major role in determining what technologies were applicable to the NYCGA project.

Feedstock costs on a per-gallon-of-ethanol basis provided an important benchmark for decision-making. Based on the operating-cost estimates, the feedstock cost for corn, taking byproduct credits into consideration, was $0.46/gallon (based on midwest corn prices) and $0.79/gallon (based on determined data, with transportation costs included). For fruit and vegetable wastes, a credit of $2.40 to $7.50 per gallon is available depending upon current disposal costs. The cheese whey cost/gallon is favorable (with a waste-disposal credit of approximately $1.00).

Fruit and vegetable wastes can be added directly to the corn-slurry section of the plant. The fruit and vegetable waste-storage area would represent a small addition in scope from an equipment-and-operating-cost perspective. The trade-off becomes the incremental increase in capital investment and operating expenses vs. the incremental increase in alcohol production, reduction in process water usage, and waste-disposal credit. The potential feedstock credit, if all of the defined fruit and vegetable waste sources are used, is $11,152,680. The estimated water savings are $27,000. The incremental increase in capital cost is $96,355. Depending on the quantity of feedstock available at a reasonable distance (35-40 miles) from the processing site, the payback period could be very short.

The feedstock credit for the use of all available cheese whey statewide is $1,132,243. The processing of cheese whey would require the addition of proper storage facilities, a parallel fermentation system, a separate beer column, and a feed concentration evaporator or membrane filtration unit. The preliminary cost estimate for the additional equipment required is well in excess of $1,000,000. Additional operating costs for steam consumption would be in the region of $250,000 per year for the recovery of the incremental alcohol (approximately 5% maximum) in a dilute-distillation feed stream.

Technology Application

The processes and unit operations employed by Vogelbusch USA in producing ethanol, as shown in the block flow diagram (Figure 4-1), are well proven and state of the art. Special consideration has been given to environmental concerns, as well as to operability of the plant with minimum downtime and labor requirements. The equipment would comply with all applicable safety standards and code requirements. Materials of construction were selected to resist corrosion and minimize contamination.

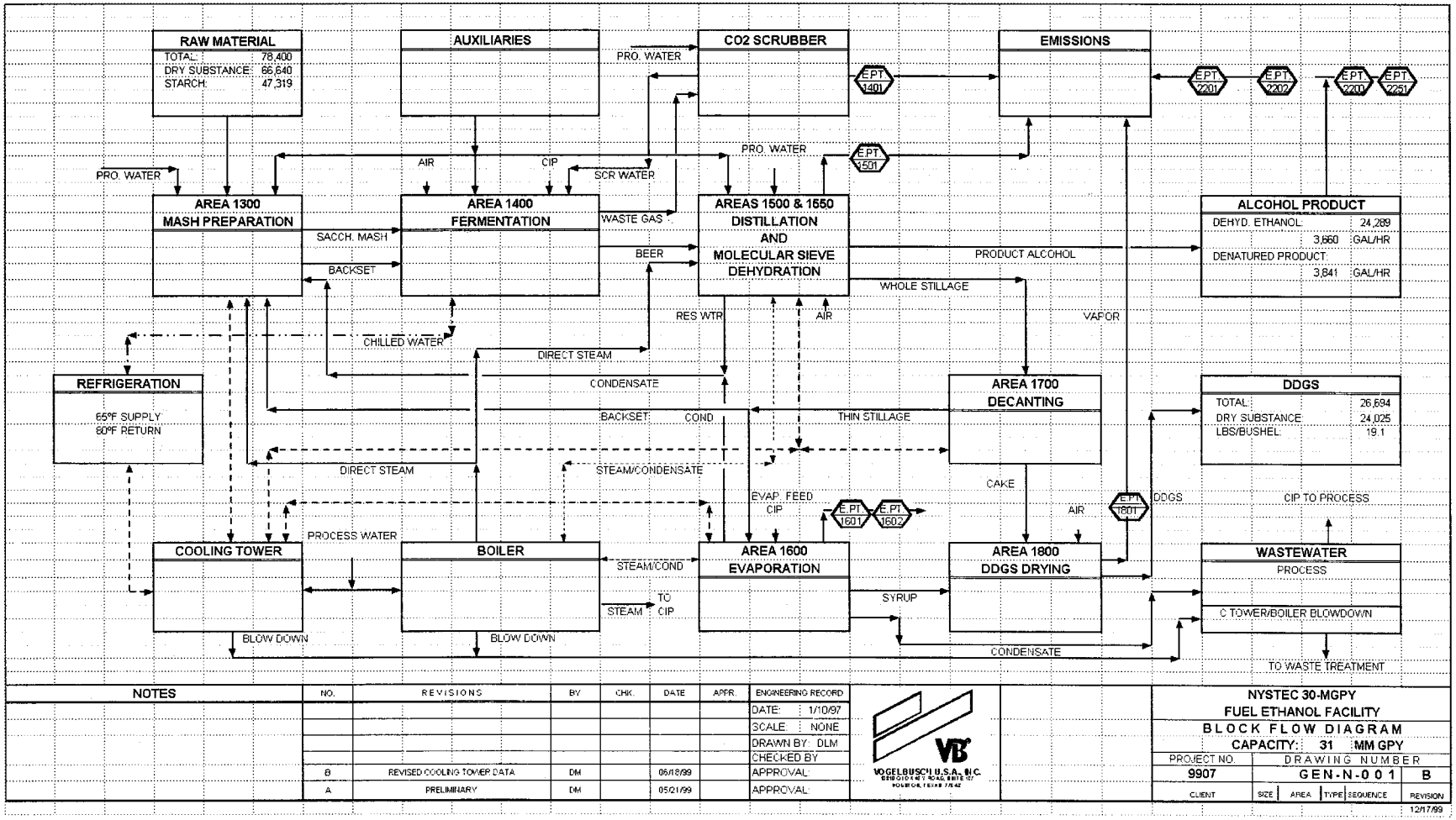

Figure 4-1, Ethanol Plant Block Flow Diagram

Independent Technology Review

The baseline design and cost data provided by Vogelbusch USA were independently reviewed by Dr. Hunter and Dr. Hirasuna. Their review provided the following conclusions.

- The values and assumptions made by Vogelbusch USA with respect to composition of corn, corn-to-alcohol conversion, and carbon dioxide generation are reasonable.
- The 15 days of downtime in plant operation should be adjusted upward to accommodate first-year start-up.
- Additional information from Vogelbusch USA on the individual areas of preparation/mashing, fermentation, and distillation is necessary to further assess equipment lists and operating conditions.
- Additional information with respect to equipment lists is necessary for a more complete analysis of the recommended process.
- The quoted equipment prices are reasonable; however, closer examination of the process strategy (based on the additional information) is required to ensure that the proper equipment was selected.
- Costs of raw materials, value of (and market for) by-products, and utility costs need to be refined to reflect conditions in New York State.

Dr. Hunter and Dr. Hirasuna concluded that Vogelbusch USA's design calculations were appropriate; however, these independent reviewers were concerned about the composition data on alternative feedstocks that was provided to Vogelbusch USA for its calculations. They felt that the composition information was faulty. Additional data was obtained using new sources, with Dr. Hunter and Dr. Hirasuna providing composition data for many of the feedstocks.

Activities were undertaken by the project team to address the issues presented by the independent review team. The modified composition data and other information were provided to Vogelbusch USA and incorporated into study activities.

BASE CASE PLANT

Based on the selected feedstocks, capital, equipment, and operating cost estimates were made for 29,000,000-gallon/year, 15,000,000-gallon/year, and 5,000,000-gallon/year corn-to-ethanol facilities.

Except for variations in production rates and grind rates, identical assumptions were made in analyzing the three plant sizes:

- Yield - 2.60 gallons/bushel,
- Operating days - 350/year,
- Corn price - $2.35/bushel,
- Carbon dioxide price - $9.00/ton,

- DDGS price - $100.00/ton, and
- Denaturant price - $0.50/gallon.

Typically, ethanol producers do not themselves process and market food-grade carbon dioxide (CO_2), but rather enter into a long-term contract with a firm that locates its own processing facility adjacent to the ethanol plant and buys the CO_2 byproduct. Further investigation of CO_2 manufacturers and their interest in co-locating would be a next step in business development.

CO_2 processing facilities associated with ethanol facilities producing less than 29 million gallons of ethanol per year are rare. However, the financial projections for this project will assume a CO_2 facility at each ethanol plant site.

EVANS MILLS SITE (REFERENCE APPENDIX D)

This section outlines the preliminary analysis developed by the technology provider for the Evans Mills site. The full text and charts for the preliminary analysis are provided in Appendix D. In Section 5, the NYCGA team has outlined an adjusted pro forma that includes suggestions from NYSTEC and the independent review team.

The projections are for a facility that will produce 5,000,000 gallons per year of 200-proof ethanol from corn. Product yields are based on the following conversion factors:

Ethanol	2.62 anhydrous gallons per bushel of corn,
Carbon dioxide	16.6 pounds per bushel of corn, and
DDGS	18.4 pounds (at 10% moisture) per bushel of corn.

The annual design production capacities of the plant are:

Fuel-grade ethanol	5,263,158 gallons,
Carbon dioxide	15,879 tons, and
DDGS	17,557 tons.

Corn consumption is estimated at 1,908,397 bushels annually, based on a moisture content of 15.5% and 70% starch on a dry basis. Annual production and consumption rates are based on 350 operating days per year, allowing 15 days for scheduled and unscheduled maintenance and cleaning.

The total installed plant cost was estimated at $17,942,890. The total estimated project cost includes additional working capital and reserves equal to 10% of the estimated installed plant cost:

Capital Improvements	$17,942,890
Working Capital & Reserves	$1,794,289
Total	$19,737,179

The facility would be constructed over an 18-month period. After construction, the plant would be started in month 19 and would be expected to achieve an overall production rate of 30% of rated capacity. It is assumed that production in month 20 would be 70% of rated capacity, with full rated capacity anticipated for month 21.

The pro-forma financial statements will reflect the following prices for products and raw material:

Corn	$2.35/bushel
Fuel Ethanol	$1.15/gallon
Carbon Dioxide	$9.00/ton
DDGS	$100.00/ton

The following costs were used to determine variable operating costs for the proposed facility:

Corn	$2.35/bushel
Chemicals	current prices
Enzymes	current prices
Water	$1.80/1000 gallon
Wastewater	$0.01/gallon of ethanol
Electricity	$0.08/kWh
Natural Gas	$3.20/mcf

Maintenance and operating costs per anhydrous ethanol gallon produced are:

Corn	$0.8969
Chemicals and Enzymes	$0.0957
Water	$0.0195
Wastewater Treatment	$0.0100
Electricity	$0.1088
Natural Gas	$0.1760
Maintenance	$0.0538

Salaries and wages required to operate and maintain the facility are included in the plant operating expenses. It is estimated that the plant operations will employ 36 persons when the facility achieves full production. Total annual compensation, including 30% for benefits, is estimated to be $1,398,800 in year 3, and is adjusted annually by increasing this cost by 2% per year.

It is also estimated that the organization will also require an additional staff of seven to perform administrative duties. Total annual compensation, including 30% for benefits, is anticipated to be $448,500 in year 3, and is adjusted annually by increasing this cost by 2% per year.

Provisions for relocation of three specially qualified (key) employees, who may not be readily available in the vicinity of the plant site, are included in Plant Salaries and Benefits and Administrative Salaries and Benefits. A one-time payment for moving expenses of $15,000 per key employee, for a total of $45,000, is provided.

The proposed project never shows a profit and has steadily increasing annual cash flow deficits, averaging $2,865,281 in years 3 through 12. The last year shown in the projections (year 12) has the largest cash flow deficit ($2,961,185).

After-tax income for the proposed project is never positive, but does improve slightly. Annual after-tax income averages -$3,539,249 in years 3 through 12. The best after-tax income (-$3,181,949) is in year 12. This represents an average annual return on investment of –18%.

Cumulative earnings reach a low at the end of year 12 of -$40,057,047.

GRIFFISS BUSINESS AND TECHNOLOGY PARK SITE (REFERENCE APPENDIX E)

Projections for the Griffiss site are for a facility that would produce a nominal 29,000,000 gallons per year of 200-proof ethanol, primarily from corn. Details are provided in Appendix E. Small quantities of fruit and vegetable wastes would supplement the corn on a seasonal basis. Ethanol yields were based on information supplied by NYSTEC for fruit and vegetable wastes available to the Griffiss Park facility. For the purposes of these projections, seasonally available waste supplies were averaged over the year. Product yields are based on the following conversion rates:

Ethanol	2.62 anhydrous gallons per bushel of corn, 5.55 anhydrous gallons per ton of fruit and vegetable waste,
Carbon dioxide	16.6 pounds per bushel of corn, 35.3 pounds per ton of fruit and vegetable waste,
DDGS	18.4 pounds (at 10% moisture) per bushel of corn, and 0.16 pounds per ton of fruit and vegetable waste.

The annual design production capacities of the plant are:

Fuel-grade ethanol	31,578,947 gallons,
Carbon dioxide	95,274 tons, and
DDGS	105,251 tons.

Corn consumption was estimated at 11,445,321 bushels annually, based on a moisture content of 15.5% and 70% starch on a dry basis. Fruit and vegetable waste consumption was estimated at 2,389 tons annually, based on a composite moisture content of 82.2% and 4.0% fermentable sugars on an as-is basis. Annual production and consumption rates were based on 350 operating days per year, allowing 15 days for scheduled and unscheduled maintenance and cleaning.

The total installed plant cost was estimated at $44,953,174. The total estimated project cost also includes working capital and reserves equal to 10% of the estimated installed plant cost:

Capital Improvements	$44,953,174
Working Capital & Reserves	$4,495,317
Total	$49,448,492

The facility would be constructed over an 18-month period. After construction, the plant would be started in month 19 and would be expected to achieve an initial overall production rate of 30% of rated capacity. It is assumed that production in month 20 would be 70% of rated capacity, with full rated capacity anticipated for month 21.

The pro-forma financial statements reflect the following prices and credits for products and raw materials:

Corn	$2.35/bushel.
Fruit & Vegetable Waste	-$50.00/ton (credit),
Fuel Ethanol	$1.15/gallon,
Carbon Dioxide	$9.00/ton, and
DDGS	$100.00/ton.

The following costs and credits were used to determine operating costs:

Corn	$2.35/bushel,
Fruit & Vegetable Waste	-$50.00/ton,
Chemicals	current prices,
Enzymes	current prices
Water	$0.64/1000 gallons,
Wastewater	$0.01/gallon of ethanol,
Electricity	$0.062/kWh,
Natural Gas	$3.20/mcf, and
150-psi steam	$5.65/1000 lbs.

Maintenance and operating costs per anhydrous ethanol gallon produced are:

Corn	$0.8966
Fruit and Vegetable Waste	($0.0040) (credit)
Chemicals and Enzymes	$0.0995
Water	$0.0063
Wastewater Treatment	$0.0100
Electricity	$0.0843
Natural Gas	$0.0000
150 psi steam	$0.2622
Maintenance	$0.0225

Salaries and wages required to operate and maintain the facility are included in the plant operating expenses. It is estimated that the plant operations will employ 36 persons when the facility achieves full production. Total annual compensation, including 30% for benefits, is estimated to be $1,398,800 in year 3, and is adjusted annually by increasing this cost by 2% per year.

It is also estimated that the organization will also require a staff of seven to perform administrative duties. Total annual compensation, including 30% for benefits, is anticipated to be $448,500 in year 3, and is adjusted annually by increasing this cost by 2% per year.

Provisions for relocation of three specially qualified (key) employees, who may not be readily available in the vicinity of the plant site, are included in Plant Salaries and Benefits and Administrative Salaries and Benefits. A one-time payment for moving expenses of $15,000 per key employee, for a total of $45,000, is provided.

The cash flow for the proposed project is negative in all but the last year ($40,565 in year 12), averaging a negative $344,082 in years 3 through 12.

After-tax income for the project shows steady improvement, but is never positive. Annual after-tax income for years 3 through 12 averages -$1,842,632, representing an average annual return on investment of minus 3.7%.

Cumulative earnings at the end of year 12 are -$29,163,198.

MILLER BREWERY SITE (REFERENCE APPENDIX F)

The Miller Brewery site design and cost were variants of the Griffiss Park site. The single point of variation was that the Miller site had usable equipment from the existing brewery configuration. The usable equipment represents cost-savings compared to the Griffiss configuration and would result in a lower initial capital cost. All other costs associated with the Miller Brewery site are identical to the Griffiss site above and are not replicated here.

The plant size was initially determined to be 15 MGPY and was the basis of the cost comparison showing potential savings by avoiding new equipment and using existing equipment in the Miller Brewery.

Process tanks were matched according to their suitability for an alcohol plant and, where necessary, the number of tanks was increased to fit the total capacity. Savings were estimated for costs of erection and concrete foundations avoided for the above tanks. At this stage, there was insufficient information to estimate the instrumentation savings, but a certain amount of instrumentation from the existing brewery could likely be used. A further estimate was made of the value of existing utilities that would be re-used in an alcohol plant. Lastly, an estimate was made for site improvements and buildings.

The total savings calculated would reduce the cost of a new 15-MGPY plant by approximately $8.1 million (about 30%). Note that the utilities and process equipment of the brewery would support a considerably larger ethanol plant, in which the economics would be greatly improved. The areas of savings and their associated amounts are:

Process Equipment:	$3,054,857,
Utilities:	$4,530,000, and
Buildings & Site Improvements:	$500,000.

Section 5

ECONOMIC AND FINANCIAL EVALUATION

THE MODEL

If the potential capital and operating costs, product prices, and rates of return were known for the entire time horizon, an economic and financial evaluation would be easy to accomplish. Investors could readily make appropriate investment decisions. However, it is not possible to know these numbers with certainty before the plant is operational. Ethanol production costs are particularly difficult to predict because they require purchase of variable feedstocks with fluctuating prices. The ethanol product price also fluctuates due to other factors (such as gasoline costs) that are only minimally correlated with cost fluctuations in input parameters. Uncertainties in key variables are quite likely to create significant fluctuations in potential rates of return. Therefore, the model used must be able to assess and comprehend the changes that are created by uncertainty in specific variables.

For this project, Vogelbusch USA provided NYSTEC with a basic pro-forma in a hardcopy format that included data for the ethanol-production facility. NYSTEC modified this pro-forma to use in a format it developed using Spreadware, a high-quality commercial off-the-shelf (COTS) pro forma software package. NYSTEC adjusted the program to accommodate a large not-yet-built ethanol-production facility. The format could easily be used to review the profitability of the ethanol-production facility, account for State-specific issues, and coordinate the sensitivity-analysis phase of the project. Although the time horizon is longer, the bottom-line results for the early years of the Griffiss and Evans Mills plants from the NYSTEC/Spreadware approach are the same as the results from the Vogelbusch USA format. For the Miller site at Fulton, Vogelbusch USA provided NYSTEC with potential cost-savings data, and NYSTEC created a new pro-forma based upon the effect that these savings would have on a plant similar to the one designed for the Griffiss site.

Production and investment decisions are not made with perfect knowledge about the future and are based on a desire to maximize the present value of future net revenues. Based on the potential uncertainties, the modules focus on discounted cash flow as the basis of long-term economic viability. By calculating the current dollar (discounted) value of future profits, a realistic return on investment can be determined. This return on investment must be assessed in conjunction with risk level. The baseline scenarios reviewed for this project have significantly different levels of risk and potential return.

The New York State ethanol industry has one aspect that is not captured in the discounted cash flow and risk assessment data from a standard pro forma. A large ethanol industry will have a positive net effect on the depressed rural economy. This is likely to provide further encouragement for participation in a farmer-

owned ethanol-production operation. Additional profits will revert back to farmer investors through the development of a more stable overall farm economy. These advantages are not quantified in the NYSTEC model, but they would accrue to any farmer-investor group and the farm community as a whole, should an ethanol plant be built. The advantages that this industry may provide to State government are quantified and discussed in the sensitivity analysis subsection later in this report.

PRO-FORMA DESIGN

The baseline pro-forma designs address the following four cost scenarios.

- Evans Mills baseline design for a 5-MGPY plant at Evans Mills (Appendix H).
- Griffiss baseline design for a 29-MGPY plant at the Griffiss Business and Technology Park. Steam is purchased from the park's existing steam plant (Appendix I).
- Griffiss alternative design, which, because of the high cost of purchasing steam from the existing Griffiss steam plant, incorporates the development and use of a new steam plant owned by the ethanol facility (Appendix J).
- Miller Brewery design for a 29-MGPY plant placed at the existing Miller Brewery in Oswego County. The pro-forma assumes that the plant would operate similarly to the plant in the Griffiss alternative design by supplying its own steam. Purchase of this site would include title to the existing buildings, tanks, steam plant, transportation infrastructure, and wastewater treatment plant. Based upon Vogelbusch USA estimates that have been re-scaled from a 15-MGPY plant to a 29-MGPY operation, NYSTEC has noted further reduced capital costs in aspects where savings can be realized (Appendix K).

All costs contained in the appended pro-forma pages on capital costs, materials, labor, taxes, revenue, and transportation are in 1999 dollars because NYSTEC believes that inflation will impact all these areas equally. By using estimated costs based on a single-year dollar value, NYSTEC was able to provide straight-line estimates of income and operating expenses. (A series of technical and political issues can be expected to impact the cost of ethanol and the cost of inputs to the process; these are reviewed in the sensitivity analysis, which follows.) The debt-service page and the income statement are provided with charts in two separate formats. One format is in baseline-year (1999) dollars, while the other is in actual-year dollars based upon an annual 2% inflation rate.

The first two years of the financial pro forma are considered to be construction years. Each plant is estimated to have an 18-month construction and ramp-up phase, with periodic testing and shut-downs. During the following six months, some testing and tuning will be required before the plant reaches full capacity. By 'Year 1', the third year in the pro-forma, it is assumed that the plant would be running at full capacity. Note that 'Year 1' in the NYSTEC pro-forma coincides with 'Year 3' in the data provided by Vogelbusch.

ASSUMPTIONS

Vogelbusch USA compiled costs and provided them to NYSTEC for completion of the pro forma. Summary pages for the three sites are contained in Appendices H through K. Project costs in the pro forma are detailed by category, as outlined in the sections that follow.

Capital and Site Review

The first page of each pro forma reviews the up-front costs. The total capital and site costs are provided as the input to the debt and depreciation calculations in the second page.

Direct field costs include construction equipment, tools, supplies, and temporary facilities. Additional field costs cover field staff and legalities. Start-up and testing are not included in these costs, but are covered through calculation of the losses of product for sale within the two construction years. Engineering costs, overtime, permits, and insurance add an additional amount. Taxes are assumed to be waived for the purchase of construction materials and equipment — which is standard for most large industrial job-creation projects. A contingency equal to a percentage of total field and home office costs is assessed to cover minor items not included in the equipment list, unknown equipment requirements, unknown site requirements, and other unidentified costs.

The estimate does not include the cost of off-site roads, railroads, and utility connections. These off-site costs are assumed to be covered by the appropriate utility, agency, or railroad that would benefit from the economic impact of providing these upgrades.

Debt Schedule

The second page of each pro forma shows the debt-repayment estimates. The debt includes the addition of 10% of construction costs for working capital. The base case assumes a 30% up-front equity provided by the plant owners. Other debt-to-equity ratios are reviewed in the sensitivity analysis.

The debt payments are based on a 15-year loan at an interest rate of 10%. Long-term debt is calculated and summarized in actual-year dollars. At the bottom of the debt-schedule page, these numbers are converted into 1999 dollars. Debt levels during the construction years are based on the level of completion of plant construction and equipment orders. During the first construction year, only the loan fees will be collected, as outlined in the Generally Accepted Accounting Principles (GAAP).

The plant depreciation is provided on a straight-line basis over 15 years, based upon the GAAP standards. Start-up expenses are amortized over the five years beginning in the start-up year, as per GAAP.

Materials

The third page of each pro forma outlines the material costs provided by Vogelbusch USA. The baseline case assumes that material costs will remain constant, except for inflationary effects. This page includes all feedstock costs, operating chemicals, process water, natural gas, steam, electricity, disposal costs, maintenance materials, and incidentals. Although the plant will not produce product at 50% of capacity in the second construction year, it is assumed that 50% of supplies and feedstock will be required. This accounts for the inevitable unusable batches, start-up challenges, and ramp-up problems that must be addressed and resolved in this year.

Labor

Based on the estimates provided by Vogelbusch USA, each plant would require 36 production employees and 7 administrative employees. Labor and fringe rates were provided by Vogelbusch USA. Production employees average $15 per hour and administrative employees average $25 per hour. All employees require an employer contribution to benefits equal to an additional 30% of salary.

Tax Impacts

The fifth page of the pro forma addresses federal, state, and local tax costs, as well as state and local government incentives. The baseline includes a rate of 35% of revenues as a federal tax. Because federal taxes are not due until all losses from previous years of operation are written off, there are no federal taxes until the cumulative total bottom line from plant operations becomes positive.

State and local taxes are assumed to be offset by any state and local incentives provided over the first ten years. Property taxes are assumed to be waived. This is based on the average type of incentives provided by the State of New York, counties, and municipalities. The effect of additional incentives will be reviewed in more detail in the sensitivity analysis phase.

State benefits are realized and incentives granted through the assessment of potential new tax revenue from job creation. NYSTEC collected data on these effects from the Public Policy Institute of New York, and provided some preliminary data based upon the direct plant jobs and their induced multiplier effects. These effects are quantified on the tax-impacts page. Additional details, including estimates of indirect non-farm jobs and their induced multiplier effects, are discussed in the sensitivity analysis section of the report.

Revenue Forecast

The sixth page of the pro forma presents the proposed sale prices of products. It is assumed that the process will produce dried DDGS for on-farm sales. No co-product will be burned for generating electricity for

on-site or off-site use. CO_2 produced by the process will be sold at an estimated $9 per ton. The ethanol sale price was set at $1.15 per gallon at the plant gate, and does not account for product transportation costs.

Income Statement

The seventh page of the pro forma ties together the figures from the other pages, and presents a total picture of the financial status of the facility. This is done through five separate types of analysis. First, this page provides a summary, in 1999 dollars, of the income and expenses from each previous page. Second, using the 2% annual inflation rate, the income and expenses are converted to actual dollar values predicted for any given year. The third analysis shows capital equipment depreciation. The fourth analysis considers the net present value of profit and capital investments — helping financial supporters review the return on investment. Finally, expenses are broken down to show their cost per gallon of denatured ethanol in the first full-scale year of production.

Summary of Transportation Costs

The final page of the pro forma outlines the costs to transport feedstock from the farm to the plant and finished product from the plant to the consumer. This is not a standard pro-forma page. Trucking costs from the farm to the plant are estimated at $7.35 per ton, based on local costs charged for transporting farm goods 35 miles, the average shipping distance from points within 50 miles of the plant to the actual plant site. Rail costs from the plant to the consumer are estimated at 5.75 cents per gallon, based on the cost of tank-car lease and transportation cost estimates provided by the Mohawk, Adirondack and Northern Railroad for transport from upstate New York to the New York City area. Costs to transport feedstock have been included in the feedstock costs.

SUMMARY OF BASELINE PRO FORMAS

Evans Mills Scenario (Reference Appendix H)

Using state-of-the-art Vogelbusch USA technology, a 5-MGPY ethanol-production plant in Evans Mills would lose $3.8 million in the first full year of production.

The annual plant losses would decrease to $1.3 million by the twentieth year, and the plant would never show a profit. By the end of this twentieth year, the cumulative loss would be $52.4 million.

A plant this size cannot justify the large up-front capital investment. This can clearly be determined from the negative Net Present Value Analysis in the Income Statement page of the pro forma. The baseline plant

requires an initial investment of $19.7 million to cover capital costs and working capital during construction and produces a negative return at the end of the twentieth year. It would continue its losses beyond this point; accordingly, this baseline scenario would not justify investments to construct the plant.

Griffiss Scenario (Reference Appendix I)

A 29-MGPY ethanol-production plant at the Griffiss Business and Technology Park in Rome using Vogelbusch USA state-of-the-art technology would produce a first-year total loss of $3.1 million. The plant would begin reporting a profit in year 12, with a significant jump in income upon completion of the depreciation schedule in year 15. By year 20, the plant would have an annual pre-tax income of $5.7 million and after-tax income of $3.9 million. By year 20, the plant would almost have offset all losses and be close to paying federal tax for the first time. At the end of this twentieth year, cumulative losses would be down to $4.4 million.

Although a small cumulative profit would be achieved in the 21st year, the magnitude of the profit would not justify the large up-front capital investment. Therefore, this baseline scenario would not justify investments for constructing the plant. An alternative for Griffiss follows.

Griffiss Alternative Scenario (Reference Appendix J)

An identical 29-MGPY ethanol-production plant at Griffiss Park in Rome NY using Vogelbusch USA state-of-the-art technology was reviewed with the additional cost of constructing a separate steam plant. Because it does not rely on any site-specific equipment, the alternative facility is not unique to Griffiss; it could be located at any available and prepared site with similar costs and utilities. Numerous such sites were found and reviewed for this feasibility study.

In the first full year of production, the Griffiss alternative ethanol plant would report a total loss of $1.1 million. The plant would begin reporting yearly income in year 5, and would see a significant jump in income with the completion of the depreciation schedule in year 15. By year 20, the plant would have annual pre-tax income of $9.4 million, and after-tax income of $6.1 million. In year 12, the plant would have offset all losses and would pay federal tax for the first time. At the end of this twentieth year, the present value of all profits would be $26.9 million.

The significant profit shown over the 20 years might justify the up-front capital investment. This can be determined from the Net Present Value Analysis in the Income Statement page of the pro forma. This alternative plant would require an initial investment of $53.0 million to cover capital costs and provide working capital during construction. The return on investment this scenario provides after 20 years is 52% over the annual effects of inflation, making this alternative scenario potentially viable. Additional opportu-

nities to increase the return and advance the feasibility of this scenario will be reviewed in the project's sensitivity analysis phase.

Miller Brewery Site Scenario (Reference Appendix K)

A 29-MGPY plant at the existing Miller Brewery in the Fulton/Volney area of Oswego County would operate like the Griffiss alternative plant, supplying its own steam. The Miller site scenario would also include purchasing the existing buildings, tanks, steam plant, transportation infrastructure, and wastewater treatment plant. Based upon Vogelbusch USA estimates that have been re-scaled from a 15-MGPY plant to a 29-MGPY operation, NYSTEC has noted reduced capital costs in aspects where savings can be realized. Although additional land and unused warehouses are available at the site, this scenario assumes that no rent is received for these facilities.

In the first full year of production, the ethanol plant losses would total $0.2 million. The plant would begin reporting yearly income in year 2, and would experience a significant jump in income with the completion of the depreciation schedule in year 15. By year 20, the plant would have an annual pre-tax income of $9.4 million, and after-tax income of $6.1 million. In year 9, the plant would have offset all losses and would pay federal tax for the first time. The present value of all profits at the end of 20 years is $33.9 million.

The significant profit shown over the 20 years might justify the up-front capital investment. This can be determined from the Net Present Value Analysis on the Income Statement page of the pro forma. The plant would require an initial investment of $46.2 million to cover site purchase, capital costs, and working capital during construction. This scenario presents a return on investment after 20 years that is 72% over the annual effects of inflation and is, therefore, potentially viable. Additional opportunities to increase the return and advance the feasibility of this scenario will be reviewed in the project's sensitivity analysis phase. That analysis will include the effect of income generated from renting or selling the unneeded space and facilities.

SENSITIVITY ANALYSIS

Because of the large number of parameters — including feedstock cost, ethanol price, and co-product prices — that affect the ethanol industry, a sensitivity analysis was developed to more carefully assess the risk and return-on-investment opportunities associated with an ethanol-processing plant. Results are provided in tables later in this subsection.

NYSTEC used the Agricultural Systems Economic Evaluation Development (ASEED) model to analyze the effect of price fluctuations in capital costs, debt costs, transportation, labor, and feedstock costs on the feasibility of ethanol production. Detailed analyses were conducted in a number of areas. For the Evans Mills scenario, Griffiss alternative scenario, and the Miller scenario, the following issues were reviewed.

- Unforeseen start-up problems have not been quantified in the engineering cost estimates. Start-up problems are unlikely, but could cause a loss of revenue within the first two months (assuming 50% downtime) that could add to the current cost of construction.
- Cost of environmental permitting and regulation could add $250,000 to project construction and start-up costs.
- Various interest rates may be available. The interest rates calculated are based on the assumption that the initial investors for the capital expenses would use loans and would expect a fixed rate of return from the plant. The current case is based on a 10% interest rate, which is 8% above the set inflation rate. With better bank financing, or a government guarantee, lower rates may be available. Government support could bring rates to the rate of inflation (2%). Supported interest rates set at prime could set interest rates at 7% (5% above inflation). High interest rates (13% or more above inflation) were also reviewed.
- Investor-owned plants should provide some up-front dollars for funding the program. The current pro forma assumes a 2.33:1 debt-to-equity ratio. These funds may not be available in New York. Cases in which no equity or half equity (5.67:1) is provided were reviewed.
- GAAP suggests depreciation based upon a straight-line rate over the life of the plant. It has been assumed that this will occur over 15 years. Variation of depreciation curves for longer or shorter plant lifetimes (including 10 and 20 years) were assessed.
- Annual cost of corn feedstock is set at $2.35. Other costs were reviewed, including 15 percent above and below this cost.
- Variations in oil prices will affect the price of ethanol, the cost of feedstocks, and the cost of transportation for feedstocks and finished products. These variations would also require adjusting the sale price of ethanol to account for its reliance on the price refiners and blenders pay for gasoline. The effects of oil costs increasing 20% and decreasing 20% were assessed, along with the effects that such variations would have on the cost of ethanol, feedstock, and transportation.
- A 7% rate change in truck transport cost was assessed. This would produce an increase in feedstock costs.
- A 7% rate change in rail transport cost was assessed, based on the issues that may result from rail mergers and/or the potential cost savings from use of a short line vs. CSX lines. Although rail costs would not directly affect plant economics, it is assumed that the refiner or blender will be interested in maintaining or decreasing the as-delivered cost of ethanol.
- Base assumptions include a property tax exemption for the life of the plant and a sales tax incentive on the purchase of materials. The effect of removing these incentives was assessed.
- The effect of other state government incentives, including a producer credit over the early years of the plant, a renewable energy credit that provides a long-term small incentive for ethanol purchase, and a set of economic development incentives that cover start-up costs were assessed.
- The effects of a 15% higher ethanol price, due to increased demand, and a 15% lower price, due to lower-than-expected demand, were assessed.
- The effect on profit was assessed for different CO_2 markets. Based upon evidence of a short supply of CO_2 for upstate New York producers, this product is likely in high demand. If so, prices higher than the initial prediction ($9 per ton) are possible, up to $11. Effects of these higher prices were assessed.
- Market fluctuations for DDGS may result in prices other than $100 per ton. Prices of $80 and $120 were also reviewed.

- The electricity industry is currently restructuring, which makes assessing electric costs very difficult. The effect of higher or lower (by 35%) electric costs was assessed.

An additional scenario — in which unused land and facilities on the site are rented for $20,000 or for $50,000 per year — was assessed for the Miller Brewery site.

An additional scenario was also reviewed for the Evans Mills site. Evans Mills is a small operation and could be run without the DDGS drying operation. The value of this change was reviewed.

Finally, although it does not affect the bottom line, NYSTEC reviewed the multiplier effect on jobs and economic development. Based upon information provided by the NYCGA and on tax data from the Policy Institute of New York State, NYSTEC was able to provide a more comprehensive assessment of on-farm and off-farm jobs created by the potential ethanol industry and the effect that these would have on State revenues.

PARAMETERS, RESULTS, AND CONCLUSIONS

The results of the sensitivity analysis are reviewed in six tables. The first three tables (Tables 5-1, 5-2, and 5-3) outline the different scenarios that were studied and a number of key parameters from the adjusted pro-forma for each analysis. The key parameters are:

- Profit for the course of the first full year of production (in dollars from that year).
- Profit for the tenth year of production (in dollars from that year).
- Profit for the twentieth year of production (in dollars from that year).
- Construction cost.
- Total debt, which is the construction cost plus working capital minus any equity brought before construction.
- Present value after 10 years. This shows the value of all profits from the construction years through the tenth year of full production, in 1999 dollars.
- Present value after 20 years. This shows the value of all profits from the construction years through the twentieth year of full production, in 1999 dollars.

Table 5-1, Sensitivity Analysis: Effect on 5-MGPY Plant at Evans Mills NY

Scenario	Change Created by Scenario	Year 1 (First Full-Scale Year) Profit	Year-10 Profit	Year-20 Profit	Construction Cost	Total Debt	Ten-Year Present Value of Profit	Twenty-Year Present Value of Profit
BASELINE SCENARIO		($3,886,905)	($3,181,945)	($1,371,711)	$17,942,890	$13,816,025	($37,223,805)	($52,410,627)
01a. Start-up Problems	Reduce Construction Year 2 product sales by 17%	($3,886,905)	($3,181,945)	($1,371,711)	$17,942,890	$13,816,025	($38,549,016)	($53,735,839)
Change from Baseline ---------->		$0	$0	$0	$0	$0	($1,325,211)	($1,325,211)
02a. Extra Permit Costs	Add $250,000 to the cost of construction permitting	($3,923,078)	($3,209,891)	($1,371,711)	$18,192,890	$14,008,525	($37,540,806)	($52,805,775)
Change from Baseline ---------->		($36,173)	($27,946)	$0	$250,000	$192,500	($317,001)	($395,147)
03a. Fifteen percent interest rate	Increase interest rate to 15%	($4,577,706)	($3,732,118)	($1,371,711)	$17,942,890	$13,816,025	($43,199,204)	($59,738,488)
Change from Baseline ---------->		($690,801)	($550,174)	$0	$0	$0	($5,975,399)	($7,327,860)
03b. Five percent interest rate above inflation	Reduce interest rate to 7%	($3,472,424)	($2,896,970)	($1,371,711)	$17,942,890	$13,816,025	($33,848,369)	($48,371,981)
Change from Baseline ---------->		$414,481	$284,975	$0	$0	$0	$3,375,436	$4,038,647
03c. Zero percent interest rate above inflation	Reduce interest rate to 2%	($2,781,623)	($2,511,293)	($1,371,711)	$17,942,890	$13,816,025	($28,696,157)	($42,376,157)
Change from Baseline ---------->		$1,105,282	$670,652	$0	$0	$0	$8,527,648	$10,034,470
04a. No Debt to Equity Ratio	Include 0% up-front equity in the plant	($4,486,915)	($3,528,886)	($1,371,711)	$17,942,890	$19,737,179	($41,764,811)	($57,721,964)
Change from Baseline ---------->		($600,010)	($346,942)	($0)	$0	$5,921,154	($4,541,006)	($5,311,337)
04b. Half the Debt to Equity Ratio	Include 15% up-front equity in the plant	($4,186,910)	($3,355,416)	($1,371,711)	$17,942,890	$16,776,602	($39,494,308)	($55,066,296)
Change from Baseline ---------->		($300,005)	($173,471)	($0)	$0	$2,960,577	($2,270,503)	($2,655,668)
05a. Ten-year depreciation	Depreciate plant construction costs over 10 years	($4,510,472)	($1,934,811)	($1,371,711)	$17,942,890	$13,816,025	($41,995,320)	($53,208,604)
Change from Baseline ---------->		($623,567)	$1,247,134	$0	$0	$0	($4,771,515)	($797,976)
05b. Twenty-year depreciation	Depreciate plant construction costs over 20 years	($3,575,122)	($2,870,161)	($1,371,711)	$17,942,890	$13,816,025	($34,055,388)	($51,656,922)
Change from Baseline ---------->		$311,783	$311,783	$0	$0	$0	$3,168,417	$753,706
06a. Competitive Feedstock Market	Corn feedstock costs increased 15%	($4,559,615)	($3,985,895)	($2,351,722)	$17,942,890	$13,816,025	($44,294,554)	($66,208,476)
Change from Baseline ---------->		($672,710)	($803,951)	($980,011)	$0	$0	($7,070,749)	($13,797,849)
06b. Less Competitive Feedstock Market	Corn feedstock costs decreased 15%	($3,214,195)	($2,377,994)	($391,700)	$17,942,890	$13,816,025	($30,153,056)	($38,612,779)
Change from Baseline ---------->		$672,710	$803,951	$980,011	$0	$0	$7,070,749	$13,797,849
07a. Lower Oil Prices by approximately 20%	Lower truck and rail costs, ethanol sale price and feedstock price	($4,459,684)	($3,866,469)	($2,206,142)	$17,942,890	$13,816,025	($42,941,568)	($63,856,185)
Change from Baseline ---------->		($572,779)	($684,524)	($834,431)	$0	$0	($5,717,763)	($11,445,557)
07b. Higher Oil Prices by approximately 20%	Raise truck and rail costs, ethanol sale price and feedstock price	($3,315,547)	($2,499,119)	($539,350)	$17,942,890	$13,816,025	($31,520,253)	($40,993,491)
Change from Baseline ---------->		$571,358	$682,826	$832,361	$0	$0	$5,703,552	$11,417,136
08a. Truck transport cost increase	Increase truck transportation (and feedstock) cost by 7%	($3,923,430)	($3,225,596)	($1,424,921)	$17,942,890	$13,816,025	($37,606,708)	($53,158,780)
Change from Baseline ---------->		($36,525)	($43,651)	($53,210)	$0	$0	($382,903)	($748,153)
08b. Truck transport cost decrease	Decrease truck transportation (and feedstock) cost by 7%	($3,850,380)	($3,138,294)	($1,318,501)	$17,942,890	$13,816,025	($36,840,902)	($51,662,474)
Change from Baseline ---------->		$36,525	$43,651	$53,210	$0	$0	$382,903	$748,153
09a. Rail transport cost increase	Increase rail costs 7% and adjust feedstock sale price accordingly	($3,903,484)	($3,201,758)	($1,395,863)	$17,942,890	$13,816,025	($37,389,594)	($52,742,206)
Change from Baseline ---------->		($16,579)	($19,813)	($24,152)	$0	$0	($165,789)	($331,579)
09b. Rail transport cost decrease	Decrease rail costs 7% and adjust feedstock sale price accordingly	($3,870,326)	($3,162,131)	($1,347,558)	$17,942,890	$13,816,025	($37,058,015)	($52,079,048)
Change from Baseline ---------->		$16,579	$19,813	$24,152	$0	$0	$165,789	$331,579
10a. Full State Property and Income Taxes	Include property taxes, State income tax at 5%, equip. sales tax at 7%	($3,964,256)	($3,245,506)	($1,384,822)	$18,415,277	$14,179,763	($37,930,794)	($53,355,277)
Change from Baseline ---------->		($77,351)	($63,561)	($13,111)	$472,387	$363,738	($706,989)	($944,650)
11a. State Producer Credit - 20 cents per gallon	20-cent-per-gallon producer credit through year 3, phase out to year 7	($2,834,273)	($3,181,945)	($1,371,711)	$17,942,890	$13,816,025	($33,120,999)	($48,307,821)
Change from Baseline ---------->		$1,052,632	$0	$0	$0	$0	$4,102,806	$4,102,806
11b. State Start-up Incentive	State covers losses in construction years 1 and 2	($3,886,905)	($3,181,945)	($1,371,711)	$17,942,890	$13,816,025	($32,559,247)	($47,746,069)
Change from Baseline ---------->		$0	$0	$0	$0	$0	$4,664,558	$4,664,558
11c. State Producer Credit - 5 cents per gallon	5-cent-per-gallon producer credit through all years	($3,623,747)	($2,867,447)	($988,340)	$17,942,890	$13,816,025	($34,487,577)	($47,042,820)
Change from Baseline ---------->		$263,158	$314,498	$383,371	$0	$0	$2,736,228	$5,367,807
12a. Higher product demand	Increase ethanol sale price by 15%	($2,979,010)	($2,096,926)	($49,080)	$17,942,890	$13,816,025	($28,144,857)	($34,252,732)
Change from Baseline ---------->		$907,895	$1,085,018	$1,322,631	$0	$0	$9,078,948	$18,157,895
12b. Higher product supply	Reduce ethanol sale price by 15%	($4,794,800)	($4,266,963)	($2,694,342)	$17,942,890	$13,816,025	($46,302,752)	($70,568,522)
Change from Baseline ---------->		($907,895)	($1,085,018)	($1,322,631)	$0	$0	($9,078,948)	($18,157,895)
13a. Higher market for carbon dioxide	Increase carbon dioxide sale price from $9 per ton to $11 per ton	($3,855,147)	($3,143,991)	($1,325,445)	$17,942,890	$13,816,025	($36,893,595)	($51,762,837)
Change from Baseline ---------->		$31,758	$37,954	$46,265	$0	$0	$330,210	$647,790
14a. Higher market for DDGS	Increase DDGS sale price from $100 per ton to $120 per ton	($3,535,760)	($2,762,294)	($860,159)	$17,942,890	$13,816,025	($33,572,055)	($45,247,427)
Change from Baseline ---------->		$351,145	$419,651	$511,552	$0	$0	$3,651,750	$7,163,200
14b. Lower market for DDGS	Decrease DDGS sale price from $100 per ton to $80 per ton	($4,238,050)	($3,601,596)	($1,883,263)	$17,942,890	$13,816,025	($40,875,555)	($59,573,827)
Change from Baseline ---------->		($351,145)	($419,651)	($511,552)	$0	$0	($3,651,750)	($7,163,200)
15a. Higher electric costs	Increase cost of electricity by 35%	($4,077,305)	($3,409,490)	($1,649,088)	$17,942,890	$13,816,025	($39,318,205)	($56,409,027)
Change from Baseline ---------->		($190,400)	($227,546)	($277,377)	$0	$0	($2,094,400)	($3,998,400)
15b. Lower electric costs	Decrease cost of electricity by 35%	($3,696,505)	($2,954,399)	($1,094,334)	$17,942,890	$13,816,025	($35,129,405)	($48,412,227)
Change from Baseline ---------->		$190,400	$227,546	$277,377	$0	$0	$2,094,400	$3,998,400
18a. No DDGS Drying	Remove cost of DDGS drying section construction	($3,642,262)	($2,992,944)	($1,371,711)	$16,252,118	$12,514,131	($35,079,899)	($49,738,212)
Change from Baseline ---------->		$244,643	$189,001	$0	($1,690,771)	($1,301,894)	$2,143,906	$2,672,415

Table 5-2, Sensitivity Analysis: Effect on 29-MGPY Plant at Griffiss

Scenario	Change Created by Scenario	Year 1 (First Full-Scale Year) Profit	Year-10 Profit	Year-20 Profit	Construction Cost	Total Debt	Ten-Year Present Value of Profit	Twenty-Year Present Value of Profit
BASELINE SCENARIO		($1,120,065)	$2,165,579	$6,086,613	$48,173,974	$37,093,960	($6,358,398)	$26,901,020
01a. Start-up Problems	Reduce Construction Year 2 product sales by 17%	($1,120,065)	$2,165,579	$6,086,613	$48,173,974	$37,093,960	($14,308,116)	$21,123,724
Change from Baseline ---------->		$0	$0	$0	$0	$0	($7,949,718)	($5,777,296)
02a. Extra Permit Costs	Add $250,000 to the cost of construction permitting	($1,156,238)	$2,137,633	$6,086,613	$48,423,974	$37,286,460	($6,675,399)	$26,628,728
Change from Baseline ---------->		($36,173)	($27,946)	$0	$250,000	$192,500	($317,001)	($272,292)
03a. Fifteen percent interest rate	Increase interest rate to 15%	($2,974,763)	$688,445	$6,086,613	$48,173,974	$37,093,960	($22,401,450)	$13,095,254
Change from Baseline ---------->		($1,854,698)	($1,477,134)	$0	$0	$0	($16,043,052)	($13,805,767)
03b. Five percent interest rate above inflation	Reduce interest rate to 7%	($7,246)	$1,904,952	$6,086,613	$48,173,974	$37,093,960	$1,402,120	$34,280,387
Change from Baseline ---------->		$1,112,819	($260,627)	$0	$0	$0	$7,760,518	$7,379,367
03c. Zero percent interest rate above inflation	Reduce interest rate to 2%	$1,847,452	$2,578,016	$6,086,613	$48,173,974	$37,093,960	$10,617,688	$44,968,186
Change from Baseline ---------->		$2,967,517	$412,437	$0	$0	$0	$16,976,086	$18,067,166
04a. No Debt to Equity Ratio	Include 0% up-front equity in the plant	($2,731,003)	$1,234,092	$6,086,613	$48,173,974	$52,991,371	($18,550,319)	$16,888,187
Change from Baseline ---------->		($1,610,938)	($931,486)	$0	$0	$15,897,411	($12,191,922)	($10,012,833)
04b. Half the Debt to Equity Ratio	Include 15% up-front equity in the plant	($1,925,534)	$1,699,836	$6,086,613	$48,173,974	$45,042,666	($12,454,359)	$21,925,840
Change from Baseline ---------->		($805,469)	($465,743)	$0	$0	$7,948,706	($6,095,961)	($4,975,180)
05a. Ten-year depreciation	Depreciate plant construction costs over 10 years	($2,791,421)	$5,508,290	$6,086,613	$48,173,974	$37,093,960	($19,147,561)	$24,781,576
Change from Baseline ---------->		($1,671,356)	$3,342,711	$0	$0	$0	($12,789,164)	($2,119,445)
05b. Twenty-year depreciation	Depreciate plant construction costs over 20 years	($284,387)	$1,950,817	$6,086,613	$48,173,974	$37,093,960	$1,022,778	$28,536,719
Change from Baseline ---------->		$835,678	($214,762)	$0	$0	$0	$7,381,176	$1,635,699
06a. Competitive Feedstock Market	Corn feedstock costs increased 15%	($5,154,540)	($2,655,993)	$3,486,551	$48,173,974	$37,093,960	($48,764,142)	($40,307,570)
Change from Baseline ---------->		($4,034,475)	($4,821,572)	($2,600,062)	$0	$0	($42,405,745)	($67,208,590)
06b. Less Competitive Feedstock Market	Corn feedstock costs decreased 15%	$2,914,410	$4,541,648	$9,906,968	$48,173,974	$37,093,960	$23,385,279	$81,330,232
Change from Baseline ---------->		$4,034,475	$2,376,069	$3,820,355	$0	$0	$29,743,677	$54,429,212
07a. Lower Oil Prices by approximately 20%	Lower truck and rail costs, ethanol sale price and feedstock price	($4,553,583)	($1,937,794)	$4,362,032	$48,173,974	$37,093,960	($40,633,419)	($26,167,277)
Change from Baseline ---------->		($3,433,518)	($4,103,372)	($1,724,581)	$0	$0	($34,275,022)	($53,068,297)
07b. Higher Oil Prices by approximately 20%	Raise truck and rail costs, ethanol sale price and feedstock price	$2,304,207	$4,067,636	$9,329,150	$48,173,974	$37,093,960	$17,984,930	$71,963,562
Change from Baseline ---------->		$3,424,272	$1,902,057	$3,242,537	$0	$0	$24,343,328	$45,062,542
08a. Truck transport cost increase	Increase truck transportation (and feedstock) cost by 7%	($1,339,097)	$1,903,815	$5,879,206	$48,173,974	$37,093,960	($8,655,355)	$23,868,475
Change from Baseline ---------->		($219,032)	($261,764)	($207,407)	$0	$0	($2,296,958)	($3,032,545)
08b. Truck transport cost decrease	Decrease truck transportation (and feedstock) cost by 7%	($901,033)	$2,427,342	$6,294,021	$48,173,974	$37,093,960	($4,061,440)	$29,918,058
Change from Baseline ---------->		$219,032	$261,764	$207,407	$0	$0	$2,296,958	$3,017,038
09a. Rail transport cost increase	Increase rail costs 7% and adjust feedstock sale price accordingly	($1,219,539)	$2,046,699	$5,992,419	$48,173,974	$37,093,960	($7,353,134)	$25,559,557
Change from Baseline ---------->		($99,474)	($118,880)	($94,194)	$0	$0	($994,737)	($1,341,463)
09b. Rail transport cost decrease	Decrease rail costs 7% and adjust feedstock sale price accordingly	($1,020,591)	$2,284,459	$6,180,808	$48,173,974	$37,093,960	($5,363,661)	$28,236,415
Change from Baseline ---------->		$99,474	$118,880	$94,194	$0	$0	$994,737	$1,335,395
10a. Full State Property and Income Taxes	Include property taxes, State income tax at 5%, equip. sales tax at 7%	($1,270,199)	$2,044,522	$5,600,930	$49,128,639	$37,829,052	($7,712,918)	$23,439,804
Change from Baseline ---------->		($150,134)	($121,057)	($485,683)	$954,665	$735,092	($1,354,520)	($3,461,216)
11a. State Producer Credit - 20 cents per gallon	20-cent-per-gallon producer credit through year 3, phase out to year 7	$5,195,724	$1,407,626	$6,086,613	$48,173,974	$37,093,960	$11,918,441	$43,639,304
Change from Baseline ---------->		$6,315,789	($757,953)	$0	$0	$0	$18,276,839	$16,738,284
11b. State Start-up Incentive	State covers losses in construction years 1 and 2	($1,120,065)	$2,165,579	$6,086,613	$48,173,974	$37,093,960	$3,568,719	$36,828,137
Change from Baseline ---------->		$0	$0	$0	$0	$0	$9,927,117	$9,927,117
11c. State Producer Credit - 5 cents per gallon	5-cent-per-gallon producer credit through all years	$458,882	$2,634,169	$7,581,762	$48,173,974	$37,093,960	$6,326,150	$48,310,170
Change from Baseline ---------->		$1,578,947	$468,590	$1,495,148	$0	$0	$12,684,548	$21,409,150
12a. Higher product demand	Increase ethanol sale price by 15%	$4,327,303	$5,639,197	$11,244,875	$48,173,974	$37,093,960	$32,720,369	$99,849,126
Change from Baseline ---------->		$5,447,368	$3,473,619	$5,158,262	$0	$0	$39,078,767	$72,948,106
12b. Higher product supply	Reduce ethanol sale price by 15%	($6,567,433)	($4,344,531)	$1,428,233	$48,173,974	$37,093,960	($63,078,039)	($68,750,396)
Change from Baseline ---------->		($5,447,368)	($6,510,109)	($4,658,380)	$0	$0	($56,719,642)	($95,651,416)
13a. Higher market for carbon dioxide	Increase carbon dioxide sale price from $9 per ton to $11 per ton	($929,517)	$2,393,301	$6,267,048	$48,173,974	$37,093,960	($4,374,132)	$29,515,657
Change from Baseline ---------->		$190,548	$227,722	$180,435	$0	$0	$1,984,266	$2,614,637
14a. Higher market for DDGS	Increase DDGS sale price from $100 per ton to $120 per ton	$984,946	$3,042,821	$8,079,906	$48,173,974	$37,093,960	$9,954,558	$55,357,995
Change from Baseline ---------->		$2,105,011	$877,242	$1,993,293	$0	$0	$16,312,956	$28,456,975
14b. Lower market for DDGS	Decrease DDGS sale price from $100 per ton to $80 per ton	($3,225,076)	($350,105)	$4,093,321	$48,173,974	$37,093,960	($28,279,612)	($2,690,848)
Change from Baseline ---------->		($2,105,011)	($2,515,683)	($1,993,293)	$0	$0	($21,921,214)	($29,591,868)
15a. Higher electric costs	Increase cost of electricity by 35%	($2,005,425)	$1,107,492	$5,248,242	$48,173,974	$37,093,960	($16,097,358)	$14,216,404
Change from Baseline ---------->		($885,360)	($1,058,087)	($838,372)	$0	$0	($9,738,960)	($12,684,616)
15b. Lower electric costs	Decrease cost of electricity by 35%	($234,705)	$2,095,383	$6,924,985	$48,173,974	$37,093,960	$1,856,254	$39,331,957
Change from Baseline ---------->		$885,360	($70,196)	$838,372	$0	$0	$8,214,652	$12,430,937

Table 5-3, Sensitivity Analysis: Effect on 29-MGPY Plant at Miller Brewery

Scenario	Change Created by Scenario	Year 1 (1st Full-Scale Year) Profit	Year 10 Profit	Year 20 Profit	Construction Cost	Total Debt	Ten Year Present Value Profit	Twenty Year Present Value Profit
BASELINE SCENARIO		($207,305)	$1,868,391	$6,086,613	$41,978,460	$32,323,414	$969,450	$33,982,897
01a. Start-up Problems	Reduce Construction Year 2 product sales by 17%	($207,305)	$2,874,447	$6,086,613	$41,978,460	$32,323,414	($5,909,323)	$28,335,264
Change from Baseline ----------->		$0	$1,006,057	$0	$0	$0	($6,878,774)	($5,647,633)
02a. Extra Permit Costs	Add $250,000 to the cost of construction permitting	($244,162)	$1,849,781	$6,086,613	$42,228,460	$32,515,914	$738,961	$33,700,197
Change from Baseline ----------->		($36,857)	($18,609)	$0	$250,000	$192,500	($230,489)	($282,700)
03a. Fifteen percent interest rate	Increase interest rate to 15%	($1,823,475)	$1,587,283	$6,086,613	$41,978,460	$32,323,414	($13,263,835)	$21,256,933
Change from Baseline ----------->		($1,616,171)	($281,107)	$0	$0	$0	($14,233,285)	($12,725,964)
03b. Five percent interest rate above inflation	Reduce interest rate to 7%	$762,398	$2,301,756	$6,086,613	$41,978,460	$32,323,414	$6,807,869	$40,829,869
Change from Baseline ----------->		$969,702	$433,366	$0	$0	$0	$5,838,418	$6,846,973
03c. Zero percent interest rate above inflation	Reduce interest rate to 2%	$2,378,568	$2,888,260	$6,086,613	$41,978,460	$32,323,414	$15,626,234	$50,931,126
Change from Baseline ----------->		$2,585,873	$1,019,869	$0	$0	$0	$14,656,784	$16,948,229
04a. No Debt to Equity Ratio	Include 0% up-front equity in the plant	($1,611,064)	$2,062,757	$6,086,613	$41,978,460	$46,176,306	($9,718,783)	$24,646,930
Change from Baseline ----------->		($1,403,760)	$194,366	$0	$0	$13,852,892	($10,688,233)	($9,335,967)
04b. Half the Debt to Equity Ratio	Include 15% up-front equity in the plant	($909,185)	$2,468,602	$6,086,613	$41,978,460	$39,249,860	($3,839,194)	$29,354,872
Change from Baseline ----------->		($701,880)	$600,211	$0	$0	$6,926,446	($4,808,644)	($4,628,025)
05a. Ten-year depreciation	Depreciate plant construction costs over 10 years	($1,663,988)	$5,787,813	$6,086,613	$41,978,460	$32,323,414	($9,106,101)	$32,231,012
Change from Baseline ----------->		($1,456,683)	$3,919,423	$0	$0	$0	($10,075,551)	($1,751,885)
05b. Twenty-year depreciation	Depreciate plant construction costs over 20 years	$521,037	$2,341,813	$6,086,613	$41,978,460	$32,323,414	$5,941,485	$35,288,357
Change from Baseline ----------->		$728,342	$473,422	$0	$0	$0	$4,972,035	$1,305,460
06a. Competitive Feedstock Market	Corn feedstock costs increased 15%	($4,241,780)	($1,947,124)	$3,486,551	$41,978,460	$32,323,414	($40,365,350)	($29,920,186)
Change from Baseline ----------->		($4,034,475)	($3,815,515)	($2,600,062)	$0	$0	($41,334,800)	($63,903,083)
06b. Less Competitive Feedstock Market	Corn feedstock costs decreased 15%	$3,827,171	$5,002,412	$9,906,968	$41,978,460	$32,323,414	$28,867,894	$88,105,431
Change from Baseline ----------->		$4,034,475	$3,134,022	$3,820,355	$0	$0	$27,898,444	$54,122,534
07a. Lower Oil Prices by approximately 20%	Lower truck and rail costs, ethanol sale price and feedstock price	($3,640,823)	($1,228,925)	$4,362,032	$41,978,460	$32,323,414	($32,234,627)	($15,779,893)
Change from Baseline ----------->		($3,433,518)	($3,097,316)	($1,724,581)	$0	$0	($33,204,077)	($49,762,790)
07b. Higher Oil Prices by approximately 20%	Raise truck and rail costs, ethanol sale price and feedstock price	$3,216,967	$4,528,400	$9,329,150	$41,978,460	$32,323,414	$23,487,693	$78,758,908
Change from Baseline ----------->		$3,424,272	$2,660,009	$3,242,537	$0	$0	$22,518,242	$44,776,012
08a. Truck transport cost increase	Increase truck transportation (and feedstock) cost by 7%	($426,337)	$2,214,916	$5,879,206	$41,978,460	$32,323,414	($589,396)	$31,000,342
Change from Baseline ----------->		($219,032)	$346,526	($207,407)	$0	$0	($1,558,847)	($2,982,555)
08b. Truck transport cost decrease	Decrease truck transportation (and feedstock) cost by 7%	$11,727	$2,038,537	$6,294,021	$41,978,460	$32,323,414	$2,518,170	$36,955,324
Change from Baseline ----------->		$219,032	$170,146	$207,407	$0	$0	$1,548,719	$2,972,427
09a. Rail transport cost increase	Increase rail costs 7% and adjust feedstock sale price accordingly	($306,778)	$1,862,281	$5,992,419	$41,978,460	$32,323,414	$298,197	$32,665,064
Change from Baseline ----------->		($99,474)	($6,110)	($94,194)	$0	$0	($671,254)	($1,317,833)
09b. Rail transport cost decrease	Decrease rail costs 7% and adjust feedstock sale price accordingly	($107,831)	$1,945,663	$6,180,808	$41,978,460	$32,323,414	$1,639,513	$35,299,539
Change from Baseline ----------->		$99,474	$77,272	$94,194	$0	$0	$670,063	$1,316,642
10a. Full State Property and Income Taxes	Include property taxes, state income tax at 5%, equip. sales tax at 7%	($304,757)	$1,668,314	$5,596,560	$42,537,733	$32,754,055	$155,742	$30,371,877
Change from Baseline ----------->		($97,453)	($200,077)	($490,053)	$559,273	$430,641	($813,708)	($3,611,020)
11a. State Producer Credit - 20 cents per gallon	20-cent-per-gallon producer credit through year 3, phase out to year 7	$6,108,485	$1,868,391	$6,086,613	$41,978,460	$32,323,414	$17,389,542	$50,402,989
Change from Baseline ----------->		$6,315,789	$0	$0	$0	$0	$16,420,092	$16,420,092
11b. State Start-up Incentive	State covers losses in construction years 1 and 2	($207,305)	$1,868,391	$6,086,613	$41,978,460	$32,323,414	$10,077,404	$43,090,850
Change from Baseline ----------->		$0	$0	$0	$0	$0	$9,107,953	$9,107,953
11c. State Producer Credit - 5 cents per gallon	5-cent-per-gallon producer credit through all years	$1,371,643	$3,094,933	$7,581,762	$41,978,460	$32,323,414	$11,896,475	$55,173,080
Change from Baseline ----------->		$1,578,947	$1,226,542	$1,495,148	$0	$0	$10,927,025	$21,190,183
12a. Higher product demand	Increase ethanol sale price by 15%	$5,240,064	$6,099,962	$11,244,875	$41,978,460	$32,323,414	$38,191,470	$106,612,811
Change from Baseline ----------->		$5,447,368	$4,231,571	$5,158,262	$0	$0	$37,222,020	$72,629,914
12b. Higher product supply	Reduce ethanol sale price by 15%	($5,654,673)	($3,635,662)	$1,428,233	$41,978,460	$32,323,414	($54,679,247)	($58,363,012)
Change from Baseline ----------->		($5,447,368)	($5,504,053)	($4,658,380)	$0	$0	($55,648,697)	($92,345,909)
13a. Higher market for carbon dioxide	Increase carbon dioxide sale price from $9 per ton to $11 per ton	($16,757)	$2,016,410	$6,267,048	$41,978,460	$32,323,414	$2,308,248	$36,560,254
Change from Baseline ----------->		$190,548	$148,019	$180,435	$0	$0	$1,338,798	$2,577,357
14a. Higher market for DDGS	Increase DDGS sale price from $100 per ton to $120 per ton	$1,897,707	$3,503,585	$8,079,906	$41,978,460	$32,323,414	$15,492,193	$62,188,213
Change from Baseline ----------->		$2,105,011	$1,635,194	$1,993,293	$0	$0	$14,522,742	$28,205,316
14b. Lower market for DDGS	Decrease DDGS sale price from $100 per ton to $80 per ton	($2,312,316)	$358,764	$4,093,321	$41,978,460	$32,323,414	($19,880,819)	$4,816,895
Change from Baseline ----------->		($2,105,011)	($1,509,627)	($1,993,293)	$0	$0	($20,850,269)	($29,166,002)
15a. Higher electric costs	Increase cost of electricity by 35%	($1,092,665)	$1,816,360	$5,248,242	$41,978,460	$32,323,414	($7,698,565)	$21,513,522
Change from Baseline ----------->		($885,360)	($52,031)	($838,372)	$0	$0	($8,668,015)	($12,469,375)
15b. Lower electric costs	Decrease cost of electricity by 35%	$678,055	$2,556,147	$6,924,985	$41,978,460	$32,323,414	$7,487,561	$46,255,848
Change from Baseline ----------->		$885,360	$687,757	$838,372	$0	$0	$6,518,111	$12,272,951
16a. Land rent at $20k	Adjust revenue for $20k per year land /warehouse rental income	($187,305)	$1,883,927	$6,105,552	$41,978,460	$32,323,414	$1,111,185	$34,254,631
Change from Baseline ----------->		$20,000	$15,536	$18,939	$0	$0	$141,734	$271,734
16b. Land rent at $50k	Adjust revenue for $50k per year land /warehouse rental income	($157,305)	$1,907,231	$6,133,960	$41,978,460	$32,323,414	$1,323,786	$34,662,233
Change from Baseline ----------->		$50,000	$38,841	$47,346	$0	$0	$354,336	$679,336
17a. Purchase site for $5 million	Adjust purchase price from $7.5 million to $5 million	$161,266	$2,054,483	$6,086,613	$39,478,460	$30,398,414	$3,266,349	$36,801,905
Change from Baseline ----------->		$368,570	$186,093	$0	($2,500,000)	($1,925,000)	$2,296,899	$2,819,008
17b. Purchase site for $10 million	Adjust purchase price from $7.5 million to $10 million	($575,875)	$2,588,151	$6,086,613	$44,478,460	$34,248,414	($1,356,847)	$31,140,493
Change from Baseline ----------->		($368,570)	$719,760	$0	$2,500,000	$1,925,000	($2,326,297)	($2,842,404)
17c. Purchase site for $15 million	Adjust purchase price from $7.5 million to $15 million	($1,313,016)	$2,015,558	$6,086,613	$49,478,460	$38,098,414	($8,151,331)	$25,366,431
Change from Baseline ----------->		($1,105,711)	$147,168	$0	$7,500,000	$5,775,000	($9,120,782)	($8,616,466)

The cases show the substantial range of incomes that can result from changes to variables in the baseline. A combination of trends in one direction or another could produce substantial profit or loss changes. However, the reader should be cautioned about assuming that the 20-year present value of profit would be reachable for some single cases. Although it is possible that corn costs, ethanol prices, electric costs, and DDGS prices could all stay in favor of the plant's profitability over 20 years, it is more likely that these variables would fluctuate from year to year. The sensitivity analysis is valuable because it shows the effect that a change in these prices would have in the profitability of a single year, as well as over 20 years. For some data points, focus should be placed on the single-year profits or losses that would result if variables swing in a certain direction. Corn costs are not expected to rise 15% and remain there for 20 years, which clearly would be disastrous for an ethanol-production facility. In such a case, corn farmers would be much more concerned about meeting current demands than about providing corn for ethanol. Finally, it should be noted that no single sensitivity factor gives the Evans Mills site a profitable profile.

Because the NYSTEC pro forma was developed to address the many complicated cost elements that are required for financial feasibility, some results may appear to be counterintuitive. Some cases that would seem likely to decrease overall profitability (e.g., case 01a at the Fulton/Volney site) result in an increase in profit in the tenth year. In this case, the result is due to the earlier break-even point of the more profitable operation. While the base case begins to assess federal taxes in earlier years, case 01a, which became profitable later, required full federal tax payments in the tenth year.

Construction Phase Issues

Problems in the construction phase can effect long-term profitability. Start-up problems (case 1a) could cause significant losses in 10-year profits. The Griffiss and Fulton sites will recover partially by the twentieth year. Extra permit costs (case 2a) produce a much smaller impact. Because that impact is reflected in the construction cost and the debt, it is spread over 15 years of operation. Overall, this impact is less than $0.5 million.

Loan and Debt Issues

Assistance with the loan, establishment of up-front equity, and adjustment in depreciation all have a potential effect on profitability. Loan reductions (cases 3b and 3c) provide an opportunity to significantly increase profit-making opportunities. A 3% reduction in the loan at the Griffiss site had an effect of increasing 20-year profits by $7.4 million. Loan guarantees could help any ethanol plant be more stable and profitable throughout the term of the loan.

Equity also has an important effect on profitability. A loss of the equity portion of the Griffiss financing (case 04a) would represent a $15.9-million increase in the size of the total debt. Over 20 years, this would

result in a $10.0-million reduction in total profits. Similar results are seen with the other cases that provide for less equity.

Longer depreciation (case 05b) would have a small effect on profitability. Depreciating the plant over 20 years instead of 15 years would result in an additional $1.6-million profit at the Griffiss site, $1.3-million profit at the Fulton site, and $0.8-million profit at the Evans Mills site.

Feedstock Cost

One of the most significant impacts on plant profitability is the cost of feedstock. Corn costs were adjusted by 15% for all years in cases 06a and 06b. Each year that corn prices are 15% off the baseline, the pre-tax profits are affected by $4.0 million in 1999 dollars at Griffiss and Fulton, and by $0.7 million at Evans Mills. The resulting effect of 20 years of lower corn prices could more than double the profit at the Griffiss plant, and could reduce the losses at Evans Mills by about 26%. But, long-term stability of corn prices at any level is unlikely. The baseline price was chosen as the likely future average price of corn supplied to the plant. Individual years with lower corn prices would provide a benefit to the plant, while individual years with higher corn prices would entail a significant economic hardship for the plant. Ethanol plants owned and operated by corn growers have an advantage: this cycle runs opposite the cycle of profits that would be seen on the individual corn farms of the plant owners.

Fuel and Transportation

Oil price fluctuations have a complicated effect on plant profits. While higher oil prices would result in higher transportation charges and, therefore, affect the cost of feedstock and the cost of delivering ethanol to suppliers, a price increase has another, more-beneficial effect. Ethanol sale prices tend to be set based upon the pre-tax cost of gasoline, adjusted for the federal ethanol subsidy. The result of this system is that the price a producer is willing to pay for ethanol goes up as the price of oil and gasoline go up. Therefore, for each year in which oil prices are up 20% (case 07b), ethanol profits at Griffiss and Fulton would be up $3.4 million in 1999 dollars. At Evans mills, prices would be up $0.6 million. Lower oil prices (case 07a) have a similar negative effect on the sale price of ethanol. Although a sustained, 10- or 20-year period with higher oil prices would have a significant effect on long-term profitability, such a situation is unlikely without significant policy changes or oil-supply issues. More likely, oil prices would fluctuate within the 20% range of the baseline. If supply issues caused oil prices to steadily rise over 20 years, the long-run profitability for the ethanol plant would be positively impacted.

The effect of differing rates for truck transportation (cases 08a and 08b) and rail transportation (09a and 09b) were also reviewed. A 7% cost increase in any year would result in some minor effects on yearly profits. Even over 20 years, the impacts of these costs would be much smaller than the impacts of many other factors that were reviewed for this analysis. Twenty years of lower truck prices would create a $3-

million impact at Griffiss and Fulton and a $0.7-million impact at Evans Mills. Twenty years of lower rail prices would create a $1.3-million impact at Griffiss and Fulton and a $0.3-million impact at Evans Mills.

State Taxes and Incentives

The base case assumes that no state sales tax is charged for construction equipment and no state income or property taxes are charged on the plant during years of operation. A case without these incentives (case 10a) was created, and it was found that the value of the incentives totaled $3.5 million in 1999 dollars over the 20-year duration of operation at Griffiss, $3.6 million at Fulton, and $0.9 million at Evans Mills.

Additional credits and incentives from the state were also reviewed. Two incentive programs produced similar results for the plant. One program (case lla) would institute a 20-cent-per-gallon producer credit through the third year of full-scale production, and phase it out by the sixth year. Another plan (case llc) would create a renewable-energy credit that totals 5 cents per gallon of product throughout the lifespan of the plant. At the Griffiss and Fulton sites, the producer credit would provide an additional $16 million by the twentieth year, while the energy credit would provide $21 million. At the Evans Mills site, the producer credit would provide $4.1 million, while the energy credit would provide $5.4 million. Although the dollar value of the producer credit is smaller, it could be more valuable to the plant, because it provides support during earlier years, when raising and providing capital to offset losses could be difficult.

Another way to offset early losses would be to provide State support for losses in the construction and start-up phase (case llb). At Griffiss, this would provide $9.9 million, at Fulton it would provide $9.1 million, and at Evans Mills it would provide $4.7 million.

The tax impacts and incentive impacts, along with job-creation estimates, for the three sites are shown in Tables 5-4, 5-5, and 5-6.

Table 5-4, Evans Mills Tax Impacts, Incentive Impacts, and Job-Creation Estimates

	Const. Yr 1	Const. Yr 2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Taxable income in actual year dollars	($18,421)	($4,646,137)	($3,886,905)	($3,862,252)	($3,833,628)	($3,800,605)	($3,464,548)	($3,421,267)	($3,372,027)	($3,316,200)	($3,253,093)
Cumulative taxable income	($18,421)	($4,664,558)	($8,551,463)	($12,413,716)	($16,247,344)	($20,047,948)	($23,512,497)	($26,933,764)	($30,305,791)	($33,621,991)	($36,875,083)
Discount Factor	1.00	1.00	1.00	0.98	0.96	0.94	0.92	0.91	0.89	0.87	0.85
Federal Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
State Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sales Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Property Taxes	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000
Incentives	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000
Total Tax Burden	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Jobs Created	9	35	43	43	43	43	43	43	43	43	43
Multiplier Jobs	11	41	52	52	52	52	52	52	52	52	52
Construction Jobs	33	33	3	0	0	0	0	0	0	0	0
On-Farm Jobs	0	30	67	67	67	67	67	67	67	67	67
Trucking Jobs	0	13	33	33	33	33	33	33	33	33	33
Multiplier from Farm & Trucking Jobs	0	52	120	120	120	120	120	120	120	120	120
State/Local Job Impact	$0	$3,440	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819
Total Impact Value	$0	$704,412	$2,485,979	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915
Producer Credit	$0.20	$0.20	$0.20	$0.20	$0.15	$0.10	$0.05	$0.00	$0.00	$0.00	$0.00
Cost of Producer Credit to NYS	$0	$418,596	$1,052,632	$1,052,632	$789,474	$526,316	$263,158	$0	$0	$0	$0
Total Remaining Gov't Revenue	$0	$285,817	$1,433,347	$1,407,283	$1,670,441	$1,933,599	$2,196,757	$2,459,915	$2,459,915	$2,459,915	$2,459,915

* All values in current year dollars

	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Taxable income in actual year dollars	($3,181,945)	($3,101,917)	($3,012,086)	($2,911,435)	($2,780,424)	($1,407,532)	($1,267,249)	($1,292,594)	($1,318,446)	($1,344,815)	($1,371,711)
Cumulative taxable income	($40,057,028)	($43,158,945)	($46,171,030)	($49,082,465)	($51,862,890)	($53,270,422)	($54,537,671)	($55,830,264)	($57,148,710)	($58,493,525)	($59,865,236)
Discount Factor	0.84	0.82	0.80	0.79	0.77	0.76	0.74	0.73	0.71	0.70	0.69
Federal Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
State Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sales Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Property Taxes	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000
Incentives	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000
Total Tax Burden	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Jobs Created	43	43	43	43	43	43	43	43	43	43	43
Multiplier Jobs	52	52	52	52	52	52	52	52	52	52	52
Construction Jobs	0	0	0	0	0	0	0	0	0	0	0
On-Farm Jobs	67	67	67	67	67	67	67	67	67	67	67
Trucking Jobs	33	33	33	33	33	33	33	33	33	33	33
Multiplier from Farm & Trucking Jobs	120	120	120	120	120	120	120	120	120	120	120
State/Local Job Impact	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819
Total Impact Value	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915
Producer Credit	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Cost of Producer Credit to NYS	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Remaining Gov't Revenue	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915	$2,459,915

Table 5-5, Griffiss Tax Impacts, Incentive Impacts, and Job-Creation Estimates

	Const. Yr 1	Const. Yr 2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Taxable income in actual year dollars	($49,459)	($9,877,658)	($1,120,065)	($874,761)	($615,212)	($340,197)	$397,870	$707,954	$1,037,914	$1,389,515	$1,764,695
Cumulative taxable income	($49,459)	($9,877,658)	($1,120,065)	($874,761)	($615,212)	($340,197)	$397,870	$707,954	$1,037,914	$1,389,515	$1,764,695
Discount Factor	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Federal Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
State Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sales Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Property Taxes	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000
Incentives	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000
Total Tax Burden	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Jobs Created	9	35	43	43	43	43	43	43	43	43	43
Multiplier Jobs	11	41	52	52	52	52	52	52	52	52	52
Construction Jobs	200	200	20	0	0	0	0	0	0	0	0
On-Farm Jobs	0	180	400	400	400	400	400	400	400	400	400
Trucking Jobs	0	80	200	200	200	200	200	200	200	200	200
Multiplier from Farm and Trucking Jobs	0	312	720	720	720	720	720	720	720	720	720
State/Local Job Impact	$0	$3,440	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819
Total Impact Value	$0	$2,917,762	$11,217,399	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015
Producer Credit	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cost of Producer Credit to NYS	$0	$418,596	$1,052,632	$1,052,632	$789,474	$526,316	$263,158	$0	$0	$0	$0
Total Remaining Government Revenue	$0	$2,499,167	$10,164,767	$10,008,384	$10,271,542	$10,534,699	$10,797,857	$11,061,015	$11,061,015	$11,061,015	$11,061,015

* All values in current year dollars

	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Taxable income in actual year dollars	$2,165,579	$2,594,501	$3,054,025	$3,546,965	$4,125,870	$8,037,929	$8,650,907	$8,823,926	$9,000,404	$9,180,412	$9,364,020
Cumulative taxable income	$2,165,579	$2,594,501	$3,054,025	$3,546,965	$4,125,870	$8,037,929	$8,650,907	$8,823,926	$9,000,404	$9,180,412	$9,364,020
Discount Factor	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Federal Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
State Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sales Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Property Taxes	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000
Incentives	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000
Total Tax Burden	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Jobs Created	43	43	43	43	43	43	43	43	43	43	43
Multiplier Jobs	52	52	52	52	52	52	52	52	52	52	52
Construction Jobs	0	0	0	0	0	0	0	0	0	0	0
On-Farm Jobs	400	400	400	400	400	400	400	400	400	400	400
Trucking Jobs	200	200	200	200	200	200	200	200	200	200	200
Multiplier from Farm and Trucking Jobs	720	720	720	720	720	720	720	720	720	720	720
State/Local Job Impact	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819
Total Impact Value	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015
Producer Credit	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cost of Producer Credit to NYS	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Remaining Government Revenue	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015

Table 5-6, Miller Brewery Tax Impacts, Incentive Impacts, and Job-Creation Estimates

	Const. Yr 1	Const. Yr 2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Taxable income in actual year dollars	($43,098)	($9,064,856)	($207,305)	$22,984	$266,018	$522,865	$1,240,947	$1,529,048	$1,834,827	$2,159,829	$2,505,749
Cumulative taxable income	($43,098)	($9,107,953)	($9,315,258)	($9,292,274)	($9,026,256)	($8,503,392)	($7,262,444)	($5,733,396)	($3,898,570)	($1,738,741)	$767,007
Discount Factor	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1
Federal Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$229,122
State Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sales Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Property Taxes	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000
Incentives	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000
Total Tax Burden	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$229,122
Jobs Created	9	35	43	43	43	43	43	43	43	43	43
Multiplier Jobs	11	41	52	52	52	52	52	52	52	52	52
Construction Jobs	200	200	20	0	0	0	0	0	0	0	0
On-Farm Jobs	0	180	400	400	400	400	400	400	400	400	400
Trucking Jobs	0	80	200	200	200	200	200	200	200	200	200
Multiplier from Farm and Trucking Jobs	0	312	720	720	720	720	720	720	720	720	720
State/Local Job Impact	$0	$3,440	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819
Total Impact Value	$0	$2,917,762	$11,217,399	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,061,015	$11,290,137
Producer Credit	$0.20	$0.20	$0.20	$0.20	$0.15	$0.10	$0.05	$0.00	$0.00	$0.00	$0.00
Cost of Producer Credit to NYS	$0	$418,596	$1,052,632	$1,052,632	$789,474	$526,316	$263,158	$0	$0	$0	$0
Total Remaining Government Revenue	$0	$2,499,167	$10,164,767	$10,008,384	$10,271,542	$10,534,699	$10,797,857	$11,061,015	$11,061,015	$11,061,015	$11,290,137

* All values in current year dollars

	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Taxable income in actual year dollars	$2,874,447	$3,267,966	$3,688,545	$4,138,646	$4,664,068	$8,094,947	$8,650,907	$8,823,926	$9,000,404	$9,180,412	$9,364,020
Cumulative taxable income	$3,641,455	$6,909,420	$10,597,966	$14,736,612	$19,400,680	$27,495,627	$36,146,535	$44,970,460	$53,970,864	$63,151,276	$72,515,297
Discount Factor	0.84	0.82	0.80	0.79	0.77	0.76	0.74	0.73	0.71	0.70	0.69
Federal Taxes	$841,823	$938,305	$1,038,296	$1,142,153	$1,261,917	$2,147,235	$2,249,713	$2,249,713	$2,249,713	$2,249,713	$2,249,713
State Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sales Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Property Taxes	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000
Incentives	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000
Total Tax Burden	$841,823	$938,305	$1,038,296	$1,142,153	$1,261,917	$2,147,235	$2,249,713	$2,249,713	$2,249,713	$2,249,713	$2,249,713
Jobs Created	43	43	43	43	43	43	43	43	43	43	43
Multiplier Jobs	52	52	52	52	52	52	52	52	52	52	52
Construction Jobs	0	0	0	0	0	0	0	0	0	0	0
On-Farm Jobs	400	400	400	400	400	400	400	400	400	400	400
Trucking Jobs	200	200	200	200	200	200	200	200	200	200	200
Multiplier from Farm and Trucking Jobs	720	720	720	720	720	720	720	720	720	720	720
State/Local Job Impact	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819	$7,819
Total Impact Value	$11,902,838	$11,999,320	$12,099,312	$12,203,168	$12,322,932	$13,208,251	$13,310,728	$13,310,728	$13,310,728	$13,310,728	$13,310,728
Producer Credit	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Cost of Producer Credit to NYS	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Remaining Government Revenue	$11,902,838	$11,999,320	$12,099,312	$12,203,168	$12,322,932	$13,208,251	$13,310,728	$13,310,728	$13,310,728	$13,310,728	$13,310,728

Product Sale Prices and Demand

Sale price of products has an effect on profitability. Sale-price fluctuations were measured within a reasonable range. The results showed the effect of a one-year increase or decrease in the price of a product. Ethanol prices were adjusted by 15% (cases 12a and 12b). The yearly effect was a $5.4 million impact on profit at Griffiss and Fulton, and a $0.9 million impact at Evans Mills. CO_2 prices were raised by $2 per ton from $9 to $11. The yearly effect was $190,000 at Griffiss and Fulton, and $32,000 at Evans Mills. DDGS prices were adjusted by $20 per ton (cases 14a and 14b). The yearly effect was $2.1 at Griffiss and Fulton, and $351,000 at Evans Mills.

DDGS and ethanol prices are likely to waver around their baseline price. CO_2 prices are less certain, and may actually start at a rate higher than $9. These prices are also likely to be set in a long-term contract. Therefore, although it is unlikely that the plant would see the benefit of 20 years of higher prices for DDGS and ethanol, it is possible that it might be able to sell CO_2 at the $11 per ton rate over the full 20 years. This would bring an additional $2.6 million in 1999 dollars to Griffiss and Fulton and an additional $650,000 to Evans Mills.

Electric Costs and Deregulation

Deregulation has created uncertainty in the cost of electricity. Electric costs may decline steadily in the near future, as a more competitive market prevails. Small processing plants may have problems securing long-term low-cost contracts. Nonetheless, it is likely that electricity costs will continue to fall. A reduction or increase in electric costs by 35% (cases 15a and 15b) would result in an annual adjustment in profits of $885,000 at Griffiss or Fulton, and $190,000 at Evans Mills. If a long-term contract were established at the lower rate, the Griffiss or Fulton site could save $12.2 million in 1999 dollars over 20 years, and the Evans Mills site could save $4.0 million over 20 years.

Rent at Fulton

Additional issues at the Fulton site focus on the potential rent that would be available by leasing excess storage areas and making existing open land available for development (cases 16a and 16b). If the Fulton site realized a $20,000 annual rent, it could receive over $271,000 in 1999 dollars over a 20-year period. A $50,000 annual rent receipt would yield more than $675,000 over 20 years. Actual rental value of these properties has not yet been reviewed, but it is clear that rental presents additional income opportunities for this location.

DDGS Drying at Evans Mills

DDGS from a small ethanol operation could be delivered to nearby dairy facilities in a wet condition. This would preclude the need to purchase and operate expensive DDGS drying equipment. Case 18a showed the effect of construction cost savings in selling wet DDGS from the Evans Mills site. Operating cost savings were not quantified, but were estimated to include 40% of energy costs. In 1999 dollars, the effect of construction cost savings totaling $1.7 million would be $245,000 in the first full year of operation, and a total of $2.7 million over 20 years. Although this impact would increase profitability at the Evans Mills location, it alone would not reverse the annual losses that would occur at this site.

Job-Creation Analysis

NYSTEC and the NYCGA conducted a preliminary review of jobs and economic development that would be realized from an ethanol-processing facility. The result of this review was provided previously in this document in Tables 5-4, 5-5, and 5-6. The initial pro-forma page on tax impacts outlined the State tax revenues from plant jobs and the multiplier effects. Based upon information provided by the NYCGA for the corn-to-ethanol industry, NYSTEC provided a preliminary assessment of on-farm and off-farm jobs created by this industry and the effect on State revenues. The tables also show the effect of additional indirect jobs from the farms and the trucking industry as well as their induced multiplier effects.

In an average year, all the jobs from a 29-MGPY ethanol plant and the related multiplier jobs in other industries could bring the State and local governments $11 million in tax dollars. Even with a producer credit, the State and local governments would see a benefit to the tax rolls, starting with $0.3 million in the second construction year and rising to $4.9 million in the first full year of operation. After the credit was removed, the full $11 million benefit is realized after year six.

NYSTEC would like to provide the State with an even more accurate assessment of the economic-development impact created by both on-farm and off-farm jobs for both corn-to-ethanol and biomass-to-ethanol processing. These assessment activities would require additional work in the future.

NEXT STEPS

This report has outlined the issues surrounding the feasibility of producing ethanol in New York State. Several issues were outside the scope of this report, and these issues form the framework for future study in this area, to be undertaken by the NYCGA and its project team. Now that a viable financial format has been developed, further studies may use this format to assess the feasibility of specific operating locations and the economics of building and operating an ethanol-processing facility. Future work includes:

- A more detailed assessment of the market for ethanol in New York, including an assessment of ethanol as fuel additive, oxygenate, and alternative fuel, and the policies and market trends that will effect each use;
- Completion of a detailed business plan for a profitable ethanol-processing facility;
- Analysis of the economics of an integrated agricultural processing facility, including a dairy operation and a small-scale ethanol-processing facility; and
- A more detailed analysis of the economic impact ethanol processing would have on the State farm economy and on State and local taxes.

APPENDIX A

FEEDSTOCK DATA SHEETS

Introduction

The feedstock analysis was an early step in the process of studying the feasibility of an ethanol-processing plant. In this step, all potential ethanol feedstocks were reviewed, including:

- Corn for Grain.
- Silage Corn.
- Fruit and Vegetable Processing Wastes such as brewery wastes, cheese whey (including cheese whey permeate concentrate), and waste from processing sweet corn, cabbage, beets, snap beans, carrots, peas, cherry pomace, grape pomace (from wine and juice production), and apple pomace.
- Biomass Feedstocks, including corn stover, grass, straw, papermill waste, and dedicated feedstock willows.

All the data was collected by NYCGA and NYSTEC. Data was reviewed and adjusted by the independent review team. Vogelbusch USA used the data to decide which feedstocks to use in production and how much ethanol could be converted from each feedstock.

Primary issues included feedstock cost and quantity, and data on carbohydrates and sugars, which was used to calculate ethanol yields. Additional composition data is required to review any major components that may contaminate the ethanol-distillation process. Biomass feedstocks were reviewed for cellulose, lignin, and ash content.

Conclusions from the feedstock analysis are:

- Corn for Grain: Primary feedstock is available in adequate quantities for ethanol generation. However, additional production or transport of feedstock will be required to satisfy both the existing markets and the ethanol market.
- Silage Corn: Ethanol production is not viable against competing uses.
- Brewery Wastes: Ethanol cannot compete against existing markets
- Cheese Whey: May be used in concentrated form. Analysis must be based upon detailed composition study from local sources. This information is not available at this time.
- Waste from Processing Sweet Corn: Viable, available, and affordable.
- Waste from Processing Cabbage: Viable, available, and affordable.
- Waste from Processing Beets: Viable, available, and affordable.
- Waste from Processing Snap Beans: Viable, available, and affordable.
- Waste from Processing Carrots: Viable, available, and affordable.
- Waste from Processing Peas: Viable, available, and affordable.
- Cherry Pomace: No viable composition information available. Quantities too low to justify further study.

- Grape Pomace (from wine and juice production): Viable, available, and affordable.
- Apple Pomace: Viable, available, and affordable.
- Corn Stover: May provide opportunity in biomass-to-ethanol processing.
- Grass: May provide opportunity in biomass-to-ethanol processing.
- Straw: May provide opportunity in biomass-to-ethanol processing.
- Papermill Waste: May provide opportunity in biomass-to-ethanol processing.
- Dedicated Feedstock Willows: Too expensive compared to other biomass feedstocks.

Feedstock Data Sheet

Feedstock / Product: Corn
Units: Tons
Source of Base Data: NYS Ag Statistics
Conversion Factor:
Source of Conv. Factor:
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	1,859,200	1,587,600	1,916,320	1,793,400	1,887,480	2,111,200
Production in Finger Lakes Region	513,367	480,849	558,241	465,043	498,104	564,595
Production in Central NY Region	181,439	163,033	175,083	164,427	188,824	215,827
Production in North Country Region	69,185	56,000	64,980	73,102	74,435	77,409

Additional Notes:

Feedstock Costs

Market or Disposal Method: Market sales
Additional Market or Method:
Additional Costs not Quantified:
Unit of measure for cost: Dollars per bushel

Source of Data	5-yr Average	1993	1994	1995	1996	1997
NY State Ag Statistics	$3.06	$2.85	$2.65	$3.85	$2.98	$2.95
NYCGA (Czub & Robbins)	$2.35					$2.35

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: included per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Corn
Source of Data: Animal Agriculture by HH Cole (Cole)
Source of Additional Data: Nutrient Requirements of Beef Cattle, National Research Board (NRB)

	Cole	NRB
Dry Matter		77%
Moisture	11.0%	
Ash	1.1%	1.6%
Crude Protein	8.9%	
Ether Extract	3.9%	4.3%
Crude Fiber	2.0%	2.6%
Nitrogen Free Extract	73.1%	
Neutral Detergent Fiber		9%
Acid Detergent Fiber		3%
Cellulose		2%
Lignin		1.0%

Notes:
Composition percentages are based on a 100% dry-matter basis.

Feedstock Data Sheet

Feedstock / Product: Waste from Sweet Corn
Units: Tons Wet Basis
Source of Base Data: NYS Ag Statistics
Conversion Factor: 0.67
Source of Conv. Factor: J. Cooper, National Canners Assn.
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	149,856	168,518	150,717	149,611	138,047	142,388
Production in Finger Lakes Region	42,128	n/a	n/a	n/a	n/a	42,128
Production in Central NY Region	3,537	n/a	n/a	n/a	n/a	3,537
Production in North Country Region	0	0	0	0	0	0

Additional Notes:

Regional data is approximate, based upon regional yields. Use of these yields is estimated to match state ratios, but is unknown on a regional basis.

Feedstock Costs

Market or Disposal Method: Solid Waste Disposal - Price paid for pick-up
Additional Market or Method:
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
Processing Plants	-$60.00	n/a	n/a	n/a	n/a	-$60.00
Processing Plants	-$65.00	n/a	n/a	n/a	n/a	-$65.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: included above per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Waste from Sweet Corn
Source of Data: Fed. of American Society for Experimental Biology (ASEB)
Type of Sample: Cob & Husk
Source of Additional Data: Nutrient Requirements of Beef Cattle, National Research Board (NRB)
Type of Sample: Process Residue

	ASEB		NRB
	Cob	Husk	Pro. Res.
Dry Matter			32%
Moisture			
Cellulose	32.0%	38.0%	
Hemicellulose	42.0%	44.5%	
Lignin	9.0%	6.6%	
Protein	1.7%	1.9%	7.7%
Ash	1.2%	2.8%	4.9%
Ether Extract			5.2%
Crude Fiber			27%
Acid Detergent Fiber			34%

Notes:

ASEB Composition percentages are based on a 100g of fresh material produced
NRB Composition percentages are based on a 100% dry-matter basis.

Feedstock Data Sheet

Feedstock / Product: Waste from Snap Beans
Units: Tons Wet Basis
Source of Base Data: NYS Ag Statistics
Conversion Factor: 0.21
Source of Conv. Factor: J. Cooper, National Canners Assn.
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	14,281	16,279	14,847	16,134	12,789	11,357
Production in Finger Lakes Region	2,016	n/a	n/a	n/a	n/a	2,016
Production in Central NY Region	1,210	n/a	n/a	n/a	n/a	1,210
Production in North Country Region	0	0	0	0	0	0

Additional Notes:

Regional data is approximate, based upon regional yields. Use of these yields is estimated to match state ratios, but is unknown on a regional basis.

Feedstock Costs

Market or Disposal Method: Solid Waste Disposal - Price paid for pick-up
Additional Market or Method:
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
Processing Plants	-$60.00	n/a	n/a	n/a	n/a	-$60.00
Processing Plants	-$65.00	n/a	n/a	n/a	n/a	-$65.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: included above per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Waste from Snap Beans
Source of Data: Fed. of American Society for Experimental Biology (ASEB)
Source of Additional Data: Updated Data from the review team, Dr. Hunter and Dr. Hirasuna

	ASEB	Rev. Team
Dry Matter		
Moisture	91.00%	90.30%
Ash	2.0%	
Fat	0.3%	
Total Carbohydrates	4.6%	7.1%
Fiber	1.3%	
Amended Fermented Sugars		4.5%
Protein	2.2%	

Notes:

ASEB Composition percentages are based on a 100g of fresh material produced
Review team data based on waste material information.

Feedstock Data Sheet

Feedstock / Product: Waste from Cabbage
Units: Tons Wet Basis
Source of Base Data: NYS Ag Statistics
Conversion Factor: 0.32
Source of Conv. Factor: J. Cooper, National Canners Assn.
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	19,240	23,360	19,488	16,320	14,880	22,154
Production in Finger Lakes Region	3,241	n/a	n/a	n/a	n/a	3,241
Production in Central NY Region	324	n/a	n/a	n/a	n/a	324
Production in North Country Region	0	0	0	0	0	0

Additional Notes:

Regional data is approximate, based upon regional yields. Use of these yields is estimated to match state ratios, but is unknown on a regional basis.

Feedstock Costs

Market or Disposal Method: Solid Waste Disposal - Price paid for pick-up
Additional Market or Method:
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
Processing Plants	-$60.00	n/a	n/a	n/a	n/a	-$60.00
Processing Plants	-$65.00	n/a	n/a	n/a	n/a	-$65.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: included above per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Waste from Cabbage
Source of Data: Fed. of American Society for Experimental Biology (ASEB)
Source of Additional Data: Updated Data from the review team, Dr. Hunter and Dr. Hirasuna

	ASEB	Rev. Team
Dry Matter		
Moisture	92.40%	92.15%
Ash	0.7%	
Fat	0.2%	
Total Carbohydrates	5.4%	5.4%
Fiber		2.3%
Amended Fermented Sugars		5.4%
Protein	1.3%	

Notes:

Composition percentages are based on a 100g of fresh material produced
Review team data based on fresh material.
Wastes include leaves and cores and are roughly the same composition as fresh cabbage.

Feedstock Data Sheet

Feedstock / Product: Apple Pomace
Units: Tons
Source of Base Data: NYS Ag Statistics
Conversion Factor: 10% for Juice/Cider, 30% for Sauce / Canned
Source of Conv. Factor: J. Cooper, National Canners Assn.
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	46,132	41,360	45,635	52,875	44,595	46,195
Production in Finger Lakes Region	17,774	n/a	n/a	n/a	n/a	17,774
Production in Central NY Region	727	n/a	n/a	n/a	n/a	727
Production in North Country Region	0	0	0	0	0	0

Additional Notes:
Regional data is approximate, based upon regional yields. Use of these yields is estimated to match State ratios, but is unknown on a regional basis.

Feedstock Costs

Market or Disposal Method: Solid Waste Disposal - Price paid for pick-up
Additional Market or Method: Pay $10 to $20 per ton to transport away
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
Processing Plants	-$60.00	n/a	n/a	n/a	n/a	-$60.00
Processing Plants	-$65.00	n/a	n/a	n/a	n/a	-$65.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: included above per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Apple Pomace
Source of Data: NYS Ag Exp. Station (Geneva), per Smock & Neuburt paper, 1950 (S&N)
Source of Additional Data: Nutrient Requirements of Beef Cattle, National Research Board (NRB)
Source of WET data: NYS Ag Exp. Station (Geneva), per Smock & Neuburt paper, 1950 (S&N)

	S & N		NRB
	Low	High	
Dry Matter			89%
Moisture	11.0%	12.5%	
Carbohydrates			
Nitrogen free extract	54.77%	59.29%	
Pectin	15.00%	18.00%	
Crude fiber	15.88%	20.55%	17.00%
Proteins	4.45%	5.67%	4.90%
Fat	3.75%	4.65%	
Ash	2.11%	3.50%	2.20%
Potassium (as K20)			0.46%
Phosphorus (as P2O5)			0.11%
Ether Extract			5.10%
Acid Detergent Fiber			26%

Wet Data

	S & N	
	Low	High
Moisture	66.4%	78.15%
Carbohydrates	9.5%	21.98%
Nitrogen free extract	54.77%	59.29%
Pectin	1.50%	2.50%
Crude fiber	4.30%	10.50%
Proteins	1.03%	1.82%
Fat	0.82%	1.43%
Ash	0.56%	2.27%
Potassium (as K20)	0.2%	1%
Phosphorus (as P2O5)	0.4%	0.7%

Notes:
Review team concludes that wet farm-style pomace has 11-20% fermentable carbohydrates, but note that some research indicates the real concentration range for fermentables is 6% to 8% wet basis.

Feedstock Data Sheet

Feedstock / Product: Waste from Carrots
Units: Tons Wet Basis
Source of Base Data: NYS Ag Statistics
Conversion Factor: 0.48
Source of Conv. Factor: J. Cooper, National Canners Assn.
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	8,218	12,240	7,392	7,968	6,768	6,720
Production in Finger Lakes Region	0	n/a	n/a	n/a	n/a	0
Production in Central NY Region	27	n/a	n/a	n/a	n/a	27
Production in North Country Region	0	0	0	0	0	0

Additional Notes:

Regional data is approximate, based upon regional yields. Use of these yields is estimated to match state ratios, but is unknown on a regional basis.

Feedstock Costs

Market or Disposal Method: Solid Waste Disposal - Price paid for pick-up
Additional Market or Method:
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
Processing Plants	-$60.00	n/a	n/a	n/a	n/a	-$60.00
Processing Plants	-$65.00	n/a	n/a	n/a	n/a	-$65.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: included above per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Waste from Carrots
Source of Data: Fed. of American Society for Experimental Biology (ASEB)
Source of Additional Data: Nutrient Requirements of Beef Cattle, National Research Board (NRB)
Source of Additional Data: Updated Data from the review team, Dr. Hunter and Dr. Hirasuna

	ASEB	NRB	Rev. Team
Dry Matter		12%	
Moisture	88.0%		88.8%
Ash	0.8%	8.2%	
Fat	0.2%		
Total Carbohydrate	9.7%		9.7%
Crude Protein	1.1%	9.9%	
Ether Extract		1.3%	
Crude Fiber	1.0%	9.7%	
Nitrogen Free Extract			
Neutral Detergent Fiber		9%	
Acid Detergent Fiber		8%	
All Fiber			7.2%
Amended Fermented Sugars			6.7%
Cellulose		7%	
Lignin		0.0%	

Notes:

ASEB Composition percentages are based on a 100g of fresh material produced
NRB Composition percentages are based on a 100% dry-matter basis.
Review team data based upon assumption of 40% peelings and tops and 60% carrot flesh

Feedstock Data Sheet

Feedstock / Product: Waste from Peas
Units: Tons Wet Basis
Source of Base Data: NYS Ag Statistics
Conversion Factor: 0.13
Source of Conv. Factor: J. Cooper, National Canners Assn
Other Info:

Location of Production	Average		1993	1994	1995	1996	1997
Statewide Production	3,767		2,877	3,206	3,927	3,595	5,229
Production in Finger Lakes Region	747		n/a	n/a	n/a	n/a	747
Production in Central NY Region	38		n/a	n/a	n/a	n/a	38
Production in North Country Region	0		0	0	0	0	0

Additional Notes:

Regional data is approximate, based upon regional yields. Use of these yields is estimated to match State ratios, but is unknown on a regional basis.

Feedstock Costs

Market or Disposal Method: Solid Waste Disposal - Price paid for pick-up
Additional Market or Method:
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5 yr Average		1993	1994	1995	1996	1997
Processing Plants	-$60.00		n/a	n/a	n/a	n/a	-$60.00
Processing Plants	-$65.00		n/a	n/a	n/a	n/a	-$65.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35 mile trucking average distance to plant
Cost to Transport: included above per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Waste from Peas
Source of Data: Fed. Of American Society for Experimental Biology (ASEB)
Other Information: per 100g of fresh material produced
Source of Additional Data: Review team data, from Dr. Hunter and Dr. Hirasuna

		ASEB	Rev. Team
Dry Matter			
Moisture		83.00%	78.00%
Ash		1.1%	
Fat		0.2%	
Total Carbohydrates		12.0%	12.0%
Amended Fermented Sugars			6.9%
Fiber		1.2%	4.9%
Protein		3.4%	

Notes:
Composition percentages are based on 100g of fresh material produced.
Review team data based upon assumption of 10% stems and pods, with remainder of material as skins, fragments, and damaged peas

Feedstock Data Sheet

Feedstock / Product: Waste from Beets
Units: Tons Wet Basis
Source of Base Data: NYS Ag Statistics
Conversion Factor: 0.41
Source of Conv. Factor: J. Cooper, National Canners Assn
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	17,045	15,670	18,311	17,589	17,048	16,605
Production in Finger Lakes Region	2,855	n/a	n/a	n/a	n/a	2,855
Production in Central NY Region	18	n/a	n/a	n/a	n/a	18
Production in North Country Region	0	0	0	0	0	0

Additional Notes:

Regional data is approximate, based upon regional yields. Use of these yields is estimated to match state ratios, but is unknown on a regional basis.

Feedstock Costs

Market or Disposal Method: Solid Waste Disposal - Price paid for pick-up
Additional Market or Method:
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
Processing Plants	-$60.00	n/a	n/a	n/a	n/a	-$60.00
Processing Plants	-$65.00	n/a	n/a	n/a	n/a	-$65.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: included above per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Waste from Beets
Source of Data: Fed. of American Society for Experimental Biology (ASEB)
Source of Additional Data: Review team data, from Dr. Hunter and Dr. Hirasuna

	ASEB	Rev. Team
Dry Matter		
Moisture	87.30%	89.85%
Ash	1.1%	
Fat	0.1%	
Total Carbohydrates	9.9%	6.8%
Amended Fermented Sugars		3.5%
Fiber	0.8%	3.3%
Protein	1.6%	

Notes:

ASEB Composition percentages are based on a 100g of fresh material produced.
Review team data based upon assumption of 50% tops and 50% roots in waste material.

Feedstock Data Sheet

Feedstock / Product: Grape Pomace
Units: Tons
Source of Base Data: NYS Ag Statistics
Conversion Factor: 0.2
Source of Conv. Factor: J. Cooper, National Canners Assn.
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	77,195	49,350	69,791	86,177	99,116	81,539
Production in Finger Lakes Region	7,029	n/a	n/a	n/a	n/a	7,029
Production in Central NY Region	0	n/a	n/a	n/a	n/a	0
Production in North Country Region	0	0	0	0	0	0

Additional Notes:

Regional data is approximate, based upon regional yields. Use of these yields is estimated to match state ratios, but is unknown on a regional basis.

Feedstock Costs

Market or Disposal Method: Solid Waste Disposal - Price paid for pick-up
Additional Market or Method:
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
Processing Plants	-$60.00	n/a	n/a	n/a	n/a	-$60.00
Processing Plants	-$65.00	n/a	n/a	n/a	n/a	-$65.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: included above per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Grape Pomace
Source of Data: Fed. of American Society for Experimental Biology (ASEB)
Type of Sample: Grape Skin
Source of Additional Data: Updated Data from the review team, Dr. Hunter and Dr. Hirasuna

	ASEB	Rev. Team
Dry Matter		
Moisture	81.60%	50.00%
Ash	0.4%	
Fat	1.0%	
Total Carbohydrates	15.7%	13.5%
Fiber	0.6%	
Protein	1.3%	
Cellulose		
Lipids		
Amended Fermented Sugars		13.5%

Notes:

ASEB Composition percentages are based on a 100g of fresh material produced.
Review team data for grape processing wastes.

Feedstock Data Sheet

Feedstock / Product: Winery Waste (Grape Pomace from wine production)
Units: tons
Source of Base Data: NYS Ag Statistics
Conversion Factor: 23 pounds of pumace is produced for each 100 pounds of wine
Source of Conv. Factor: Gene Pierce, President of Glenora Winery
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	13,853	10,702	15,036	12,930	20,525	10,074
Production in Finger Lakes Region	9,697	7,491	10,525	9,051	14,368	7,052
Production in Central NY Region	0	0	0	0	0	0
Production in North Country Region	0	0	0	0	0	0

Additional Notes:
Wine data collected per gallon produced. Transferred into ton data based on 180 gallons/ton ratio provided by Gene Pierce of Glenora Winery.
32% of wine (and 32% of pomace) is in the Finger Lakes region, the rest near Hudson, Erie, and Long Island.

Feedstock Costs

Market or Disposal Method: Land spread on-site. No value.
Additional Market or Method: Some wineries will make grapeseed oil or mix into compost, but none in New York.
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
Gleonra Winery / NY Wine Assoc.	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: $7.75 per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Winery Waste (Grape Pumace from wine production)
Source of Data: Nutrient Requirements of Beef Cattle, National Research Board (NRB)
Source of Additional Data:

	NRB
Dry Matter	91%
Crude Protein	13.0%
Ether Extract	7.9%
Total Ash	10.3%
Crude Fiber	31.9%
Neutral Detergent Fiber	55%
Acid Detergent Fiber	54%
Cellulose	
Lignin	35%

Notes:
Composition percentages are based on a 100% dry-matter basis.

Feedstock Data Sheet

Feedstock / Product: Cheese Whey
Units: Tons
Source of Base Data: NYS Ag Statistics
Conversion Factor: See Below
Source of Conv. Factor: Dave Brown, Cornell Coop. Ext.
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	219,853	200,588	248,534	208,048	214,726	227,367
Production in F. Lakes, Central, East	107,358	n/a	n/a	n/a	n/a	107,358
Production in North Country Region	74,179	n/a	n/a	n/a	n/a	74,179

Additional Notes:
Conversion Factors: Cream & Neufchatel: 7.5/lb. to liquid, 0.065 to dry;
Cottage (60% of creamed & low-fat production and curd production): 8.5/lb. to liquid, 0.065 to dry;
All other cheese: 9.0/lb.to liquid, 0.068 to dry.
Cent/FL/East. 1997 data only broken down by Italian, cottage, and all
North Country 1997 data for St. Law, Jeff, Lewis, Franklin, Clinton, Essex. Data only broken down by Italian and all other cheese w/o cottage. 18324.5 tons calc.w/9.0 lb to liquid, 0.068 to dry. 129157.5 tons calc w/7.5 to liquid

Feedstock Costs

Market or Disposal Method: Disposed. Companies will pay to have this removed
Additional Market or Method: Can be mixed into feed for animals. Delivered free or for small transport fee.
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
Average disposal cost in 1977	-$5.15	n/a	n/a	n/a	n/a	-$5.15

Transportation Method and Cost

Method to Transport to Plant:
Basis of Cost Estimate:
Cost to Transport: n/a per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Cheese Whey
Source of Data: Dr. Lorin Harris, Utah State University (Harris)
Source of Additional Data: Nutrient Requirements of Beef Cattle, National Research Board (NRB)
Source of WET data: Dairy and Microbiology, E.M. Forster, 1957

	Harris	NRB
Dry Matter		93%
Moisture		
Ash	10.3%	9.8%
Crude Protein	14.7%	14.2%
Ether Extract	0.9%	0.7%
Crude Fiber		0.2%
Nitrogen Free Extract	74.1%	
Neutral Detergent Fiber		
Acid Detergent Fiber		
Cellulose		
Lignin		

Wet Data

	Forster
Moisture	93.0%
Lactose	4.9%
Nitrogen Comp	0.9%
Ash	0.6%
Fat	0.3%
Lactic Acid	0.2%

Notes:

Cheese Whey	SW	SWP	AW	AWP
Solids	6.70%	5.70%	6.40%	5.80%
Lactose	5.00%	4.90%	4.30%	4.30%
Protein	0.60%	0.01%	0.60%	0.02%
Ash	0.52%	0.50%	0.60%	0.56%
Fat	0.25%	0.00%	0.05%	0.00%
Lactic Acid	0.13%	0.14%	0.46%	0.44%

Legend: Sweet Whey (SW), Sweet Whey Permeate (SWP), Acid Whey (AW), Acid Whey Permeate (AWP)

Feedstock Data Sheet

Feedstock / Product: Cherry Pomace
Units: Tons
Source of Base Data: NYS Ag Statistics
Conversion Factor: 0.15
Source of Conv. Factor: J. Cooper, National Canners Assn.
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	1,283	1,133	1,770	1,485	1,050	975
Production in Finger Lakes Region	552	n/a	n/a	n/a	n/a	552
Production in Central NY Region	0	n/a	n/a	n/a	n/a	0
Production in North Country Region	0	0	0	0	0	0

Additional Notes:

Regional data is approximate, based upon regional yields. Use of these yields is estimated to match state ratios, but is unknown on a regional basis.

Feedstock Costs

Market or Disposal Method: Solid Waste Disposal - Price paid for pick-up
Additional Market or Method:
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
Processing Plants	-$60.00	n/a	n/a	n/a	n/a	-$60.00
Processing Plants	-$65.00	n/a	n/a	n/a	n/a	-$65.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: included above per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Cherry Pomace
Source of Data: Review Team of Dr. Hunter and Dr. Hirasuna
Source of Additional Data:

	Rev. Team
Dry Matter	
Moisture	
Non-Fiber Carbohydrates	12.4%
Protein	

Notes:

Non-Fiber Carbohydrates data is based upon the edible portion. If pomace includes seeds, the total non-fiber carbohydrates percentage would be 5.3% for tart cherry waste and 7.5% for sweet cherry waste, based upon data provided from the review team and found from the USDA nutrient database.

Feedstock Data Sheet

Feedstock / Product: Corn Silage
Units: Tons
Source of Base Data: NYS Ag Statistics
Conversion Factor:
Source of Conv. Factor:
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	7,779,200	7,810,000	8,216,000	6,790,000	7,905,000	8,175,000
Production in Finger Lakes Region	553,600	n/a	n/a	n/a	n/a	553,600
Production in Central NY Region	725,600	n/a	n/a	n/a	n/a	725,600
Production in North Country Region	1,202,420	1,001,000	1,424,100	1,093,900	1,282,000	1,211,100

Additional Notes:

Feedstock Costs

Market or Disposal Method: Market sales
Additional Market or Method:
Additional Costs not Quantified:
Unit of measure for cost: Dollars per ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
NY State Ag Statistics	$26.30	$24.10	$22.70	$24.50	$25.80	$34.40
	$0.00					

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant (5 miles trucking included above)
Cost to Transport: $2.00 per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Corn Silage
Source of Data: Animal Agriculture by HH Cole (Cole)
Source of Additional Data: Nutrient Requirements of Beef Cattle, National Research Board (NRB)

	Cole	NRB
Dry Matter		29%
Moisture	72.1%	
Ash	7.6%	7.2%
Crude Protein	2.3%	8.4%
Ether Extract	0.8%	3.0%
Crude Fiber	7.3%	32.3%
Nitrogen Free Extract	15.7%	
Neutral Detergent Fiber		53%
Acid Detergent Fiber		30%
Cellulose		23%
Lignin		5.0%

Notes:
Composition percentages are based on a 100% dry-matter basis.

Feedstock Data Sheet

Feedstock / Product: Brewery Waste
Units: Tons (dry solids)
Source of Base Data: Local news articles on breweries
Conversion Factor: 0.33 tons per barrel of beer produced
Source of Conv. Factor: United Nations University studies
Other Info: Does not include microbrews

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	2,901,690	2,778,600	2,828,100	2,877,600	3,014,550	3,009,600
Production in Finger Lakes Region	0	0	0	0	0	0
Production in Central NY Region	2,234,301	2,139,522	2,177,637	2,215,752	2,321,204	2,317,392
Production in North Country Region	0	0	0	0	0	0

Additional Notes:
3 major breweries in upstate NY (FX Matt, Genesee, Anhauser-Busch) could contribute.
Info is based on reliable production data. Conversion factor should be reviewed by Technology Provider.

Feedstock Costs

Market or Disposal Method:
Additional Market or Method: May be given away to farmers (+ transport cost) as feed.
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
Research on breweries	$22.50	n/a	n/a	n/a	n/a	$22.50
	$0.00					

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: $7.75 per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Brewery Waste
Source of Data: Spent grain data from Coors Brewery provided by NREL
Location of Sample: Golden CO
Source of Additional Data: Research studies

	Average	St. Dev.
Total Solids	80.63	0.12
Extractives (water and ethanol soluble)		
Glucose	27.86	0.05
Xylose	15.03	0.95
Galactose	2.33	0.18
Arabinose	7.12	0.32
Mannose	0	0
Klason lignin	35.42	13.23
Acid soluble lignin	5.06	0.03
Total ash	4.09	0.25
Mass balance		

Additional Data

	Brewers Dried grains percentage	Dried Spent Hops percentage	Grains & 6% Hops
Moisture	8.00%	8.04%	8.00%
Protein	25.00%	17.85%	24.57%
Fat	6.50%	4.90%	6.40%
Fiber	14.80%	27.77%	15.58%
Nitrogen Free Extract	42.00%	35.54%	41.61%
Ash	3.70%	5.90%	3.83%

Notes:

Feedstock Data Sheet

Feedstock / Product: Corn Stover
Units: Tons
Source of Base Data: NYS Ag Statistics
Conversion Factor: 2.0 tons/acre
Source of Conv. Factor: NREL 1.8-2.0 dry tons/acre, NYSERDA 2.5 tons/acre
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	1,208,000	1,080,000	1,180,000	1,220,000	1,260,000	1,300,000
Production in Finger Lakes Region	332,000	n/a	n/a	n/a	328,000	336,000
Production in Central NY Region	128,100	n/a	n/a	n/a	126,400	129,800
Production in North Country Region	49,720	40,600	45,800	53,400	53,800	55,000

Additional Notes:

Feedstock Costs

Market or Disposal Method: Based on sale for ethanol plants - estimated
Additional Market or Method:
Additional Costs not Quantified:
Unit of measure for cost: Dollars / dry ton delivered (Harlan) / Dollars / dry ton before delivery (other)

Source of Data	5-yr Average	1993	1994	1995	1996	1997
NREL Harlan Indiana Demo Study	$32.00	n/a	n/a	n/a	n/a	$32.00
Other source	$30.00	n/a	n/a	n/a	n/a	$30.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: included per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Corn Stover
Source of Data: Stalk Residue Book provided by Raytheon
Source of Additional Data: NREL Feedstock Datasheet

	Raytheon	NREL
Total Solids		
Extractives (water and ethanol soluble)		2.11%
Glucose	38%	45.39%
Xylose	16%	23.86%
Galactose	1%	1.11%
Arabinose	2%	2.00%
Mannose	1%	0.00%
Klason lignin		18.53%
Acid soluble lignin		0.00%
Total ash		7.00%
Mass balance		0.02%
Cellulose	38.4%	
Pentosan	27.6%	
Lignin	34.3%	

Notes:
Composition percentages are based on a 100% dry-matter basis.

Feedstock Data Sheet

Feedstock / Product: Straw
Units: Tons
Source of Base Data: NYS Ag Statistics
Conversion Factor: Wheat .9 tons/acre, Oats .7 tons/acre, Rye 1.1/acre, Barley .7/acre
Source of Conv. Factor: NYCGA

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	294,740	273,900	307,800	281,500	278,400	332,100
Production in Finger Lakes Region	46,576	n/a	n/a	n/a	48,373	44,780
Production in Central NY Region	15,633	n/a	n/a	n/a	15,453	15,813
Production in North Country Region	7,446	n/a	n/a	n/a	5,880	9,012

Additional Notes:
RCBS- Wheat only.
Regional data- 1996 and 1997 -North Country data primarily Oats, Quantities of others negligible.
Regional data from 1996 in the Finger Lakes and Central Regions are estimates for Rye and Barley based on 97.

Feedstock Costs

Market or Disposal Method: Sold
Unit of measure for cost: Dollars per Ton

Source of Data	5 yr Average	1993	1994	1995	1996	1997
Robbins Corn and Bulk Service	$60.00	n/a	n/a	n/a	n/a	$60.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: included per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Straw

Barley Straw

Source of Data: Animal Agriculture by HH Cole (Cole)
Source of Additional Data: Nutrient Requirements of Beef Cattle, National Research Board (NRB)

	Cole	NRB
Dry Matter		91%
Moisture	10.0%	
Ash	6.0%	7.1%
Crude Protein	3.7%	4.3%
Ether Extract	1.6%	1.9%
Crude Fiber	37.7%	42.0%
Nitrogen Free Extract	41.0%	
Neutral Detergent Fiber		80%
Acid Detergent Fiber		59%
Cellulose		37%
Lignin		11.0%

Wheat Straw

Source of Data: NREL Feedstock Datasheet
Source of Additional Data: Nutrient Requirements of Beef Cattle, National Research Board (NRB)

	NREL	NRB
Dry Matter		89%
Ash	11%	7.8%
Crude Protein		3.60%
Ether Extract		1.80%
Crude Fiber		41.60%
Neutral Detergent Fiber		85%
Acid Detergent Fiber		54%
Cellulose		39%
Klason Lignin	15%	14.0%
Extractives	13%	
Glucose	37%	
Xylose	24%	

Oat Hay and Oat Straw

Source of Data: Dr. Lorin Harris, Utah State University (Oat Hay Only) (Harris)
Source of Additional Data: Nutrient Req. of Beef Cattle, Nat'l Research Board (Oat Straw Only) (NRB)

	Harris	NRB
Dry Matter		92%
Ash	7.5%	7.8%
Crude Protein	9.2%	4.4%
Ether Extract	3.1%	2.2%
Crude Fiber	31.0%	40.5%
Nitrogen Free Extract	49.2%	
Neutral Detergent Fiber		70%
Acid Detergent Fiber		47%
Cellulose		40%
Lignin		14.0%

Notes:
Composition percentages are based on a 100% dry-matter basis.

Feedstock Data Sheet

Feedstock / Product: Grass
Units: Tons
Source of Base Data: NYS Ag Statistics
Conversion Factor:
Source of Conv. Factor:
Other Info: Hay- other than Alfalfa

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	1,848,000	1,890,000	2,132,000	1,758,000	1,740,000	1,720,000
Production in Finger Lakes Region	56,500	n/a	n/a	n/a	61,300	51,700
Production in Central NY Region	97,550	n/a	n/a	n/a	102,000	93,100
Production in North Country Region	354,740	369,000	416,200	321,600	325,400	341,500

Additional Notes:

Feedstock Costs

Market or Disposal Method: Sold
Additional Market or Method:
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5 yr Average	1993	1994	1995	1996	1997
NY State Ag Statistics	$72.90	$74.50	$75.00	$70.00	$68.00	$77.00
NY CGA (Czub & Robbins)	$65.00					$65.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35 mile trucking average distance to plant
Cost to Transport: included per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Grass

Timothy Hay

Source of Data: Dr. Lorin Harris, Utah State University (Harris)
Source of Additional Data: Nutrient Requirements of Beef Cattle, National Research Board (NRB)

	Harris	NRB
Ash	5.8%	6.3%
Crude Protein	8.5%	
Ether Extract	2.7%	2.6%
Crude Fiber	33.5%	31.0%
Nitrogen Free Extract	49.5%	
Neutral Detergent Fiber		67%
Acid Detergent Fiber		36%
Cellulose		33%
Lignin		5.0%

Broome Hay

Source of Data: Dr. Lorin Harris, Utah State University (Harris)
Source of Additional Data: Nutrient Requirements of Beef Cattle, National Research Board (NRB)

	Harris	NRB
Dry Matter		88%
Ash	8.6%	9.4%
Crude Protein	11.8%	16.0%
Ether Extract	2.6%	2.6%
Crude Fiber	32.0%	30.0%
Nitrogen Free Extract	45.0%	
Neutral Detergent Fiber		65%
Acid Detergent Fiber		35%
Cellulose		32%
Lignin		4.0%

Notes:
Composition percentages are based on a 100% dry-matter basis.

Feedstock Data Sheet

Feedstock / Product: Papermill Waste
Units: Wet Tons (approx. 55% moisture content)
Source of Base Data: NYSEG report to NYSERDA (1998)
Conversion Factor: none
Source of Conv. Factor:
Other Info:

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	643,000	n/a	n/a	n/a	n/a	643,000
Production in Finger Lakes Region	0	n/a	n/a	n/a	n/a	0
Production in Central NY Region	33,215	n/a	n/a	n/a	n/a	33,215
Production in North Country Region	151,000	n/a	n/a	n/a	n/a	151,000

Additional Notes:
Data based on single-year survey of all 50 mills in NYS.
No trend data is available for this feedstock, but paper production has been quite steady.
Industrial stoker coal market takes 263,000 tons per year

Feedstock Costs

Market or Disposal Method: Sent to landfill or other interested buyers
Additional Market or Method: Paper companies will pay $21 per ton to have this removed
Additional Costs not Quantified:
Unit of measure for cost: Dollars per Ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
NYSEG Study	-$21.00	n/a	n/a	n/a	n/a	-$21.00

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: $7.75 per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Papermill Waste
Source of Data: NREL data on waste paper from Fort Howard
Location of Sample: Fort Howard
Source of Additional Data: NYSEG study of wastes from two NYS plants/ESF national study

	Average	St. Dev.
Total Solids	38.3	0.06
Extractives (water and ethanol soluble)		
Glucose	22.18	0.57
Xylose	5.38	0.08
Galactose	0.11	0
Arabinose	0.23	0.02
Mannose	1.49	0.01
Klason lignin	16.98	0.34
Acid soluble lignin	0.8	0.01
Total ash	48.53	0.05
Mass balance	92.65	

Additional Data

Sample 1:	As received	Dry basis
Moisture Content:	55.52%	
Volatile Matter:	31.14%	70.01%
Fixed Carbon:	0.92%	2.07%
Ash:	12.42%	27.92%
Sulfur:	0.04%	0.08%
BTU/LB:	2154	4343
Lbs of SO2 per mBTU:		0.33
Lbs of Sulfur per mBTU:	0.186	
Percent Solids:		44.48%

Sample 2:	As received	Dry basis
Moisture Content:	70.02%	
Volatile Matter:	16.32%	54.43%
Fixed Carbon:	1.36%	4.53%
Ash:	12.30%	41.04%
Sulfur:	0.03%	0.08%
BTU/LB:	1398	4662
Lbs of SO2 per mBTU:		0.34
Lbs of Sulfur per mBTU:	0.215	
Percent Solids:		29.98%

Ash minerals in Sample 2:	
Silicon Dioxide	42.64%
Aluminum Oxide	30.63%
Ferric Oxide	1.31%
Titanium Dioxide	0.72%
Phosphorus Pentoxide	0.25%
Calcium Oxide	20.69%
Magnesium Oxide	0.93%
Sodium Oxide	0.26%
Potassium Oxide	0.19%
Sulfur Trioxide	0.80%

Feedstock Data Sheet

Feedstock / Product: Dedicated Feedstock Willow
Units: Dry Tons
Source of Base Data: SUNY ESF
Conversion Factor: 6 dry tons per acre
Source of Conv. Factor: SUNY ESF
Other Info: low production now on test farms only

Location of Production	Average	1993	1994	1995	1996	1997
Statewide Production	112	20	20	20	150	350
Production in Finger Lakes Region	0	0	0	0	0	0
Production in Central NY Region	112	20	20	20	150	350
Production in North Country Region	0	0	0	0	0	0

Additional Notes:
Willow is well suited for idle lands with lower soil quality than corn acreage.
Willow is only being tried on test plots. SUNY predicts between 10,000 and 80,000 acres of willow in New York State by 2015 for electricity production.
Additional willow may be grown for ethanol production. Land availability is being measured by NYSTEC.
Numbers for 1993-1995 are estimates based on known information about project history

Feedstock Costs

Market or Disposal Method: Burned for electricity. Cost based on test farm estimates by Anteres Grp.
Additional Market or Method:
Additional Costs not Quantified:
Unit of measure for cost: Dollars per dry ton

Source of Data	5-yr Average	1993	1994	1995	1996	1997
Salix Consortium / SRC	$128.30					$128.30

Transportation Method and Cost

Method to Transport to Plant: Dry feedstock sent by truck
Basis of Cost Estimate: 35-mile trucking average distance to plant
Cost to Transport: $7.75 per Ton

Feedstock Composition - Assay Information

Feedstock / Product: Dedicated Feedstock Willow
Source of Data: Environmental Science School / NYSEG study of local willows
Location of Sample: Tully test fields

Carbon:	40.38%	Moisture:	10.00%
Hydrogen:	6.23%	Ash:	1.47%
Nitrogen:	0.46%		
Oxygen:	41.40%	Btu/lb (dry):	8392
Sulfur:	0.05%	Btu/lb (wet):	7553

Notes:

APPENDIX B

CORN PRODUCTION AND AVAILABLE LAND

The following charts outline available land and corn production in bushels within 50 miles of each of the three plant locations. They assume that counties are evenly spaced with farms and urban lands. Therefore, a county that is 40% within a 50-mile radius is assumed to have 40% of its idle land and 40% of its corn production within the radius.

Table B-1, Corn and Available Land (Acres) within 50 Miles of the Miller Brewery Plant Site

County	% within 50 miles of plant site	1997 Corn Grown (in bushels)	1997 Corn within 50 miles	Farm Acres Lost in County (1969 to 1997)	Farm Loss (acres) within 50 miles
Cayuga	98.9	7,852,900	7,764,790	-1,363	0
Cortland	28.5	648,000	184,706	21,645	6,170
Jefferson	33.1	1,100,000	363,836	60,939	20,156
Lewis	27.1	454,000	123,148	16,284	4,417
Madison	55.4	1,724,800	955,142	19,022	10,534
Monroe	1.2	2,617,600	32,092	18,007	221
Oneida	39.5	2,586,400	1,021,835	43,823	17,314
Onondaga	100.0	3,396,000	3,396,000	21,020	21,020
Ontario	29.6	4,954,600	1,466,116	21,941	6,492
Oswego	100.0	642,600	642,600	25,960	25,960
Seneca	70.2	3,325,400	2,334,198	-1,997	0
Tompkins	0.1	2,387,900	2,388	16,092	16
Wayne	98.3	4,028,800	3,961,398	32,095	31,558
Yates	1.0	1,867,200	18,056	8,382	81
Totals			**22,266,305**		**143,939**

Table B-2, Corn and Available Land (Acres) within 50 Miles of the Griffiss Park Plant Site

County	% within 50 miles of plant site	1997 Corn Grown (in bushels)	1997 Corn within 50 miles	Farm Acres Lost in County (1969 to 1997)	Farm Loss (acres) within 50 miles
Chenango	46.8	713,000	333,812	27,257	12,761
Cortland	23.4	648,000	151,690	21,645	5,067
Fulton	50.4	137,800	69,446	7,142	3,599
Hamilton	27.9	unavailable	unavailable	unavailable	unavailable
Herkimer	85.2	777,000	662,361	26,088	22,239
Jefferson	8.9	1,100,000	97,823	60,939	5,419
Lewis	75.5	454,000	342,961	16,284	12,302
Madison	100.0	1,724,800	1,724,800	19,022	19,022
Montgomery	37.9	1,409,200	534,242	12,302	4,664
Oneida	100.0	2,586,400	2,586,400	43,823	43,823
Onondaga	74.3	3,396,000	2,521,564	21,020	15,607
Oswego	78.2	642,600	502,603	25,960	20,305
Otsego	66.6	699,300	465,517	47,645	31,717
Schoharie	2.9	575,700	16,822	27,545	805
Totals			**10,010,041**		**197,329**

Table B-3, Corn and Available Land (Acres) within 50 Miles of the Evans Mills Plant Site

County	% within 50 miles of plant site	1997 Corn Grown (in bushels)	1997 Corn within 50 miles	Farm Acres Lost in County (1969 to 1997)	Farm Loss (acres) within 50 miles
Hamilton	1.4	unavailable	unavailable	unavailable	unavailable
Herkimer	26.9	777,000	209,114	26,088	7,021
Jefferson	100.0	1,100,000	1,100,000	60,939	60,939
Lewis	100.0	454,000	454,000	16,284	16,284
Oneida	12.2	2,586,400	316,705	43,823	5,366
Oswego	43.6	642,600	280,386	25,960	11,327
St. Lawrence	53.5	568,000	303,636	74,881	40,029
Totals			**2,663,840**		**140,967**

APPENDIX C

MILLER BREWERY SITE EXISTING EQUIPMENT

The Miller Brewery site design and cost will be a variant of the Griffiss Park site. The variation will take into account the usable equipment from the existing brewery configuration. The usable equipment represents cost-savings compared to the Griffiss configuration and will result in a lower initial capital cost.

Thirty-one buildings as follows:

- Office and Central Service Building and Maintenance Workshop/Training Center
  - 103,100 square feet
  - Concrete and steel structure
  - Tinted glass-curtain walls at the main entrance
  - 1 ea 80-ton and 3 ea 100-ton chillers for air conditioning
  - Sprinkler systems throughout the building
- Packaging and Warehouse Buildings
  - 687,600 square feet of heated space
  - Ceiling clear heights of 26 feet
  - Column spacing of 60 feet by 60 feet
  - 1000 linear feet of loading-dock frontage
- Utilities Building
  - 3 gas-fired steam boilers including:
    - 1 ea 80,000 lbs/hr package boiler and
    - 2 ea 90,000 lbs/hr Keeler boilers
- Water Treatment Facility
  - Capacity of 5.2 million gallons per day
  - 70,000 lbs of BOD
  - Service from a 60-inch line
  - Two additional 10-inch mains enter the property
  - 17,000-square-foot control building
  - 2 ea 13,200-volt electric feeds to a separate substation
- Glass Warehouse
  - 500-foot by 200-foot structure
  - Dry sprinkler system
  - 26-foot clear ceiling heights
  - 50-foot by 50-foot column spacing
  - 6 ea tailboard loading docks
- Process Manufacturing Buildings
  - 163 stainless steel process tanks with a total capacity that exceeds 16 million gallons
  - 67 tanks are glycol jacketed for cooling
  - 12 ea 550-ton ammonia compressors for process cooling
  - 6 ea glycol chillers for process cooling
- Miscellaneous buildings for auxiliary uses

APPENDIX D

EVANS MILLS SITE

Financial Evaluation of a Corn-to-Ethanol Production Facility Located in Evans Mills, New York

Plant Design Capacity

The projections presented are for a facility that will produce a nominal 5,000,000 gallons per year of 200-proof ethanol from corn. Product yields are based on the following conversion rates:

Ethanol	2.62 anhydrous gallons per bushel corn
Carbon dioxide	16.6 pounds per bushel corn
DDGS	18.4 pounds (at 10% moisture) per bushel of corn

The annual design production capacity of the plant is as follows:

Fuel grade ethanol	5,263,158 gallons
Carbon dioxide	15,879 tons
DDGS	17,557 tons

Corn consumption is estimated at 1,908,397 bushels annually, based on a moisture content of 15.5% and 70% starch on a dry basis.

Annual production and consumption rates are based on 350 operating days per year, allowing 15 days for scheduled and unscheduled maintenance and cleaning.

Project Cost

Based on our extensive experience and equipment database, the total installed plant cost was estimated at $17,942,890.

A detailed capital cost estimate is provided on the following page.

The total estimated project cost includes working capital and reserves equal to 10% of the estimated installed plant cost:

Capital Improvements	$17,942,890
Working Capital & Reserves	1,794,289
Total	$19,737,179

NYSTEC - 5-MGPY Corn-to-Fuel-Ethanol Facility at Evans Mills NY **Base Case**

Area No.	Area Description	Equipment Cost	Erection, Piping, Insulation		Electrical & Controls		Concrete & Structural		Total Cost
			Factor	Cost	Factor	Cost	Factor	Cost	
1000	SITE & BUILDINGS	$153,575	0.00	$0	0.00	$0	0.00	$0	**$153,575**
1200	MILLING	$129,834	0.32	$41,547	0.30	$38,950	0.40	$51,934	**$262,265**
1300	PREPARATION/MASHING	$415,484	0.57	$236,826	0.30	$124,645	0.50	$207,742	**$984,697**
1400	FERMENTATION	$856,321	0.61	$522,356	0.30	$256,896	0.20	$171,264	**$1,806,837**
1500	DISTILLATION	$821,160	0.68	$558,389	0.40	$328,464	0.40	$328,464	**$2,036,477**
1550	MS DEHYDRATION	$511,918	0.25	$127,980	0.10	$51,192	0.20	$102,384	**$793,473**
1600	EVAPORATION	$657,731	0.63	$414,371	0.30	$197,319	0.35	$230,206	**$1,499,627**
1700	DECANTING	$468,138	0.36	$168,530	0.30	$140,441	0.30	$140,441	**$917,550**
1800	DDGS DRYING	$791,930	0.30	$237,579	0.25	$197,983	0.20	$158,386	**$1,385,878**
1900	CIP & CHEMICALS	$180,362	0.74	$133,468	0.30	$54,109	0.50	$90,181	**$458,119**
2000	GRAIN STORAGE	$85,320	0.30	$25,596	0.30	$25,596	0.50	$42,660	**$179,172**
2100	ALCOHOL STORAGE & LO	$360,146	0.30	$108,044	0.25	$90,037	0.40	$144,058	**$702,285**
2200	DDGS STORAGE & LO	$190,246	0.30	$57,074	0.25	$47,562	0.30	$57,074	**$351,955**
3000	DCS (COMPUTER)	$153,574	0.10	$15,357	0.50	$76,787	0.40	$61,429	**$307,147**
4000	COOLING TOWER	$102,384	0.40	$40,953	0.30	$30,715	0.30	$30,715	**$204,767**
5000	BOILER & BFW	$409,535	0.40	$163,814	0.40	$163,814	0.40	$163,814	**$900,976**
6000	INSTR & PLANT AIR	$51,192	0.30	$15,358	0.30	$15,358	0.50	$25,596	**$107,503**
7000	W WATER TREATMENT	$409,535	0.30	$122,860	0.20	$81,907	1.00	$409,535	**$1,023,836**
TOTAL FOR ALL AREAS		**$6,748,383**	**0.443**	**$2,990,100**	**0.285**	**$1,921,773**	**0.358**	**$2,415,883**	**$14,076,139**

INSTALLED COST

INSTALLED ESTIMATE ABOVE		$14,076,139
CONTINGENCY	10.00%	$1,407,614
TOTAL INSTALLED COST		$15,483,753

PROCESS ENGINEERING (VOGELBUSCH)

KNOW-HOW FEE (FIXED COST)	$100,000
SCHEDULE A DESIGN PACKAGE (FIXED COST)	$495,000
START UP & LIAISON (RATE REIMBURSABLE)	$175,000
TOTAL PROCESS ENGINEERING	$770,000

DETAILED ENGINEERING & CONSTRUCTION OVERHEAD

PERCENTAGE OF INSTALLED COST -	12.00%	$1,689,137

Total Capital Cost Estimate **$17,942,890**

Figure D-1, Capital Cost Estimate, Base Case

Project Financing

It is assumed that the project is funded with an equity participation of 30% of the total project cost. This represents a 2.33 to 1 debt-to-equity ratio.

The following details the anticipated funding sources for the project:

Project Financing (Term Loan)	$13,816,025
Equity	5,921,154
Total	$19,737,179

It is assumed that the project will be financed with a $13,816,025 loan that bears a fixed interest rate of 10% over a 15-year term and is structured so that interest only is paid on the note balance during years 1 and 2. In year 3, full amortization begins, with a total annual debt service of $13,816,025, including both principal and interest.

Detail of debt service is shown on the following page.

Debt Service	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Total Plant Debt Balance	$7,403,750	$13,816,025	$13,381,183	$12,902,856	$12,376,697	$11,797,921	$11,161,268	$10,460,950	$9,690,600	$8,843,215	$7,911,092	$6,885,756
Interest Payment		$1,150,134	$1,381,603	$1,338,118	$1,290,286	$1,237,670	$1,179,792	$1,116,127	$1,046,095	$969,060	$884,322	$791,109
Principal Payment			$434,842	$478,327	$526,159	$578,775	$636,653	$700,318	$770,350	$847,385	$932,124	$1,025,336

Beginning Debt	$13,816,025
Interest Rate	10.00%
Payments	15
Annual Debt Service Payment	$1,816,445

Figure D-2, Debt Service, Base Case

Construction and Startup Timetable

The facility is to be constructed over an 18-month period.

After construction is complete, the plant will be started in month 19, when it is expected to achieve an overall production rate of 30% of rated capacity. It is assumed that production in month 20 will be 70% of rated capacity, with full rated capacity anticipated for month 21.

Draw-Down Schedule

The projections are based on a construction draw-down schedule that ties progress payments to construction progress. It is anticipated that construction funds will be drawn, as follows:

Month 1	30.00%	$5,382,867
Months 2 - 19	3.33%	$598,096/month
Month 20	10.00%	$1,794,295
TOTAL	100.00%	$17,942,890

Depreciation and Amortization

The projections anticipate that the term loan will be fully amortized over a 15-year period.

Interest paid during construction on the draw down of the available credit line is capitalized and added to the cost of the plant. The following details the estimated total plant cost:

Capital Improvements	$17,942,890
Capitalized Interest	764,114
Total Plant Cost	$18,707,004

Total plant cost of $18,707,004 is depreciated using straight-line depreciation over the estimated life of the facility of 15 years, beginning in year 2.

(Note: According to Generally Accepted Accounting Principles (GAAP), depreciation for project feasibility projections is based on the estimated useful life of the facility. In this case, a typical 15 years straight-line depreciation was used.)

The project will incur fees to the lenders. It is anticipated that these fees will equal 2% of the financing amount, or $276,321. The anticipated bank fees are capitalized and amortized on a straight-line basis over a 15-year period, beginning in year 1.

Expenses incurred prior to startup of the plant have been capitalized as organizational expenses. These expenses are estimated at $1,490,817 and will be amortized on a straight-line basis over a 5-year period beginning in year 2 (as per GAAP).

Details of depreciation and amortization calculations are provided on the following page.

Depreciation Calculations	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Plant Cost	$12,248,324	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004
Annual depreciation-percentage		6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%
Annual depreciation-dollars	**$0**	**$1,247,134**	**$1,247,134**	**$1,247,134**	**$1,247,134**	**$1,247,134**	**$1,247,134**	**$1,247,134**	**$1,247,134**	**$1,247,134**	**$1,247,134**	**$1,247,134**
Cumulative depreciation	$0	$1,247,134	$2,494,268	$3,741,402	$4,988,536	$6,235,670	$7,482,804	$8,729,938	$9,977,072	$11,224,206	$12,471,340	$13,718,474
Net plant value	$12,248,324	$17,459,870	$16,212,736	$14,965,602	$13,718,468	$12,471,334	$11,224,200	$9,977,066	$8,729,932	$7,482,798	$6,235,664	$4,988,530
Loan Fees	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321
Annual amortization-percentage	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%
Annual amortization-dollars	**$18,421**	**$18,421**	**$18,421**	**$18,421**	**$18,421**	**$18,421**	**$18,421**	**$18,421**	**$18,421**	**$18,421**	**$18,421**	**$18,421**
Cumulative amortization	$18,421	$36,842	$55,263	$73,684	$92,105	$110,526	$128,947	$147,368	$165,789	$184,210	$202,631	$221,052
Net loan fees	$257,900	$239,479	$221,058	$202,637	$184,216	$165,795	$147,374	$128,953	$110,532	$92,111	$73,690	$55,269
Start up expenses	$790,259	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817
Annual amortization-percentage		20.00%	20.00%	20.00%	20.00%	20.00%						
Annual amortization-dollars	**$0**	**$298,163**	**$298,163**	**$298,163**	**$298,163**	**$298,165**						
Cumulative amortization	$0	$298,163	$596,326	$894,489	$1,192,652	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817
Net start up expenses	$790,259	$1,192,654	$894,491	$596,328	$298,165	$0						

Figure D-3, Depreciation Calculations, Base Case

Accounts Receivable and Inventories

Accounts receivable are estimated to climb as sales increase until they stabilize at 30-days of sales. Normal industry terms are net 30. Accounts receivable will equal an investment of $662,592.

There has been no provision for uncollectable accounts.

Inventories are projected to rise as the plant comes on stream, with raw materials equaling five days of production, work in progress anticipated to equal two days of production, and finished goods estimated at three days. Details of inventories are:

Raw Material Inventory	5 days	$61,435
Work in Progress	2 days	24,574
Finished Goods	3 days	65,353
Total Inventory		$151,361

All inventory and accounts-receivable values have been inflated at a rate of 2% per year, starting in year 3.

Accounts Payable

Accounts payable are estimated to be paid on a net-30 basis, except for items that, contractually, are to be paid on different terms and for payroll, which is projected on a cash basis.

In order to be conservative in projecting cash flow, no provision for accounts payable is shown in the projections.

Product Sales and Raw Material Costs

The pro forma financial statements reflect the following prices for products and raw material:

Corn	$2.35/bushel
Fuel Ethanol	$1.15/gallon
Carbon Dioxide	$9.00/ton
DDGS	$100/ton

Typically, ethanol producers do not process and market food-grade carbon dioxide themselves, but rather enter into a long-term contract with a firm that locates its own processing facility adjacent to the ethanol plant and take the carbon dioxide produced from fermentation. The price above represents a typical contract price for scrubbed carbon dioxide in gaseous form.

It should be noted that carbon dioxide processing facilities for production quantities yielded by facilities as small as that proposed are rare. The financial projections assume, however, that there will be a processor willing to locate at the plant site.

Maintenance and Operating Costs

Maintenance costs include the equipment and supplies necessary for keeping the plant equipment in operating order and are estimated to be approximately 1.5% of the Capital Improvements costs. This corresponds with costs at similar facilities.

The following costs were used to determine variable operating costs for the proposed facility:

Corn	$2.35/bushel	NYSTEC (A. Hartman)
Chemicals	current prices	Chemical Marketing Reporter, et al.
Enzymes	current prices	vendor quotes
Water	$1.80/1000 gal	NYSTEC (A. Hartman)
Wastewater	$0.01/gal ethanol	costs at similar facilities
Electricity	$0.08/kWh	Niagara Mohawk Power (G. Haenlin)
Natural Gas	$3.20/mcf	NYSTEC (K. Thiesen)

Maintenance and operating costs per anhydrous ethanol gallon produced are:

Corn	$0.8969
Chemicals and Enzymes	$0.0957
Water	$0.0195
Wastewater Treatment	$0.0100
Electricity	$0.1088
Natural Gas	$0.1760
Maintenance	$0.0538

A detailed breakdown of raw material usage and costs is provided on the following page.

All costs have been inflated at a rate of 2% per year, starting in year 4.

	Usage			Cost				
Raw Material	**lb/Hr**	**lb/Yr**	**lb/Gal***	**$**	**Unit**	**$/lb**	**$/Yr**	**$/Gal***
Corn	12,723	106,870,229	21.3740	$2.35	bushel	$0.04196	**$4,484,733**	**$0.8969**
Fruit Waste	0	0	0.0000	$0.00	ton	$0.00000	**$0**	**$0.0000**
Alpha-amylase	10.1	84,802	0.0170	$1.100	lb	$1.10000	$93,282	$0.0187
Gluco-amylase	3.1	26,172	0.0052	$3.700	liter	$3.70000	$96,838	$0.0194
Sulfuric Acid	0	0	0.0000	$86.20	US ton	$0.04310	$0	$0.0000
Caustic Soda	62	518,000	0.1036	$300.000	ton	$0.15000	$77,700	$0.0155
Ammonia	28	238,000	0.0476	$260.00	US ton	$0.13000	$30,940	$0.0062
Nutrients	0	0	0.0000	$0.124	lb	$0.12400	$0	$0.0000
Ammonium Sulfate	13	112,000	0.0224	$132.00	US ton	$0.06600	$7,392	$0.0015
Antifoam (Corn Oil)	0	0	0.0000	$0.249	lb	$0.24900	$0	$0.0000
Gasoline	199	1,675,559	0.3351	$0.600	gal	$0.09734	$163,093	$0.0326
Diesel	0	0	0.0000	$0.600	gal	$0.05880	$0	$0.0000
BFW Chemicals	0.09	784	0.0002	$0.97	lb	$0.97000	$760	$0.0002
CW Chemicals	1.0	8,400	0.0017	$1.00	lb	$1.00000	$8,400	$0.0017
WWT Nutrients	0	0	0.0000	$0.11	lb	$0.11000	$0	$0.0000
WWT Chemicals	0.00	0	0.0000	$2.50	lb	$2.50000	$0	$0.0000
Chemicals Total							**$478,405**	**$0.0957**
Make-up Water	53,803	451,942,400	90.3885	$0.0018	gal	$0.00022	**$97,659**	**$0.0195**

* Raw material usage and cost is per anhydrous alcohol gallon produced

Figure D-4, Raw Materials Detail, Base Case

Plant Labor, Plant Management, and Administrative Costs

Salaries and wages required to operate and maintain the facility are included in the plant operating expenses. It is estimated that the plant operations will employ 36 persons when the facility achieves full production. Total annual compensation, including 30% for benefits, is estimated to be $1,398,800 in year 3 and is adjusted annually by increasing this cost by 2% per year.

It is also estimated that the organization will also require a staff of seven to perform administrative duties. Total annual compensation, including 30% for benefits, is anticipated to be $448,500 in year 3 and is adjusted annually by increasing this cost by 2% per year.

Provisions for relocation of three specially qualified (key) employees, who may not be readily available in the vicinity of the plant site, are included in Plant Salaries and Benefits and Administrative Salaries and Benefits. A one-time payment for moving expenses of $15,000 per key employee, for a total of $45,000, is provided.

Details of both plant and administrative personnel is provided on the next four pages in the following spreadsheets:

Personnel Detail
Salaries, Wages, and Benefits by Job Classification - Year 1 Details
Salaries, Wages, and Benefits by Job Classification - Year 2 Details
Salaries, Wages, and Benefits by Job Classification

PLANT PERSONNEL Operations	Rate	Hourly/ Salaried	Annual Hours	Annual Comp.	Number	Base Comp.	30% Benefits	Annual Total
Management								
Plant Manager	$80,000	S		$80,000	1	$80,000	$24,000	$104,000
Production Manager	$65,000	S		$65,000	1	$65,000	$19,500	$84,500
Professional								
Lab Manager	$50,000	S		$50,000	1	$50,000	$15,000	$65,000
Supervisory								
Shift Supervisor	$16.17	H	2,288	$37,000	4	$148,000	$44,400	$192,400
Maintenance Supervisor	$17.79	H	2,080	$37,000	1	$37,000	$11,100	$48,100
Administrative Supervisor	$16.35	H	2,080	$34,000	1	$34,000	$10,200	$44,200
Direct Labor								
Operators	$10.93	H	2,288	$25,000	16	$400,000	$120,000	$520,000
Indirect Labor								
Maintenance Technicians	$13.46	H	2,080	$28,000	4	$112,000	$33,600	$145,600
Laboratory Technicians	$10.93	H	2,288	$25,000	2	$50,000	$15,000	$65,000
Shipping/Receiving Clerk	$9.62	H	2,080	$20,000	1	$20,000	$6,000	$26,000
Administrative Clerks	$9.62	H	2,080	$20,000	2	$40,000	$12,000	$52,000
Yard	$9.62	H	2,080	$20,000	2	$40,000	$12,000	$52,000
				Total Employment:	**36**	**Total Compensation:**		**$1,398,800**

ADMINISTRATIVE PERSONNEL Administration	Rate	Hourly/ Salaried	Annual Hours	Annual Comp.	Number	Base Comp.	30% Benefits	Annual Total
Management								
General Manager	$100,000	S		$100,000	1	$100,000	$30,000	$130,000
Marketing Manager	$60,000	S		$60,000	1	$60,000	$18,000	$78,000
Accountant	$60,000	S		$60,000	1	$60,000	$18,000	$78,000
Professional								
Plant Engineer	$65,000	S		$65,000	1	$65,000	$19,500	$84,500
Other								
Secretary/Receptionist	$9.62	H	2,080	$20,000	1	$20,000	$6,000	$26,000
Bookkeeper	$9.62	H	2,080	$20,000	2	$40,000	$12,000	$52,000
				Total Employment:	**7**	**Total Compensation:**		**$448,500**

Figure D-5, Salaries, Wages, and Benefits by Job Classification, Base Case

Plant Salaries, Wages, and Benefits by Job Classification - Year-1 Details	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Total
Operations													
Management													
Plant Manager					$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$69,336
Production Manager													$0
Professional													
Lab Manager										$5,417	$5,417	$5,417	$16,251
Supervisory													
Shift Supervisor													$0
Maintenance Supervisor										$4,008	$4,008	$4,008	$12,024
Administrative Supervisor											$3,683	$3,683	$7,366
Direct Labor													
Operators													$0
Indirect Labor													
Maintenance Technicians													$0
Laboratory Technicians													$0
Shipping/Receiving Clerk													$0
Administrative Clerks												$4,333	$4,333
Yard													$0
Total	$0	$0	$0	$0	$8,667	$8,667	$8,667	$8,667	$8,667	$18,092	$21,775	$26,108	$109,310

Administrative Salaries, Wages, and Benefits by Job Classification - Year-1 Details	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Total
Administration													
Management													
General Manager	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$129,996
Marketing Manager	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$78,000
Accountant	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$78,000
Professional													
Plant Engineer					$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$56,336
Other													
Secretary/Receptionist	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$26,004
Bookkeeper	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$25,998
Total	$28,167	$28,167	$28,167	$28,167	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$394,334

Figure D-6, Salaries, Wages, and Benefits by Job Classification - Year-1 Details, Base Case

Plant Salaries, Wages, and Benefits by Job Classification - Year-2 Details	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18	Month 19	Month 20	Month 21	Month 22	Month 23	Month 24	Total
Operations													
Management													
Plant Manager	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$104,004
Production Manager	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$84,504
Professional													
Lab Manager	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$65,004
Supervisory													
Shift Supervisor					$16,033	$16,033	$18,438	$16,033	$16,033	$16,033	$16,033	$16,033	$130,669
Maintenance Supervisor	$4,609	$4,008	$4,008	$4,008	$4,008	$4,008	$4,609	$4,008	$4,008	$4,008	$4,008	$4,008	$49,298
Administrative Supervisor	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$44,196
Direct Labor													
Operators					$43,333	$43,333	$49,833	$43,333	$43,333	$43,333	$43,333	$43,333	$353,164
Indirect Labor													
Maintenance Technicians					$12,133	$12,133	$13,953	$12,133	$12,133	$12,133	$12,133	$12,133	$98,884
Laboratory Technicians					$5,417	$5,417	$6,230	$5,417	$5,417	$5,417	$5,417	$5,417	$44,149
Shipping/Receiving Clerk					$2,167	$2,167	$2,384	$2,167	$2,167	$2,167	$2,167	$2,167	$17,553
Administrative Clerks	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$51,996
Yard					$4,333	$4,333	$4,766	$4,333	$4,333	$4,333	$4,333	$4,333	$35,097
Total	$33,751	$33,150	$33,150	$33,150	$116,566	$116,566	$129,355	$116,566	$116,566	$116,566	$116,566	$116,566	$1,078,518

Administrative Salaries, Wages, and Benefits by Job Classification - Year-2 Details	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18	Month 19	Month 20	Month 21	Month 22	Month 23	Month 24	Total
Administration													
Management													
General Manager	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$129,996
Marketing Manager	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$78,000
Accountant	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$78,000
Professional													
Plant Engineer	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$84,504
Other													
Secretary/Receptionist	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$26,004
Bookkeeper	$2,167	$2,167	$2,167	$2,167	$2,167	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$41,164
Total	$35,209	$35,209	$35,209	$35,209	$35,209	$37,375	$37,375	$37,375	$37,375	$37,375	$37,375	$37,375	$437,668

Figure D-7, Salaries, Wages, and Benefits by Job Classification - Year-2 Details, Base Case

Plant Salaries, Wages, and Benefits by Job Classification

Operations	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Management												
Plant Manager	$69,336	$104,004	$104,004	$106,084	$108,206	$110,370	$112,577	$114,829	$117,126	$119,469	$121,858	$124,295
Production Manager	$0	$84,504	$84,504	$86,194	$87,918	$89,676	$91,470	$93,299	$95,165	$97,068	$99,009	$100,989
Professional												
Lab Manager	$16,251	$65,004	$65,004	$66,304	$67,630	$68,983	$70,363	$71,770	$73,205	$74,669	$76,162	$77,685
Supervisory												
Shift Supervisor	$0	$130,669	$192,396	$196,244	$200,169	$204,172	$208,255	$212,420	$216,668	$221,001	$225,421	$229,929
Maintenance Supervisor	$12,024	$49,298	$48,096	$49,058	$50,039	$51,040	$52,061	$53,102	$54,164	$55,247	$56,352	$57,479
Administrative Supervisor	$7,366	$44,196	$44,196	$45,080	$45,982	$46,902	$47,840	$48,797	$49,773	$50,768	$51,783	$52,819
Direct Labor				$0	$0	$0	$0	$0	$0	$0	$0	$0
Operators	$0	$353,164	$519,996	$530,396	$541,004	$551,824	$562,860	$574,117	$585,599	$597,311	$609,257	$621,442
Indirect Labor												
Maintenance Technicians	$0	$98,884	$145,596	$148,508	$151,478	$154,508	$157,598	$160,750	$163,965	$167,244	$170,589	$174,001
Laboratory Technicians	$0	$44,149	$65,004	$66,304	$67,630	$68,983	$70,363	$71,770	$73,205	$74,669	$76,162	$77,685
Shipping/Receiving Clerk	$0	$17,553	$26,004	$26,524	$27,054	$27,595	$28,147	$28,710	$29,284	$29,870	$30,467	$31,076
Administrative Clerks	$4,333	$51,996	$51,996	$53,036	$54,097	$55,179	$56,283	$57,409	$58,557	$59,728	$60,923	$62,141
Yard	$0	$35,097	$51,996	$53,036	$54,097	$55,179	$56,283	$57,409	$58,557	$59,728	$60,923	$62,141
Total	$109,310	$1,078,518	$1,398,792	$1,426,768	$1,455,304	$1,484,411	$1,514,100	$1,544,382	$1,575,268	$1,606,772	$1,638,906	$1,671,682

Administrative Salaries, Wages, and Benefits by Job Classification

Administration	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Management												
General Manager	$129,996	$129,996	$129,996	$132,596	$135,248	$137,953	$140,712	$143,526	$146,397	$149,325	$152,312	$155,358
Marketing Manager	$78,000	$78,000	$78,000	$79,560	$81,151	$82,774	$84,429	$86,118	$87,840	$89,597	$91,389	$93,217
Accountant	$78,000	$78,000	$78,000	$79,560	$81,151	$82,774	$84,429	$86,118	$87,840	$89,597	$91,389	$93,217
Professional												
Plant Engineer	$56,336	$84,504	$84,504	$86,194	$87,918	$89,676	$91,470	$93,299	$95,165	$97,068	$99,009	$100,989
Other												
Secretary/Receptionist	$26,004	$26,004	$26,004	$26,524	$27,054	$27,595	$28,147	$28,710	$29,284	$29,870	$30,467	$31,076
Bookkeeper	$25,998	$41,164	$51,996	$53,036	$54,097	$55,179	$56,283	$57,409	$58,557	$59,728	$60,923	$62,141
Total	$394,334	$437,668	$448,500	$457,470	$466,619	$475,951	$485,470	$495,180	$505,083	$515,185	$525,489	$535,998

Figure D-8, Annual Salaries, Wages, and Benefits by Job Classification, Base Case

Additional Fixed Costs

The following additional fixed annual costs are incorporated into the financial analysis:

taxes and insurance	$197,372
miscellaneous fixed costs	$44,243

These costs have been inflated at a rate of 2% per year, starting in year 4.

Federal Income Taxes

It is anticipated that the facility will be set up as a limited partnership and, as such, there are no taxes charged directly to the partnership. The financial projections do, however, provide for a deduction for corporate income taxes at the 35% rate. It will be necessary to distribute to the partners an amount equal to the tax effect of the "pass-through" earnings. Therefore, a deduction prior to the net income for income tax is shown.

Pro Forma - Base Case

The Base Case Financial Statements provided in subsequent pages are made up of the following:

Sources and Application of Funds (Year 1)
Sources and Application of Funds (Year 2)
Balance Sheet (Years 1 through 12)
Income Statement (Years 1 through 12)
Cash Flow Statement (Years 1 through 12)
Pricing Sensitivity Matrix - Average Annual Pre-tax Income (Years 3 through 12)
Pricing Sensitivity Matrix - Average Annual Cash Flow (Years 3 through 12)

The proposed project never shows a profit and has steadily increasing annual cash flow deficits, averaging -$2,865,281 in years 3 through 12. The last year shown in the projections (year 12) has the largest cash flow deficit, -$2,961,185.

After-tax income for the proposed project is never positive, but does improve slightly. Annual after-tax income averages -$3,539,249 in years 3 through 12. The best after-tax income, -$3,181,949, is in year 12. This represents an average annual return on investment of –18%.

Cumulative earnings reach a low of -$40,057,047 at the end of year 12.

SOURCES AND APPLICATION OF FUNDS (YEAR 1)	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Total
CASH INFLOW													
PRODUCTION UNITS													
INVENTORY-FINISHED PRODUCTS													
SALES UNITS													
SALES DOLLARS													
ACCOUNTS RECEIVABLE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STATE PRODUCERS INCENTIVE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
INCOMING CASH													
COLLECTIONS												$0	$0
EQUITY	$5,921,154												$5,921,154
SUBORDINATED DEBT													$0
OTHER FINANCING													$0
PROJECT FINANCING	$0	$457,134	$649,608	$655,022	$706,189	$682,074	$687,758	$693,490	$699,269	$714,521	$724,158	$734,526	$7,403,750
Total incoming cash	**$5,921,154**	**$457,134**	**$649,608**	**$655,022**	**$706,189**	**$682,074**	**$687,758**	**$693,490**	**$699,269**	**$714,521**	**$724,158**	**$734,526**	**$13,324,903**
DISBURSEMENTS													
Construction draws	$5,382,867	$597,498	$597,498	$597,498	$597,498	$597,498	$597,498	$597,498	$597,498	$597,498	$597,498	$597,498	$11,955,345
Loan commitment fees	$276,321												$276,321
Plant salaries and benefits	$0	$0	$0	$0	$38,667	$8,667	$8,667	$8,667	$8,667	$18,092	$21,775	$26,108	$139,310
Taxes and insurance	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$197,372
Administrative salaries and benefits	$43,167	$28,167	$28,167	$28,167	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$409,334
Miscellaneous	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$44,243
Interest expense	$0	$0	$3,809	$9,223	$14,681	$20,566	$26,250	$31,982	$37,761	$43,588	$49,542	$55,577	$292,979
Total disbursements	**$5,722,489**	**$645,799**	**$649,608**	**$655,022**	**$706,189**	**$682,074**	**$687,758**	**$693,490**	**$699,269**	**$714,521**	**$724,158**	**$734,526**	**$13,314,903**
Beginning cash	$0	$198,665	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$0
Total receipts	$5,921,154	$457,134	$649,608	$655,022	$706,189	$682,074	$687,758	$693,490	$699,269	$714,521	$724,158	$734,526	$13,324,903
Total disbursements	$5,722,489	$645,799	$649,608	$655,022	$706,189	$682,074	$687,758	$693,490	$699,269	$714,521	$724,158	$734,526	$13,314,903
Ending cash	**$198,665**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**
Note balance	**$0**	**$457,134**	**$1,106,742**	**$1,761,764**	**$2,467,953**	**$3,150,027**	**$3,837,785**	**$4,531,275**	**$5,230,544**	**$5,945,066**	**$6,669,224**	**$7,403,750**	
Interest rate	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	
Interest expense	$0	$3,809	$9,223	$14,681	$20,566	$26,250	$31,982	$37,761	$43,588	$49,542	$55,577	$61,698	

Figure D-9, Sources and Application of Funds, Year 1, Base Case

SOURCES AND APPLICATION OF FUNDS (YEAR 2)	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18	Month 19	Month 20	Month 21	Month 22	Month 23	Month 24	Total
CASH INFLOW													
PRODUCTION UNITS													
Fuel Ethanol (gal)							$131,579	$307,017	$438,596	$438,596	$438,596	$438,596	$2,192,980
Carbon Dioxide (tons)							$397	$926	$1,323	$1,323	$1,323	$1,323	$6,615
DDGS (tons)							$439	$1,024	$1,463	$1,463	$1,463	$1,463	$7,315
INVENTORY-FINISHED PRODUCTS													
Fuel Ethanol (gal)							$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	
Carbon Dioxide (tons)							$300	$300	$300	$300	$300	$300	
DDGS (tons)							$300	$300	$300	$300	$300	$300	
SALES UNITS													
Fuel Ethanol (gal)							$31,579	$307,017	$438,596	$438,596	$438,596	$438,596	$2,092,980
Carbon Dioxide (tons)							$97	$926	$1,323	$1,323	$1,323	$1,323	$6,315
DDGS (tons)							$139	$1,024	$1,463	$1,463	$1,463	$1,463	$7,015
SALES DOLLARS													
Fuel Ethanol							$36,316	$353,070	$504,385	$504,385	$504,385	$504,385	$2,406,926
Carbon Dioxide							$872	$8,335	$11,907	$11,907	$11,907	$11,907	$56,835
DDGS							$13,890	$102,410	$146,300	$146,300	$146,300	$146,300	$701,500
Total Sales							**$51,078**	**$463,815**	**$662,592**	**$662,592**	**$662,592**	**$662,592**	**$3,165,261**
ACCOUNTS RECEIVABLE	$0	$0	$0	$0	$0	$0	$51,078	$463,815	$662,592	$662,592	$662,592	$662,592	$662,592
INCOMING CASH													
COLLECTIONS	$0	$0	$0	$0	$0	$0	$0	$51,078	$463,815	$662,592	$662,592	$662,592	$2,502,669
PROJECT FINANCING	$793,623	$799,635	$805,301	$814,008	$903,209	$998,911	$1,178,722	$118,866	$0	$0	$0	$0	$6,412,276
Total incoming cash	**$793,623**	**$799,635**	**$805,301**	**$814,008**	**$903,209**	**$998,911**	**$1,178,722**	**$169,944**	**$463,815**	**$662,592**	**$662,592**	**$662,592**	**$8,914,945**
DISBURSEMENTS													$0
Construction draws	$597,498	$597,498	$597,498	$597,498	$597,498	$597,498	$597,498	$1,805,059					$5,987,545
Corn						$86,009	$112,118	$448,474	$523,219	$373,728	$373,728	$373,728	$2,291,004
Chemicals and Enzymes							$39,867	$39,867	$39,867	$39,867	$39,867	$39,867	$239,202
Process water							$8,138	$8,138	$8,138	$8,138	$8,138	$8,138	$48,828
Waste Water Treatment							$4,167	$4,167	$4,167	$4,167	$4,167	$4,167	$25,002
Electricity	$45,333	$45,333	$45,333	$45,333	$45,333	$45,333	$45,333	$45,333	$45,333	$45,333	$45,333	$45,333	$543,996
Natural Gas							$73,333	$73,333	$73,333	$73,333	$73,333	$73,333	$439,998
Maintenance	$0	$0	$0	$0	$0	$0	$7,083	$16,526	$23,609	$23,609	$23,609	$23,609	$118,045
Plant salaries and benefits	$33,751	$33,150	$33,150	$33,150	$116,566	$116,566	$129,355	$116,566	$116,566	$116,566	$116,566	$116,566	$1,078,518
Taxes and insurance	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$16,448	$197,372
Administrative salaries and benefits	$35,209	$35,209	$35,209	$35,209	$35,209	$37,375	$37,375	$37,375	$37,375	$37,375	$37,375	$37,375	$437,668
Consulting	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$3,687	$44,243
Interest expense	$61,698	$68,311	$74,975	$81,686	$88,469	$95,996	$104,320	$114,143	$115,134	$115,134	$115,134	$115,134	$1,150,134
Total disbursements	**$793,623**	**$799,635**	**$806,299**	**$813,010**	**$903,209**	**$998,911**	**$1,178,722**	**$2,729,115**	**$1,006,876**	**$857,385**	**$857,385**	**$857,385**	**$12,601,554**
Beginning cash	$10,000	$10,000	$10,000	$9,002	$10,000	$10,000	$10,000	$10,000	($2,549,171)	($3,092,232)	($3,287,024)	($3,481,817)	$10,000
Total receipts	$793,623	$799,635	$805,301	$814,008	$903,209	$998,911	$1,178,722	$169,944	$463,815	$662,592	$662,592	$662,592	$8,914,945
Total disbursements	$793,623	$799,635	$806,299	$813,010	$903,209	$998,911	$1,178,722	$2,729,115	$1,006,876	$857,385	$857,385	$857,385	$12,601,554
Ending cash	**$10,000**	**$10,000**	**$9,002**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**($2,549,171)**	**($3,092,232)**	**($3,287,024)**	**($3,481,817)**	**($3,676,609)**	**($3,676,609)**
Note balance	**$8,197,373**	**$8,997,008**	**$9,802,309**	**$10,616,317**	**$11,519,526**	**$12,518,437**	**$13,697,159**	**$13,816,025**	**$13,816,025**	**$13,816,025**	**$13,816,025**	**$13,816,025**	
Interest rate	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	
Interest expense	$68,311	$74,975	$81,686	$88,469	$95,996	$104,320	$114,143	$115,134	$115,134	$115,134	$115,134	$115,134	

Figure D-10, Sources and Application of Funds, Year 2, Base Case

BALANCE SHEET	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Assets												
Current Assets												
Cash	$10,000	($4,633,331)	($7,407,641)	($10,201,109)	($13,014,118)	($15,847,057)	($18,700,326)	($21,574,332)	($24,469,488)	($27,386,218)	($30,324,956)	($33,286,141)
Accounts receivable	$0	$662,592	$675,844	$689,361	$703,148	$717,211	$731,555	$746,186	$761,110	$776,332	$791,859	$807,696
State Producers Incentive	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Inventory	$0	$151,361	$154,389	$157,476	$160,626	$163,839	$167,115	$170,458	$173,867	$177,344	$180,891	$184,509
Reserve for Capital Expenses		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Current Assets	**$10,000**	**($3,819,377)**	**($6,577,409)**	**($9,354,272)**	**($12,150,344)**	**($14,966,008)**	**($17,801,656)**	**($20,657,688)**	**($23,534,511)**	**($26,432,542)**	**($29,352,206)**	**($32,293,936)**
Property, Plant & Equipment												
Plant equipment	$12,248,324	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004	$18,707,004
Construction in progress												
Accumulated depreciation	$0	$1,247,134	$2,494,268	$3,741,402	$4,988,536	$6,235,670	$7,482,804	$8,729,938	$9,977,072	$11,224,206	$12,471,340	$13,718,474
Net Plant Value	**$12,248,324**	**$17,459,870**	**$16,212,736**	**$14,965,602**	**$13,718,468**	**$12,471,334**	**$11,224,200**	**$9,977,066**	**$8,729,932**	**$7,482,798**	**$6,235,664**	**$4,988,530**
Other Assets												
Organizational costs	$790,259	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817
Accumulated amortization	$0	$298,163	$596,326	$894,489	$1,192,652	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817	$1,490,817
Loan acquisition costs	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321	$276,321
Accumulated amortization	$18,421	$36,842	$55,263	$73,684	$92,105	$110,526	$128,947	$147,368	$165,789	$184,210	$202,631	$221,052
Total Other Assets	**$1,048,158**	**$1,432,132**	**$1,115,548**	**$798,964**	**$482,380**	**$165,795**	**$147,374**	**$128,953**	**$110,532**	**$92,111**	**$73,690**	**$55,269**
Total Assets	**$13,306,482**	**$15,072,625**	**$10,750,876**	**$6,410,295**	**$2,050,505**	**($2,328,879)**	**($6,430,082)**	**($10,551,669)**	**($14,694,047)**	**($18,857,633)**	**($23,042,852)**	**($27,250,137)**
Liabilities and Partners' Equity												
Current Liabilities												
Income Taxes Payable												
Current portion of long-term debt		$434,842	$478,327	$526,159	$578,775	$636,653	$700,318	$770,350	$847,385	$932,124	$1,025,336	$1,127,869
Total Current Liabilities	**$0**	**$434,842**	**$478,327**	**$526,159**	**$578,775**	**$636,653**	**$700,318**	**$770,350**	**$847,385**	**$932,124**	**$1,025,336**	**$1,127,869**
Long-Term Liabilities												
Project financing	$7,403,750	$13,816,025	$13,381,183	$12,902,856	$12,376,697	$11,797,921	$11,161,268	$10,460,950	$9,690,600	$8,843,215	$7,911,092	$6,885,756
Subordinated Debt												
Other loan												
Less current portion		($434,842)	($478,327)	($526,159)	($578,775)	($636,653)	($700,318)	($770,350)	($847,385)	($932,124)	($1,025,336)	($1,127,869)
Total Long-Term Liabilities	**$7,403,750**	**$13,381,183**	**$12,902,856**	**$12,376,697**	**$11,797,921**	**$11,161,268**	**$10,460,950**	**$9,690,600**	**$8,843,215**	**$7,911,092**	**$6,885,756**	**$5,757,886**
Partners' Equity												
Equity	$5,921,154	$5,921,154	$5,921,154	$5,921,154	$5,921,154	$5,921,154	$5,921,154	$5,921,154	$5,921,154	$5,921,154	$5,921,154	$5,921,154
Accumulated earnings	($18,421)	($4,664,554)	($8,551,461)	($12,413,715)	($16,247,346)	($20,047,954)	($23,512,504)	($26,933,773)	($30,305,801)	($33,622,002)	($36,875,098)	($40,057,047)
Total Partners' Equity	**$5,902,733**	**$1,256,600**	**($2,630,307)**	**($6,492,561)**	**($10,326,192)**	**($14,126,801)**	**($17,591,351)**	**($21,012,620)**	**($24,384,648)**	**($27,700,849)**	**($30,953,944)**	**($34,135,893)**
Total Liabilities and Equity	**$13,306,482**	**$15,072,625**	**$10,750,876**	**$6,410,295**	**$2,050,505**	**($2,328,879)**	**($6,430,082)**	**($10,551,669)**	**($14,694,047)**	**($18,857,633)**	**($23,042,852)**	**($27,250,137)**

Figure D-11, Balance Sheet, Base Case

INCOME STATEMENT	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12
Sales												
Fuel Ethanol	$0	$2,406,926	$6,052,632	$6,173,684	$6,297,158	$6,423,101	$6,551,563	$6,682,594	$6,816,246	$6,952,571	$7,091,622	$7,233,454
Carbon Dioxide	$0	$56,835	$142,911	$145,769	$148,684	$151,658	$154,691	$157,785	$160,941	$164,160	$167,443	$170,792
DDGS	$0	$701,500	$1,755,725	$1,790,840	$1,826,657	$1,863,190	$1,900,454	$1,938,463	$1,977,232	$2,016,777	$2,057,113	$2,098,255
Total Sales	**$0**	**$3,165,261**	**$7,951,267**	**$8,110,293**	**$8,272,499**	**$8,437,949**	**$8,606,708**	**$8,778,842**	**$8,954,419**	**$9,133,508**	**$9,316,178**	**$9,502,501**
State Producers Incentive	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Income	**$0**	**$3,165,261**	**$7,951,267**	**$8,110,293**	**$8,272,499**	**$8,437,949**	**$8,606,708**	**$8,778,842**	**$8,954,419**	**$9,133,508**	**$9,316,178**	**$9,502,501**
Cost of sales												
Corn	$0	$2,291,004	$4,484,733	$4,574,427	$4,665,916	$4,759,234	$4,854,419	$4,951,507	$5,050,537	$5,151,548	$5,254,579	$5,359,671
Chemicals and Enzymes	$0	$239,202	$478,405	$487,973	$497,732	$507,687	$517,841	$528,198	$538,762	$549,537	$560,528	$571,739
Process water	$0	$48,828	$97,659	$99,612	$101,604	$103,636	$105,709	$107,823	$109,979	$112,179	$114,423	$116,711
Waste Water Treatment	$0	$25,002	$50,000	$51,000	$52,020	$53,060	$54,121	$55,203	$56,307	$57,433	$58,582	$59,754
Electricity	$0	$543,996	$544,000	$554,880	$565,978	$577,298	$588,844	$600,621	$612,633	$624,886	$637,384	$650,132
Natural Gas	$0	$439,998	$880,000	$897,600	$915,552	$933,863	$952,540	$971,591	$991,023	$1,010,843	$1,031,060	$1,051,681
Steam	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maintenance	$0	$118,045	$269,143	$274,526	$280,017	$285,617	$291,329	$297,156	$303,099	$309,161	$315,344	$321,651
Plant salaries and benefits	$0	$712,185	$1,398,800	$1,426,776	$1,455,312	$1,484,418	$1,514,106	$1,544,388	$1,575,276	$1,606,782	$1,638,918	$1,671,696
Depreciation	$0	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134
Total Cost of Sales	**$0**	**$5,665,393**	**$9,449,873**	**$9,613,928**	**$9,781,265**	**$9,951,947**	**$10,126,043**	**$10,303,621**	**$10,484,750**	**$10,669,503**	**$10,857,952**	**$11,050,169**
Gross Margin	**$0**	**($2,500,132)**	**($1,498,606)**	**($1,503,635)**	**($1,508,766)**	**($1,513,998)**	**($1,519,335)**	**($1,524,779)**	**($1,530,331)**	**($1,535,995)**	**($1,541,774)**	**($1,547,668)**
General & Administrative Costs												
Taxes and insurance		$197,372	$197,372	$201,319	$205,345	$209,452	$213,641	$217,914	$222,272	$226,717	$231,251	$235,876
Administrative salaries and benefits		$437,668	$448,500	$457,470	$466,619	$475,951	$485,470	$495,179	$505,083	$515,185	$525,489	$535,999
Miscellaneous		$44,243	$44,243	$45,128	$46,031	$46,952	$47,891	$48,849	$49,826	$50,823	$51,839	$52,876
Interest expense		$1,150,134	$1,381,603	$1,338,118	$1,290,286	$1,237,670	$1,179,792	$1,116,127	$1,046,095	$969,060	$884,322	$791,109
Amortization-Loan Fees	$18,421	$18,421	$18,421	$18,421	$18,421	$18,421	$18,421	$18,421	$18,421	$18,421	$18,421	$18,421
Amortization-Start-up Expens	$0	$298,163	$298,163	$298,163	$298,163	$298,165	$0	$0	$0	$0	$0	$0
Total Gen. & Admin. Expenses	**$18,421**	**$2,146,000**	**$2,388,301**	**$2,358,619**	**$2,324,865**	**$2,286,611**	**$1,945,215**	**$1,896,490**	**$1,841,697**	**$1,780,206**	**$1,711,322**	**$1,634,281**
Pre-Tax Income	**($18,421)**	**($4,646,133)**	**($3,886,907)**	**($3,862,254)**	**($3,833,631)**	**($3,800,609)**	**($3,464,550)**	**($3,421,269)**	**($3,372,028)**	**($3,316,201)**	**($3,253,096)**	**($3,181,949)**
Income taxes-35%												
Net Income	**($18,421)**	**($4,646,133)**	**($3,886,907)**	**($3,862,254)**	**($3,833,631)**	**($3,800,609)**	**($3,464,550)**	**($3,421,269)**	**($3,372,028)**	**($3,316,201)**	**($3,253,096)**	**($3,181,949)**
Cumulative pre-tax earnings	($18,421)	($4,664,554)	($8,551,461)	($12,413,715)	($16,247,346)	($20,047,954)	($23,512,504)	($26,933,773)	($30,305,801)	($33,622,002)	($36,875,098)	($40,057,047)
Cumulative earnings	($18,421)	($4,664,554)	($8,551,461)	($12,413,715)	($16,247,346)	($20,047,954)	($23,512,504)	($26,933,773)	($30,305,801)	($33,622,002)	($36,875,098)	($40,057,047)

Figure D-12, Income Statement, Base Case

CASH FLOW STATEMENT	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12
Cash Flow From Operations												
Net income	($18,421)	($4,646,133)	($3,886,907)	($3,862,254)	($3,833,631)	($3,800,609)	($3,464,550)	($3,421,269)	($3,372,028)	($3,316,201)	($3,253,096)	($3,181,949)
Adjustments to Reconcile Net Income												
to Net Cash Provided by Operations												
Depreciation	$0	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134
Amortization	$18,421	$316,584	$316,584	$316,584	$316,584	$316,586	$18,421	$18,421	$18,421	$18,421	$18,421	$18,421
Net (Increase) Decrease in Operating Assets:												
Accounts receivable	$0	($662,592)	($13,252)	($13,517)	($13,787)	($14,063)	($14,344)	($14,631)	($14,924)	($15,222)	($15,527)	($15,837)
State Producers Incentive	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Inventories	$0	($151,361)	($3,027)	($3,088)	($3,150)	($3,213)	($3,277)	($3,342)	($3,409)	($3,477)	($3,547)	($3,618)
Net Increase (Decrease) in Operating Liabilities:												
Accounts payable												
Other current liabilities			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Net Cash From Operations	**$0**	**($3,896,368)**	**($2,339,468)**	**($2,315,141)**	**($2,286,849)**	**($2,254,164)**	**($2,216,616)**	**($2,173,687)**	**($2,124,806)**	**($2,069,346)**	**($2,006,614)**	**($1,935,849)**
Cash Flows From Investing Activities												
(Increase) Decrease in Property and Equipment	($12,248,324)	($6,458,680)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
(Increase) Decrease in Organization Costs	($790,259)	($700,558)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
(Increase) Decrease in Loan Fees	($276,321)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
(Increase) Decrease in Equipment Reserve												
Cash Flows From Financing Operations												
Increase (Decrease) in Equity	$5,921,154											
Increase (Decrease) in Long-Term Financing	$7,403,750	$6,412,276	($434,842)	($478,327)	($526,159)	($578,775)	($636,653)	($700,318)	($770,350)	($847,385)	($932,124)	($1,025,336)
Net Increase (Decrease) In Cash	**$10,000**	**($4,643,331)**	**($2,774,311)**	**($2,793,468)**	**($2,813,009)**	**($2,832,940)**	**($2,853,269)**	**($2,874,005)**	**($2,895,156)**	**($2,916,731)**	**($2,938,738)**	**($2,961,185)**
Cash Balance - Beginning of Period	**$0**	**$10,000**	**($4,633,331)**	**($7,407,641)**	**($10,201,109)**	**($13,014,118)**	**($15,847,057)**	**($18,700,326)**	**($21,574,332)**	**($24,469,488)**	**($27,386,218)**	**($30,324,956)**
Cash Balance - End of Period	**$10,000**	**($4,633,331)**	**($7,407,641)**	**($10,201,109)**	**($13,014,118)**	**($15,847,057)**	**($18,700,326)**	**($21,574,332)**	**($24,469,488)**	**($27,386,218)**	**($30,324,956)**	**($33,286,141)**

Figure D-13, Cash Flow Statement, Base Case

Sensitivity Analyses – Base Case

Sensitivity tables generated by various corn costs and selling prices for fuel ethanol are provided.

The first table shows the average annual pre-tax income and the second the average annual cash flow for full operating years, with debt service.

The prices for carbon dioxide and the DDGS are assumed to be constant in each table, because the price for each will most probably be set by long-term contracts and will not vary to the extent that a commodity like fuel ethanol will.

Ethanol ($/gallon)

Corn $/bu	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40
2.75	($5,618,397)	($5,355,239)	($5,092,081)	($4,828,924)	($4,565,766)	**($4,302,608)**	($4,039,450)	($3,776,292)	($3,513,134)	($3,249,976)	($2,986,818)
2.70	($5,522,977)	($5,259,820)	($4,996,662)	($4,733,504)	($4,470,346)	**($4,207,188)**	($3,944,030)	($3,680,872)	($3,417,714)	($3,154,556)	($2,891,398)
2.65	($5,427,558)	($5,164,400)	($4,901,242)	($4,638,084)	($4,374,926)	**($4,111,768)**	($3,848,610)	($3,585,452)	($3,322,294)	($3,059,137)	($2,795,979)
2.60	($5,332,138)	($5,068,980)	($4,805,822)	($4,542,664)	($4,279,506)	**($4,016,348)**	($3,753,190)	($3,490,032)	($3,226,875)	($2,963,717)	($2,700,559)
2.55	($5,236,718)	($4,973,560)	($4,710,402)	($4,447,244)	($4,184,086)	**($3,920,928)**	($3,657,770)	($3,394,613)	($3,131,455)	($2,868,297)	($2,605,139)
2.50	($5,141,298)	($4,878,140)	($4,614,982)	($4,351,824)	($4,088,666)	**($3,825,509)**	($3,562,351)	($3,299,193)	($3,036,035)	($2,772,877)	($2,509,719)
2.45	($5,045,878)	($4,782,720)	($4,519,562)	($4,256,404)	($3,993,247)	**($3,730,089)**	($3,466,931)	($3,203,773)	($2,940,615)	($2,677,457)	($2,414,299)
2.40	($4,950,458)	($4,687,300)	($4,424,143)	($4,160,985)	($3,897,827)	**($3,634,669)**	($3,371,511)	($3,108,353)	($2,845,195)	($2,582,037)	($2,318,879)
2.35	**($4,855,038)**	**($4,591,881)**	**($4,328,723)**	**($4,065,565)**	**($3,802,407)**	**($3,539,249)**	**($3,276,091)**	**($3,012,933)**	**($2,749,775)**	**($2,486,617)**	**($2,223,460)**
2.30	($4,759,619)	($4,496,461)	($4,233,303)	($3,970,145)	($3,706,987)	**($3,443,829)**	($3,180,671)	($2,917,513)	($2,654,355)	($2,391,198)	($2,128,040)
2.25	($4,664,199)	($4,401,041)	($4,137,883)	($3,874,725)	($3,611,567)	**($3,348,409)**	($3,085,251)	($2,822,094)	($2,558,936)	($2,295,778)	($2,032,620)
2.20	($4,568,779)	($4,305,621)	($4,042,463)	($3,779,305)	($3,516,147)	**($3,252,989)**	($2,989,832)	($2,726,674)	($2,463,516)	($2,200,358)	($1,937,200)
2.15	($4,473,359)	($4,210,201)	($3,947,043)	($3,683,885)	($3,420,728)	**($3,157,570)**	($2,894,412)	($2,631,254)	($2,368,096)	($2,104,938)	($1,841,780)
2.10	($4,377,939)	($4,114,781)	($3,851.623)	($3,588,466)	($3,325,308)	**($3,062,150)**	($2,798,992)	($2,535,834)	($2,272,676)	($2,009,518)	($1,746,360)
2.05	($4,282,519)	($4,019,361)	($3,756,204)	($3,493,046)	($3,229,888)	**($2,966,730)**	($2,703,572)	($2,440,414)	($2,177,256)	($1,914,098)	($1,650,940)
2.00	($4,187,100)	($3,923,942)	($3,660,784)	($3,397,626)	($3,134,468)	**($2,871,310)**	($2,608,152)	($2,344,994)	($2,081,836)	($1,818,678)	($1,555,521)
1.95	($4,091,680)	($3,828,522)	($3,565,364)	($3,302,206)	($3,039,048)	**($2,775,890)**	($2,512,732)	($2,249,574)	($1,986,417)	($1,723,259)	($1,460,101)

Note: Matrix assumes that the selling prices of DDGS and carbon dioxide remain constant

Figure D-14, Pricing Sensitivity Matrix, Average Pre-Tax Income (Years 3 through 12) , Base Case

Ethanol ($/gallon)

Corn $/bu	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40
2.75	($4,944,429)	($4,681,271)	($4,418,113)	($4,154,956)	($3,891,798)	**($3,628,640)**	($3,365,482)	($3,102,324)	($2,839,166)	($2,576,008)	($2,312,850)
2.70	($4,849,009)	($4,585,852)	($4,322,694)	($4,059,536)	($3,796,378)	**($3,533,220)**	($3,270,062)	($3,006,904)	($2,743,746)	($2,480,588)	($2,217,430)
2.65	($4,753,590)	($4,490,432)	($4,227,274)	($3,964,116)	($3,700,958)	**($3,437,800)**	($3,174,642)	($2,911,484)	($2,648,326)	($2,385,169)	($2,122,011)
2.60	($4,658,170)	($4,395,012)	($4,131,854)	($3,868,696)	($3,605,538)	**($3,342,380)**	($3,079,222)	($2,816,064)	($2,552,907)	($2,289,749)	($2,026,591)
2.55	($4,562,750)	($4,299,592)	($4,036,434)	($3,773,276)	($3,510,118)	**($3,246,960)**	($2,983,802)	($2,720,645)	($2,457,487)	($2,194,329)	($1,931,171)
2.50	($4,467,330)	($4,204,172)	($3,941,014)	($3,677,856)	($3,414,698)	**($3,151,541)**	($2,888,383)	($2,625,225)	($2,362,067)	($2,098,909)	($1,835,751)
2.45	($4,371,910)	($4,108,752)	($3,845,594)	($3,582,436)	($3,319,279)	**($3,056,121)**	($2,792,963)	($2,529,805)	($2,266,647)	($2,003,489)	($1,740,331)
2.40	($4,276,490)	($4,013,332)	($3,750,175)	($3,487,017)	($3,223,859)	**($2,960,701)**	($2,697,543)	($2,434,385)	($2,171,227)	($1,908,069)	($1,644,911)
2.35	**($4,181,070)**	**($3,917,913)**	**($3,654,755)**	**($3,391,597)**	**($3,128,439)**	**($2,865,281)**	**($2,602,123)**	**($2,338,965)**	**($2,075,807)**	**($1,812,649)**	**($1,549,492)**
2.30	($4,085,651)	($3,822,493)	($3,559,335)	($3,296,177)	($3,033,019)	**($2,769,861)**	($2,506,703)	($2,243,545)	($1,980,387)	($1,717,230)	($1,454,072)
2.25	($3,990,231)	($3,727,073)	($3,463,915)	($3,200,757)	($2,937,599)	**($2,674,441)**	($2,411,283)	($2,148,126)	($1,884,968)	($1,621,810)	($1,358,652)
2.20	($3,894,811)	($3,631,653)	($3,368,495)	($3,105,337)	($2,842,179)	**($2,579,021)**	($2,315,864)	($2,052,706)	($1,789,548)	($1,526,390)	($1,263,232)
2.15	($3,799,391)	($3,536,233)	($3,273,075)	($3,009,917)	($2,746,760)	**($2,483,602)**	($2,220,444)	($1,957,286)	($1,694,128)	($1,430,970)	($1,167,812)
2.10	($3,703,971)	($3,440,813)	($3,177,655)	($2,914,498)	($2,651,340)	**($2,388,182)**	($2,125,024)	($1,861,866)	($1,598,708)	($1,335,550)	($1,072,392)
2.05	($3,608,551)	($3,345,393)	($3,082,236)	($2,819,078)	($2,555,920)	**($2,292,762)**	($2,029,604)	($1,766,446)	($1,503,288)	($1,240,130)	($976,972)
2.00	($3,513,132)	($3,249,974)	($2,986,816)	($2,723,658)	($2,460,500)	**($2,197,342)**	($1,934,184)	($1,671,026)	($1,407,868)	($1,144,710)	($881,553)
1.95	($3,417,712)	($3,154,554)	($2,891,396)	($2,628,238)	($2,365,080)	**($2,101,922)**	($1,838,764)	($1,575,606)	($1,312,449)	($1,049,291)	($786,133)

Note: Matrix assumes that the selling prices of DDGS and carbon dioxide remain constant

Figure D-15, Pricing Sensitivity Matrix, Average Annual Cash Flow (Years 3 through 12) , Base Case

Sensitivity Analyses – Alternative Scenario

Pre-tax Income and Cash Flow Sensitivity Matrices are also provided for an "Alternative Scenario," which discounts the total project cost of the facility by 30% to $13,816,025.

The Alternative Scenario assumes that carbon steel is used in place of stainless steel for tanks and equipment where corrosion allowances are acceptable, used equipment can be located and used in place of new equipment where possible, and instrumentation is minimized. The increased maintenance and labor costs associated with these capital cost savings have not been factored into the Income and Cash Flow tables.

Sensitivity tables generated by various corn costs and selling prices for fuel ethanol are provided.

The first table shows the average annual pre-tax income and the second the average annual cash flow for full operating years, with debt service.

The prices for carbon dioxide and the DDGS are assumed to be constant in each table, because the price for each will most probably be set by long-term contracts and will not vary to the extent that a commodity like fuel ethanol will.

Although these assumptions benefit the bottom line for the project, neither the Pre-tax Income nor the Cash Flow is positive anywhere on either Sensitivity Matrix.

Ethanol ($/gallon)

Corn $/bu	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40
2.75	($4,741,963)	($4,478,805)	($4,215,647)	($3,952,490)	($3,689,332)	**($3,426,174)**	($3,163,016)	($2,899,858)	($2,636,700)	($2,373,542)	($2,110,384)
2.70	($4,646,543)	($4,383,386)	($4,120,228)	($3,857,070)	($3,593,912)	**($3,330,754)**	($3,067,596)	($2,804,438)	($2,541,280)	($2,278,122)	($2,014,964)
2.65	($4,551,124)	($4,287,966)	($4,024,808)	($3,761,650)	($3,498,492)	**($3,235,334)**	($2,972,176)	($2,709,018)	($2,445,860)	($2,182,703)	($1,919,545)
2.60	($4,455,704)	($4,192,546)	($3,929,388)	($3,666,230)	($3,403,072)	**($3,139,914)**	($2,876,756)	($2,613,598)	($2,350,441)	($2,087,283)	($1,824,125)
2.55	($4,360,284)	($4,097,126)	($3,833,968)	($3,570,810)	($3,307,652)	**($3,044,494)**	($2,781,336)	($2,518,179)	($2,255,021)	($1,991,863)	($1,728,705)
2.50	($4,264,864)	($4,001,706)	($3,738,548)	($3,475,390)	($3,212,232)	**($2,949,075)**	($2,685,917)	($2,422,759)	($2,159,601)	($1,896,443)	($1,633,285)
2.45	($4,169,444)	($3,906,286)	($3,643,128)	($3,379,970)	($3,116,813)	**($2,853,655)**	($2,590,497)	($2,327,339)	($2,064,181)	($1,801,023)	($1,537,865)
2.40	($4,074,024)	($3,810,866)	($3,547,709)	($3,284,551)	($3,021,393)	**($2,758,235)**	($2,495,077)	($2,231,919)	($1,968,761)	($1,705,603)	($1,442,445)
2.35	**($3,978,604)**	**($3,715,447)**	**($3,452,289)**	**($3,189,131)**	**($2,925,973)**	**($2,662,815)**	**($2,399,657)**	**($2,136,499)**	**($1,873,341)**	**($1,610,183)**	**($1,347,026)**
2.30	($3,883,185)	($3,620,027)	($3,356,869)	($3,093,711)	($2,830,553)	**($2,567,395)**	($2,304,237)	($2,041,079)	($1,777,921)	($1,514,764)	($1,251,606)
2.25	($3,787,765)	($3,524,607)	($3,261,449)	($2,998,291)	($2,735,133)	**($2,471,975)**	($2,208,817)	($1,945,660)	($1,682,502)	($1,419,344)	($1,156,186)
2.20	($3,692,345)	($3,429,187)	($3,166,029)	($2,902,871)	($2,639,713)	**($2,376,555)**	($2,113,398)	($1,850,240)	($1,587,082)	($1,323,924)	($1,060,766)
2.15	($3,596,925)	($3,333,767)	($3,070,609)	($2,807,451)	($2,544,294)	**($2,281,136)**	($2,017,978)	($1,754,820)	($1,491,662)	($1,228,504)	($965,346)
2.10	($3,501,505)	($3,238,347)	($2,975,189)	($2,712,032)	($2,448,874)	**($2,185,716)**	($1,922,558)	($1,659,400)	($1,396,242)	($1,133,084)	($869,926)
2.05	($3,406,085)	($3,142,927)	($2,879,770)	($2,616,612)	($2,353,454)	**($2,090,296)**	($1,827,138)	($1,563,980)	($1,300,822)	($1,037,664)	($774,506)
2.00	($3,310,666)	($3,047,508)	($2,784,350)	($2,521,192)	($2,258,034)	**($1,994,876)**	($1,731,718)	($1,468,560)	($1,205,402)	($942,244)	($679,087)
1.95	($3,215,246)	($2,952,088)	($2,688,930)	($2,425,772)	($2,162,614)	**($1,899,456)**	($1,636,298)	($1,373,140)	($1,109,983)	($846,825)	($583,667)

Note: Matrix assumes that the selling prices of DDGS and carbon dioxide remain constant

Figure D-16, Pricing Sensitivity Matrix, Average Annual Pre-Tax Income (Years 3 through 12), Alternative Scenario

Ethanol ($/gallon)

Corn ($/bu)	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40
2.75	($4,245,481.25)	($3,982,323.36)	($3,719,165.46)	($3,456,007.57)	($3,192,849.67)	**($2,929,691.78)**	($2,666,533.88)	($2,403,375.99)	($2,140,218.09)	($1,877,060.20)	($1,613,902.30)
2.70	($4,150,061.40)	($3,886,903.51)	($3,623,745.62)	($3,360,587.72)	($3,097,429.83)	**($2,834,271.93)**	($2,571,114.04)	($2,307,956.14)	($2,044,798.25)	($1,781,640.35)	($1,518,482.46)
2.65	($4,054,641.56)	($3,791,483.66)	($3,528,325.77)	($3,265,167.87)	($3,002,009.98)	**($2,738,852.08)**	($2,475,694.19)	($2,212,536.29)	($1,949,378.40)	($1,686,220.51)	($1,423,062.61)
2.60	($3,959,221.71)	($3,696,063.82)	($3,432,905.92)	($3,169,748.03)	($2,906,590.13)	**($2,643,432.24)**	($2,380,274.34)	($2,117,116.45)	($1,853,958.55)	($1,590,800.66)	($1,327,642.76)
2.55	($3,863,801.86)	($3,600,643.97)	($3,337,486.07)	($3,074,328.18)	($2,811,170.28)	**($2,548,012.39)**	($2,284,854.49)	($2,021,696.60)	($1,758,538.71)	($1,495,380.81)	($1,232,222.92)
2.50	($3,768,382.02)	($3,505,224.12)	($3,242,066.23)	($2,978,908.33)	($2,715,750.44)	**($2,452,592.54)**	($2,189,434.65)	($1,926,276.75)	($1,663,118.86)	($1,399,960.96)	($1,136,803.07)
2.45	($3,672,962.17)	($3,409,804.27)	($3,146,646.38)	($2,883,488.48)	($2,620,330.59)	**($2,357,172.69)**	($2,094,014.80)	($1,830,856.91)	($1,567,699.01)	($1,304,541.12)	($1,041,383.22)
2.40	($3,577,542.32)	($3,314,384.43)	($3,051,226.53)	($2,788,068.64)	($2,524,910.74)	**($2,261,752.85)**	($1,998,594.95)	($1,735,437.06)	($1,472,279.16)	($1,209,121.27)	($945,963.37)
2.35	**($3,482,122.47)**	**($3,218,964.58)**	**($2,955,806.68)**	**($2,692,648.79)**	**($2,429,490.89)**	**($2,166,333.00)**	**($1,903,175.11)**	**($1,640,017.21)**	**($1,376,859.32)**	**($1,113,701.42)**	**($850,543.53)**
2.30	($3,386,702.63)	($3,123,544.73)	($2,860,386.84)	($2,597,228.94)	($2,334,071.05)	**($2,070,913.15)**	($1,807,755.26)	($1,544,597.36)	($1,281,439.47)	($1,018,281.57)	($755,123.68)
2.25	($3,291,282.78)	($3,028,124.88)	($2,764,966.99)	($2,501,809.09)	($2,238,651.20)	**($1,975,493.31)**	($1,712,335.41)	($1,449,177.52)	($1,186,019.62)	($922,861.73)	($659,703.83)
2.20	($3,195,862.93)	($2,932,705.04)	($2,669,547.14)	($2,406,389.25)	($2,143,231.35)	**($1,880,073.46)**	($1,616,915.56)	($1,353,757.67)	($1,090,599.77)	($827,441.88)	($564,283.98)
2.15	($3,100,443.08)	($2,837,285.19)	($2,574,127.29)	($2,310,969.40)	($2,047,811.51)	**($1,784,653.61)**	($1,521,495.72)	($1,258,337.82)	($995,179.93)	($732,022.03)	($468,864.14)
2.10	($3,005,023.24)	($2,741,865.34)	($2,478,707.45)	($2,215,549.55)	($1,952,391.66)	**($1,689,233.76)**	($1,426,075.87)	($1,162,917.97)	($899,760.08)	($636,602.18)	($373,444.29)
2.05	($2,909,603.39)	($2,646,445.49)	($2,383,287.60)	($2,120,129.71)	($1,856,971.81)	**($1,593,813.92)**	($1,330,656.02)	($1,067,498.13)	($804,340.23)	($541,182.34)	($278,024.44)
2.00	($2,814,183.54)	($2,551,025.65)	($2,287,867.75)	($2,024,709.86)	($1,761,551.96)	**($1,498,394.07)**	($1,235,236.17)	($972,078.28)	($708,920.38)	($445,762.49)	($182,604.60)
1.95	($2,718,763.70)	($2,455,605.80)	($2,192,447.91)	($1,929,290.01)	($1,666,132.12)	**($1,402,974.22)**	($1,139,816.33)	($876,658.43)	($613,500.54)	($350,342.64)	($87,184.75)

Note: Matrix assumes that the selling prices of DDGS and carbon dioxide remain constant

Figure D-17, Pricing Sensitivity Matrix, Average Annual Cash Flow (Years 3 through 12), Alternative Scenario

APPENDIX E

GRIFFISS BUSINESS AND TECHNOLOGY PARK SITE

Financial Evaluation of an Ethanol Production Facility Located in the Griffiss Business and Technology Park, Rome New York

Plant Design Capacity

The projections presented are for a facility that will produce a nominal 30,000,000 gallons per year of 200-proof ethanol, primarily from corn.

Small quantities of various fruit and vegetable wastes will supplement corn on a seasonal basis. Ethanol yields were based on the following information supplied by NYSTEC for fruit and vegetable wastes available to the Griffiss Park facility:

Table E-1, Supplemental Wastes within 50 Miles of the Griffiss Park Facility

Waste	Total Annual (tons)	Months (1-12) Available	Dried Substance	Carbohy-drates	Amended Fermented Sugars	Price/ Credit
Snap Beans	1200	7, 8, 9	9.7%	7.1%	4.5%	-$50.00
Apples	750	1, 2, 3, 8, 11, 12	34.0%	15.7%	2.0%	-$50.00
Cabbage	300	1, 2, 9, 10, 11, 12	7.9%	5.4%	5.4%	-$50.00
Carrots	50		11.0%	9.7%	6.7%	-$50.00
Peas	30		22.0%	12.0%	6.9%	-$50.00
Beets	30		10.2%	6.8%	3.5%	-$50.00
Grapes	30	9, 10	50.0%	13.5%	13.5%	-$50.00

For the purposes of these projections, it was assumed that the monthly input of fruit and vegetable waste would be a composite average of the above.

Product yields are based on the following conversion rates:

Ethanol	2.62 anhydrous gallons per bushel of corn
	5.55 anhydrous gallons per ton of fruit and vegetable waste
Carbon dioxide	16.6 pounds per bushel of corn
	35.3 pounds per ton of fruit and vegetable waste
DDGS	18.4 pounds (at 10% moisture) per bushel of corn
	0.16 pounds per ton of fruit and vegetable waste

The annual design production capacity of the plant is as follows:

Fuel-grade ethanol	31,578,947 gallons
Carbon dioxide	95,274 tons
DDGS	105,251 tons

Corn consumption is estimated at 11,445,321 bushels annually, based on a moisture content of 15.5% and 70% starch on a dry basis. Fruit and vegetable waste consumption is estimated at 2,389 tons annually, based on a composite moisture content of 82.2% and 4.0% fermentable sugars on an as-is basis.

Annual production and consumption rates are based on 350 operating days per year, allowing 15 days for scheduled and unscheduled maintenance and cleaning.

Project Cost

Based on our extensive experience and equipment database, the total installed plant cost was estimated at $44,953,174.

A detailed capital cost estimate is provided on the following page.

The total estimated project cost includes working capital and reserves equal to 10% of the estimated installed plant cost:

Capital Improvements	$44,953,174
Working Capital & Reserves	4,495,317
Total	$49,448,492

Area NO.	Area Description	Equipment Cost	Erection, Piping, Insulation		Electrical & Controls		Concrete & Structural		Total Cost
			Factor	Cost	Factor	Cost	Factor	Cost	
1000	SITE & BUILDINGS	$450,000	0.00	$0	0.00	$0	0.00	$0	**$450,000**
1100	FRUIT WASTE STORAGE	$60,222	0.20	$12,044	0.1	$6,022	0.30	$18,067	**$96,355**
1200	MILLING	$289,909	0.32	$92,771	0.30	$86,973	0.40	$115,964	**$585,616**
1300	PREPARATION/MASHING	$964,611	0.57	$549,828	0.30	$289,383	0.50	$482,306	**$2,286,128**
1400	FERMENTATION	$2,635,516	0.61	$1,607,665	0.30	$790,655	0.20	$527,103	**$5,560,939**
1500	DISTILLATION	$1,966,486	0.68	$1,337,210	0.40	$786,594	0.40	$786,594	**$4,876,885**
1550	MS DEHYDRATION	$1,500,000	0.25	$375,000	0.10	$150,000	0.20	$300,000	**$2,325,000**
1600	EVAPORATION	$1,914,176	0.63	$1,205,931	0.30	$574,253	0.35	$669,962	**$4,364,321**
1700	DECANTING	$1,647,583	0.36	$593,130	0.30	$494,275	0.30	$494,275	**$3,229,263**
1800	DDGS DRYING	$2,703,121	0.30	$810,936	0.25	$675,780	0.20	$540,624	**$4,730,462**
1900	CIP & CHEMICALS	$275,745	0.74	$204,051	0.30	$82,724	0.50	$137,873	**$700,392**
2000	GRAIN STORAGE	$250,000	0.30	$75,000	0.30	$75,000	0.50	$125,000	**$525,000**
2100	ALCOHOL STORAGE & LO	$719,156	0.30	$215,747	0.25	$179,789	0.40	$287,662	**$1,402,354**
2200	DDGS STORAGE & LO	$316,775	0.30	$95,033	0.25	$79,194	0.30	$95,033	**$586,034**
3000	DCS (COMPUTER)	$250,000	0.10	$25,000	0.50	$125,000	0.40	$100,000	**$500,000**
4000	COOLING TOWER	$300,000	0.40	$120,000	0.30	$90,000	0.30	$90,000	**$600,000**
5000	BOILER & BFW	$0	0.40	$0	0.40	$0	0.40	$0	**$0**
6000	INSTR & PLANT AIR	$150,000	0.30	$45,000	0.30	$45,000	0.50	$75,000	**$315,000**
7000	W WATER TREATMENT	$1,200,000	0.30	$360,000	0.20	$240,000	1.00	$1,200,000	**$3,000,000**
TOTAL FOR ALL AREAS		**$17,593,300**	**0.439**	**$7,724,346**	**0.271**	**$4,770,642**	**0.344**	**$6,045,461**	**$36,133,749**

INSTALLED COST

INSTALLED ESTIMATE ABOVE		$36,133,749
CONTINGENCY	10.00%	$3,613,375
TOTAL INSTALLED COST		$39,747,124

PROCESS ENGINEERING (VOGELBUSCH)

KNOW-HOW FEE (FIXED COST)	$200,000
SCHEDULE A DESIGN PACKAGE (FIXED COST)	$495,000
START UP & LIAISON (RATE REIMBURSABLE)	$175,000
TOTAL PROCESS ENGINEERING	$870,000

DETAILED ENGINEERING & CONSTRUCTION OVERHEAD

PERCENTAGE OF INSTALLED COST -	12.00%	$4,336,050

Total Capital Cost Estimate **$44,953,174**

Figure E-1, Capital Cost Estimate, Base Case

Project Financing

It is assumed that the project is funded with an equity participation of 30% of the total project cost. This represents a 2.33 to 1 debt-to-equity ratio.

The following details the anticipated funding sources for the project:

Project Financing (Term Loan)	$34,613,944
Equity	14,834,548
Total	$49,448,492

It is assumed that the project will be financed with a $34,613,944 loan that bears a fixed interest rate of 10% over a 15-year term and is structured so that interest only is paid on the note balance during years 1 and 2. In year 3, full amortization begins, with a total annual debt service of $4,550,826, including both principal and interest.

Detail of debt service is shown on the following page.

DEBT SERVICE	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Total Plant Debt Balance	$17,784,273	$34,613,944	$33,524,513	$32,326,138	$31,007,926	$29,557,892	$27,962,856	$26,208,315	$24,278,321	$22,155,327	$19,820,034
Interest Payment		$2,836,560	$3,461,394	$3,352,451	$3,232,614	$3,100,793	$2,955,789	$2,796,286	$2,620,832	$2,427,832	$2,215,533
Principal Payment			$1,089,432	$1,198,375	$1,318,212	$1,450,033	$1,595,037	$1,754,540	$1,929,994	$2,122,994	$2,335,293

Beginning Debt	$34,613,944
Interest Rate	10.00%
Payments	15
Annual Debt Service Payment	$4,550,826

Figure E-2, Debt Service, Base Case

Construction and Startup Timetable

The facility is to be constructed over an 18-month period.

After construction is complete, the plant will be started in month 19, when it is expected to achieve an overall production rate of 30% of rated capacity. It is assumed that production in month 20 will be 70% of rated capacity, with full rated capacity anticipated for month 21.

Draw-Down Schedule

The projections are based on a construction draw-down schedule that ties progress payments to construction progress. It is anticipated that construction funds will be drawn, as follows:

Month 1	30.00%	$13,485,952
Months 2 - 19	3.33%	1,498,439/month
Month 20	10.00%	4,495,320
TOTAL	100.00%	$44,953,174

Depreciation and Amortization

The projections anticipate that the term loan will be fully amortized over a 15-year period.

Interest paid during construction on the draw down of the available credit line is capitalized and added to the cost of the plant. The following details the estimated total plant cost:

Capital Improvements	$44,953,174
Capitalized Interest	1,844,059
Total Plant Cost	$46,797,233

The total plant cost of $46,797,233 is being depreciated using straight-line depreciation over the estimated life of the facility of 15 years, beginning in year 2.

(Note: According to Generally Accepted Accounting Principles (GAAP), depreciation for project feasibility projections is based on the estimated useful life of the facility. In this case, a typical 15-year straight-line depreciation was used.)

The project will incur fees to the lenders. It is anticipated that these fees will equal 2% of the financing amount, or $692,279. The anticipated bank fees are capitalized and amortized on a straight-line basis over a 15-year period, beginning in year 1.

Expenses incurred prior to startup of the plant have been capitalized as organizational expenses. These expenses are estimated at $2,196,680 and will be amortized on a straight-line basis over a 5-year period beginning in year 2 (as per GAAP).

Details of depreciation and amortization calculations are provided on the following page.

Depreciation Calculations	YEAR 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Plant Cost	$30,655,707	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233
Annual depreciation-percentage		6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%
Annual depreciation-dollars	**$0**	**$3,119,816**	**$3,119,816**	**$3,119,816**	**$3,119,816**	**$3,119,816**	**$3,119,816**	**$3,119,816**	**$3,119,816**	**$3,119,816**	**$3,119,816**	**$3,119,816**
Cumulative depreciation	$0	$3,119,816	$6,239,632	$9,359,448	$12,479,264	$15,599,080	$18,718,896	$21,838,712	$24,958,528	$28,078,344	$31,198,160	$34,317,976
Net plant value	$30,655,707	$43,677,417	$40,557,601	$37,437,785	$34,317,969	$31,198,153	$28,078,337	$24,958,521	$21,838,705	$18,718,889	$15,599,073	$12,479,257
Loan Fees	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279
Annual amortization-percentage	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%	6.67%
Annual amortization-dollars	**$46,152**	**$46,152**	**$46,152**	**$46,152**	**$46,152**	**$46,152**	**$46,152**	**$46,152**	**$46,152**	**$46,152**	**$46,152**	**$46,152**
Cumulative amortization	$46,152	$92,304	$138,456	$184,608	$230,760	$276,912	$323,064	$369,216	$415,368	$461,520	$507,672	$553,824
Net loan fees	$646,127	$599,975	$553,823	$507,671	$461,519	$415,367	$369,215	$323,063	$276,911	$230,759	$184,607	$138,455
Start up expenses	$1,260,835	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680
Annual amortization-percentage		20.00%	20.00%	20.00%	20.00%	20.00%						
Annual amortization-dollars	**$0**	**$439,336**	**$439,336**	**$439,336**	**$439,336**	**$439,336**						
Cumulative amortization	$0	$439,336	$878,672	$1,318,008	$1,757,344	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680
Net start up expenses	$1,260,835	$1,757,344	$1,318,008	$878,672	$439,336	$0						

Figure E-3, Depreciation Calculations, Base Case

Accounts Receivable and Inventories

Accounts receivable are estimated to climb as sales increase until they stabilize at 30-days sales. Normal industry terms are net 30. Accounts receivable will equal an investment of $3,974,867.

There has been no provision for uncollectable accounts.

Inventories are projected to rise as the plant comes on stream, with raw materials equaling five days of production, work in progress anticipated to equal two days of production, and finished goods estimated at three days. Details of inventories are as follows:

Raw Material Inventory	5 days	$368,445
Work in Progress	2 days	147,378
Finished Goods	3 days	392,041
Total Inventory		$907,864

All inventory and accounts-receivable values have been inflated at a rate of 2% per year, starting in year 3.

Accounts Payable

Accounts payable are estimated to be paid on a net-30 basis, except for items that, contractually, are to be paid on different terms and for payroll, which is projected on a cash basis.

In order to be conservative in projecting cash flow, no provision for accounts payable is shown in the projections.

Product Sales and Raw Material Costs

The pro forma financial statements reflect the following prices and credits for products and raw material:

Corn	$2.35/bushel
Fruit & Vegetable Waste	-$50.00/ton (credit)
Fuel Ethanol	$1.15/gallon
Carbon Dioxide	$9.00/ton
DDGS	$100.00/ton

Typically, ethanol producers do not process and market food-grade carbon dioxide themselves, but rather enter into a long-term contract with a firm that would locate its processing facility adjacent to the ethanol plant and take the carbon dioxide produced from fermentation. The price above represents a typical contract price for scrubbed carbon dioxide in gaseous form.

Maintenance and Operating Costs

Maintenance costs include the equipment and supplies necessary to keep the plant equipment in operating order and are estimated to be approximately 1.5% of the Capital Improvements costs. This corresponds with costs at similar facilities.

The following costs and credits were used to determine variable operating costs for the proposed facility:

Corn	$2.35/bushel	NYSTEC (A. Hartman)
Fruit & Vegetable Waste	-$50.00/ton	NYSTEC (G. Proakis)
Chemicals	current prices	Chemical Marketing Reporter, et al.
Enzymes	current prices	vendor quotes
Water	$0.64/1000 gal	NYSTEC (A. Hartman)
Wastewater	$0.01/gal ethanol	costs at similar facilities
Electricity	$0.062/kWh	Niagara Mohawk Power (G. Haenlin)
Natural Gas	$3.20/mcf	NYSTEC (K. Thiesen)
150-psi steam	$5.65/1000 lbs	NYSTEC (G. Proakis)

Maintenance and operating costs per anhydrous ethanol gallon produced are, as follows:

Corn	$0.8966
Fruit and Vegetable Waste	-$0.0040 (credit)
Chemicals and Enzymes	$0.0995
Water	$0.0063
Wastewater Treatment	$0.0100
Electricity	$0.0843
Natural Gas	$0.0000
150 psi steam	$0.2622
Maintenance	$0.0225

A detailed breakdown of raw material usage and costs is provided on the following page.

All costs have been inflated at a rate of 2% per year, starting in year 4.

Raw Material	USAGE			COST				
	lb/Hr	lb/Yr	lb/Gal*	$	Unit	$/lb	$/Yr	$/Gal*
Corn	76,302	640,937,954	21.3646	$2.35	bushel	$0.04196	**$26,896,503**	**$0.8966**
Fruit Waste	569	4,778,378	0.1593	-$50.00	ton	($0.025)	**($119,459)**	**($0.0040)**
Alpha-amylase	60.6	508,810	0.0170	$1.100	lb	$1.10000	$559,691	$0.0187
Gluco-amylase	18.7	157,034	0.0052	$3.700	liter	$3.70000	$581,026	$0.0194
Sulfuric Acid	0	0	0.0000	$86.20	US ton	$0.04310	$0	$0.0000
Caustic Soda	370	3,108,000	0.1036	$300.000	ton	$0.15000	$466,200	$0.0155
Ammonia	170	1,428,000	0.0476	$260.00	US ton	$0.13000	$185,640	$0.0062
Nutrients	0	0	0.0000	$0.124	lb	$0.12400	$0	$0.0000
Ammonium Sulfate	80	672,000	0.0224	$132.00	US ton	$0.06600	$44,352	$0.0015
Antifoam (Corn Oil)	0	0	0.0000	$0.249	lb	$0.24900	$0	$0.0000
Gasoline	1,197	10,053,353	0.3351	$0.600	gal	$0.09734	$978,555	$0.0326
Diesel	0	0	0.0000	$0.600	gal	$0.05880	$0	$0.0000
BFW Chemicals	0.00	0	0.0000	$0.97	lb	$0.97000	$0	$0.0000
CW Chemicals	6.0	50,400	0.0017	$1.00	lb	$1.00000	$50,400	$0.0017
WWT Nutrients	0	0	0.0000	$0.11	lb	$0.11000	$0	$0.0000
WWT Chemicals	0.00	0	0.0000	$2.50	lb	$2.50000	$0	$0.0000
Chemicals Total							**$2,865,864**	**$0.0955**
Make-up Water	291,341	2,447,268,096	81.5756	$0.0006	gal	$0.00008	**$188,025**	**$0.0063**
Steam	165,708	1,391,947,200	46.3982	$5.650	1000 lbs	$0.00565	**$7,864,502**	**$0.2622**

* Raw material usage and cost is per anhydrous alcohol gallon produced

Figure E-4, Raw Materials Detail, Base Case

Plant Labor, Plant Management, and Administrative Costs

Salaries and wages required to operate and maintain the facility are included in the plant operating expenses. In is estimated that the plant operations will employ 36 persons when the facility achieves full production. Total annual compensation, including 30% for benefits, is estimated to be $1,398,800 in year 3 and is adjusted annually by increasing this cost by 2% per year.

It is estimated that the organization will also require a staff of seven to perform administrative duties. Total annual compensation, including 30% for benefits, is anticipated to be $448,500 in year 3 and is adjusted annually by increasing this cost by 2% per year.

Provisions for relocation of three specially qualified (key) employees, who may not be readily available in the vicinity of the plant site, are included in Plant Salaries and Benefits and Administrative Salaries and Benefits. A one-time payment for moving expenses of $15,000 per key employee, for a total of $45,000, is provided.

Details of both plant and administrative personnel is provided on the next four pages in the following spreadsheets:

Personnel Detail
Salaries, Wages, and Benefits by Job Classification - Year 1 Details
Salaries, Wages, and Benefits by Job Classification - Year 2 Details
Salaries, Wages, and Benefits by Job Classification

PLANT PERSONNEL	Rate	Hourly/ Salaried	Annual Hours	Annual Comp.	Number	Base Comp.	30% Benefits	Annual Total
Operations								
Management								
Plant Manager	$80,000	S		$80,000	1	$80,000	$24,000	$104,000
Production Manager	$65,000	S		$65,000	1	$65,000	$19,500	$84,500
Professional								
Lab Manager	$50,000	S		$50,000	1	$50,000	$15,000	$65,000
Supervisory								
Shift Supervisor	$16.17	H	2,288	$37,000	4	$148,000	$44,400	$192,400
Maintenance Supervisor	$17.79	H	2,080	$37,000	1	$37,000	$11,100	$48,100
Administrative Supervisor	$16.35	H	2,080	$34,000	1	$34,000	$10,200	$44,200
Direct Labor								
Operators	$10.93	H	2,288	$25,000	16	$400,000	$120,000	$520,000
Indirect Labor								
Maintenance Technicians	$13.46	H	2,080	$28,000	4	$112,000	$33,600	$145,600
Laboratory Technicians	$10.93	H	2,288	$25,000	2	$50,000	$15,000	$65,000
Shipping/Receiving Clerk	$9.62	H	2,080	$20,000	1	$20,000	$6,000	$26,000
Administrative Clerks	$9.62	H	2,080	$20,000	2	$40,000	$12,000	$52,000
Yard	$9.62	H	2,080	$20,000	2	$40,000	$12,000	$52,000
				Total Employment:	**36**	**Total Compensation:**		**$1,398,800**

ADMINISTRATIVE PERSONNEL	Rate	Hourly/ Salaried	Annual Hours	Annual Comp.	Number	Base Comp.	30% Benefits	Annual Total
Administration								
Management								
General Manager	$100,000	S		$100,000	1	$100,000	$30,000	$130,000
Marketing Manager	$60,000	S		$60,000	1	$60,000	$18,000	$78,000
Accountant	$60,000	S		$60,000	1	$60,000	$18,000	$78,000
Professional								
Plant Engineer	$65,000	S		$65,000	1	$65,000	$19,500	$84,500
Other								
Secretary/Receptionist	$9.62	H	2,080	$20,000	1	$20,000	$6,000	$26,000
Bookkeeper	$9.62	H	2,080	$20,000	2	$40,000	$12,000	$52,000
				Total Employment:	**7**	**Total Compensation:**		**$448,500**

Figure E-5, Salaries, Wages, and Benefits by Job Classification, Base Case

PLANT SALARIES, WAGES, AND BENEFITS BY JOB CLASSIFICATION - YEAR 1 DETAILS	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Total
Operations													
Management													
Plant Manager					$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$69,336
Production Manager													$0
Professional													
Lab Manager										$5,417	$5,417	$5,417	$16,251
Supervisory													
Shift Supervisor													$0
Maintenance Supervisor										$4,008	$4,008	$4,008	$12,024
Administrative Supervisor											$3,683	$3,683	$7,366
Direct Labor													
Operators													$0
Indirect Labor													
Maintenance Technicians													$0
Laboratory Technicians													$0
Shipping/Receiving Clerk													$0
Administrative Clerks												$4,333	$4,333
Yard													$0
TOTAL	$0	$0	$0	$0	$8,667	$8,667	$8,667	$8,667	$8,667	$18,092	$21,775	$26,108	$109,310

ADMINISTRATIVE SALARIES, WAGES, AND BENEFITS BY JOB CLASSIFICATION - YEAR 1 DETAILS	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Total
Administration													
Management													
General Manager	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$129,996
Marketing Manager	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$78,000
Accountant	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$78,000
Professional													
Plant Engineer					$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$56,336
Other													
Secretary/Receptionist	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$26,004
Bookkeeper	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$25,998
TOTAL	$28,167	$28,167	$28,167	$28,167	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$394,334

Figure E-6, Salaries, Wages, and Benefits by Job Classification – Year 1 Details, Base Case

PLANT SALARIES, WAGES, AND BENEFITS BY JOB CLASSIFICATION - YEAR 2 DETAILS	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18	Month 19	Month 20	Month 21	Month 22	Month 23	Month 24	Total
Operations													
Management													
Plant Manager	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$8,667	$104,004
Production Manager	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$84,504
Professional													
Lab Manager	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$5,417	$65,004
Supervisory													
Shift Supervisor					$16,033	$16,033	$18,438	$16,033	$16,033	$16,033	$16,033	$16,033	$130,669
Maintenance Supervisor	$4,609	$4,008	$4,008	$4,008	$4,008	$4,008	$4,609	$4,008	$4,008	$4,008	$4,008	$4,008	$49,298
Administrative Supervisor	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$3,683	$44,196
Direct Labor													
Operators					$43,333	$43,333	$49,833	$43,333	$43,333	$43,333	$43,333	$43,333	$353,164
Indirect Labor													
Maintenance Technicians					$12,133	$12,133	$13,953	$12,133	$12,133	$12,133	$12,133	$12,133	$98,884
Laboratory Technicians					$5,417	$5,417	$6,230	$5,417	$5,417	$5,417	$5,417	$5,417	$44,149
Shipping/Receiving Clerk					$2,167	$2,167	$2,384	$2,167	$2,167	$2,167	$2,167	$2,167	$17,553
Administrative Clerks	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$51,996
Yard					$4,333	$4,333	$4,766	$4,333	$4,333	$4,333	$4,333	$4,333	$35,097
TOTAL	$33,751	$33,150	$33,150	$33,150	$116,566	$116,566	$129,355	$116,566	$116,566	$116,566	$116,566	$116,566	$1,078,518

ADMINISTRATIVE SALARIES, WAGES, AND BENEFITS BY JOB CLASSIFICATION - YEAR 2 DETAILS	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18	Month 19	Month 20	Month 21	Month 22	Month 23	Month 24	Total
Administration													
Management													
General Manager	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$10,833	$129,996
Marketing Manager	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$78,000
Accountant	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$6,500	$78,000
Professional													
Plant Engineer	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$7,042	$84,504
Other													
Secretary/Receptionist	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$2,167	$26,004
Bookkeeper	$2,167	$2,167	$2,167	$2,167	$2,167	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$4,333	$41,164
TOTAL	$35,209	$35,209	$35,209	$35,209	$35,209	$37,375	$37,375	$37,375	$37,375	$37,375	$37,375	$37,375	$437,668

Figure E-7, Salaries, Wages, and Benefits by Job Classification – Year 2 Details, Base Case

PLANT SALARIES, WAGES, AND BENEFITS BY JOB CLASSIFICATION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12
Operations												
Management												
Plant Manager	$69,336	$104,004	$104,004	$106,084	$108,206	$110,370	$112,577	$114,829	$117,126	$119,469	$121,858	$124,295
Production Manager	$0	$84,504	$84,504	$86,194	$87,918	$89,676	$91,470	$93,299	$95,165	$97,068	$99,009	$100,989
Professional												
Lab Manager	$16,251	$65,004	$65,004	$66,304	$67,630	$68,983	$70,363	$71,770	$73,205	$74,669	$76,162	$77,685
Supervisory												
Shift Supervisor	$0	$130,669	$192,396	$196,244	$200,169	$204,172	$208,255	$212,420	$216,668	$221,001	$225,421	$229,929
Maintenance Supervisor	$12,024	$49,298	$48,096	$49,058	$50,039	$51,040	$52,061	$53,102	$54,164	$55,247	$56,352	$57,479
Administrative Supervisor	$7,366	$44,196	$44,196	$45,080	$45,982	$46,902	$47,840	$48,797	$49,773	$50,768	$51,783	$52,819
Direct Labor												
Operators	$0	$353,164	$519,996	$530,396	$541,004	$551,824	$562,860	$574,117	$585,599	$597,311	$609,257	$621,442
Indirect Labor												
Maintenance Technicians	$0	$98,884	$145,596	$148,508	$151,478	$154,508	$157,598	$160,750	$163,965	$167,244	$170,589	$174,001
Laboratory Technicians	$0	$44,149	$65,004	$66,304	$67,630	$68,983	$70,363	$71,770	$73,205	$74,669	$76,162	$77,685
Shipping/Receiving Clerk	$0	$17,553	$26,004	$26,524	$27,054	$27,595	$28,147	$28,710	$29,284	$29,870	$30,467	$31,076
Administrative Clerks	$4,333	$51,996	$51,996	$53,036	$54,097	$55,179	$56,283	$57,409	$58,557	$59,728	$60,923	$62,141
Yard	$0	$35,097	$51,996	$53,036	$54,097	$55,179	$56,283	$57,409	$58,557	$59,728	$60,923	$62,141
TOTAL	$109,310	$1,078,518	$1,398,792	$1,426,768	$1,455,304	$1,484,411	$1,514,100	$1,544,382	$1,575,268	$1,606,772	$1,638,906	$1,671,682

ADMINISTRATIVE SALARIES, WAGES, AND BENEFITS BY JOB CLASSIFICATION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12
Administration												
Management												
General Manager	$129,996	$129,996	$129,996	$132,596	$135,248	$137,953	$140,712	$143,526	$146,397	$149,325	$152,312	$155,358
Marketing Manager	$78,000	$78,000	$78,000	$79,560	$81,151	$82,774	$84,429	$86,118	$87,840	$89,597	$91,389	$93,217
Accountant	$78,000	$78,000	$78,000	$79,560	$81,151	$82,774	$84,429	$86,118	$87,840	$89,597	$91,389	$93,217
Professional												
Plant Engineer	$56,336	$84,504	$84,504	$86,194	$87,918	$89,676	$91,470	$93,299	$95,165	$97,068	$99,009	$100,989
Other												
Secretary/Receptionist	$26,004	$26,004	$26,004	$26,524	$27,054	$27,595	$28,147	$28,710	$29,284	$29,870	$30,467	$31,076
Bookkeeper	$25,998	$41,164	$51,996	$53,036	$54,097	$55,179	$56,283	$57,409	$58,557	$59,728	$60,923	$62,141
TOTAL	$394,334	$437,668	$448,500	$457,470	$466,619	$475,951	$485,470	$495,180	$505,083	$515,185	$525,489	$535,998

Figure E-8, Personnel Detail, Base Case

Additional Fixed Costs

The following additional fixed annual costs are incorporated into the financial analysis:

Taxes and Insurance	$494,485
Miscellaneous fixed costs	$217,406

These costs have been inflated at a rate of 2% per year, starting in year 4.

Federal Income Taxes

It is anticipated that the facility will be set up as a limited partnership and, as such, there are no taxes charged directly to the partnership. The financial projections do, however, provide for a deduction for corporate income taxes at the 35% rate. It will be necessary to distribute to the partners an amount equal to the tax effect of the "pass-through" earnings. Therefore, a deduction prior to the net income for income tax is shown.

Pro Forma - Base Case

The Base Case Financial Statements provided in subsequent pages are made up of the following:

Sources and Application of Funds (year 1)
Sources and Application of Funds (year 2)
Balance Sheet (years 1 through 12)
Income Statement (years 1 through 12)
Cash Flow Statement (years 1 through 12)
Pricing Sensitivity Matrix - Average Annual Pre-tax Income (years 3 through 12)
Pricing Sensitivity Matrix - Average Annual Cash Flow (years 3 through 12)

The cash flow for the proposed project is negative in all but the last year shown in the projections ($40,565 in year 12), averaging -$344,082 in years 3 through 12.

After-tax income for the project does show steady improvement, but is never positive. Annual after-tax income for years 3 through 12 averages -$1,842,632, representing an average annual return on investment of –3.7%.

Cumulative earnings at the end of year 12 are -$29,163,198.

SOURCES AND APPLICATION OF FUNDS (YEAR 1)	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Total
CASH INFLOW													
PRODUCTION UNITS													
INVENTORY-FINISHED PRODUCTS													
SALES UNITS													
SALES DOLLARS													
Total Sales	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
ACCOUNTS RECEIVABLE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STATE PRODUCERS INCENTIVE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
INCOMING CASH													
COLLECTIONS												$0	$0
EQUITY	$14,834,548												$14,834,548
SUBORDINATED DEBT													$0
OTHER FINANCING													$0
PROJECT FINANCING	$0	$1,040,656	$1,593,129	$1,606,405	$1,665,501	$1,649,380	$1,663,125	$1,676,984	$1,690,959	$1,714,475	$1,732,446	$1,751,216	$17,784,273
Total incoming cash	**$14,834,548**	**$1,040,656**	**$1,593,129**	**$1,606,405**	**$1,665,501**	**$1,649,380**	**$1,663,125**	**$1,676,984**	**$1,690,959**	**$1,714,475**	**$1,732,446**	**$1,751,216**	**$32,618,820**
DISBURSEMENTS													
Construction draws	$13,485,952	$1,496,941	$1,496,941	$1,496,941	$1,496,941	$1,496,941	$1,496,941	$1,496,941	$1,496,941	$1,496,941	$1,496,941	$1,496,941	$29,952,303
Loan commitment fees	$692,279												$692,279
Plant salaries and benefits	$0	$0	$0	$0	$38,667	$8,667	$8,667	$8,667	$8,667	$18,092	$21,775	$26,108	$139,310
Taxes and insurance	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207	$494,485
Administrative salaries and benefits	$43,167	$28,167	$28,167	$28,167	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$409,334
Miscellaneous	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142	$217,706
Interest expense	$0	$0	$8,672	$21,948	$35,335	$49,214	$62,959	$76,818	$90,793	$104,884	$119,172	$133,609	$703,404
Total disbursements	**$14,280,747**	**$1,584,457**	**$1,593,129**	**$1,606,405**	**$1,665,501**	**$1,649,380**	**$1,663,125**	**$1,676,984**	**$1,690,959**	**$1,714,475**	**$1,732,446**	**$1,751,216**	**$32,608,820**
Beginning cash	$0	$553,801	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$0
Total receipts	$14,834,548	$1,040,656	$1,593,129	$1,606,405	$1,665,501	$1,649,380	$1,663,125	$1,676,984	$1,690,959	$1,714,475	$1,732,446	$1,751,216	$32,618,820
Total disbursements	$14,280,747	$1,584,457	$1,593,129	$1,606,405	$1,665,501	$1,649,380	$1,663,125	$1,676,984	$1,690,959	$1,714,475	$1,732,446	$1,751,216	$32,608,820
Ending cash	**$553,801**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**
Note balance	**$0**	**$1,040,656**	**$2,633,784**	**$4,240,189**	**$5,905,690**	**$7,555,070**	**$9,218,194**	**$10,895,178**	**$12,586,137**	**$14,300,611**	**$16,033,057**	**$17,784,273**	
Interest rate	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	
Interest expense	$0	$8,672	$21,948	$35,335	$49,214	$62,959	$76,818	$90,793	$104,884	$119,172	$133,609	$148,202	

Figure E-9, Sources and Application of Funds – Year 1, Base Case

SOURCES AND APPLICATION OF FUNDS (YEAR 2)	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18	Month 19	Month 20	Month 21	Month 22	Month 23	Month 24
CASH INFLOW												
PRODUCTION UNITS												
Fuel Ethanol (gal)							$789,474	$1,842,105	$2,631,579	$2,631,579	$2,631,579	$2,631,579
Carbon Dioxide (tons)							$2,382	$5,557	$7,939	$7,939	$7,939	$7,939
DDGS (tons)							$2,631	$6,140	$8,771	$8,771	$8,771	$8,771
INVENTORY-FINISHED PRODUCTS												
Fuel Ethanol (gal)							$100,000	$100,000	$100,000	$100,000	$100,000	$100,000
Carbon Dioxide (tons)							$300	$300	$300	$300	$300	$300
DDGS (tons)							$300	$300	$300	$300	$300	$300
SALES UNITS												
Fuel Ethanol (gal)							$689,474	$1,842,105	$2,631,579	$2,631,579	$2,631,579	$2,631,579
Carbon Dioxide (tons)							$2,082	$5,557	$7,939	$7,939	$7,939	$7,939
DDGS (tons)							$2,331	$6,140	$8,771	$8,771	$8,771	$8,771
SALES DOLLARS												
Fuel Ethanol							$792,895	$2,118,421	$3,026,316	$3,026,316	$3,026,316	$3,026,316
Carbon Dioxide							$18,735	$50,016	$71,451	$71,451	$71,451	$71,451
DDGS							$233,130	$613,970	$877,100	$877,100	$877,100	$877,100
Total Sales							**$1,044,760**	**$2,782,407**	**$3,974,867**	**$3,974,867**	**$3,974,867**	**$3,974,867**
ACCOUNTS RECEIVABLE	$0	$0	$0	$0	$0	$0	$1,044,760	$2,782,407	$3,974,867	$3,974,867	$3,974,867	$3,974,867
INCOMING CASH												
COLLECTIONS	$0	$0	$0	$0	$0	$0	$0	$1,044,760	$2,782,407	$3,974,867	$3,974,867	$3,974,867
PROJECT FINANCING	$1,984,252	$2,000,187	$2,015,857	$2,034,652	$2,134,025	$2,667,508	$3,811,030	$182,162	$0	$0	$0	$0
Total incoming cash	**$1,984,252**	**$2,000,187**	**$2,015,857**	**$2,034,652**	**$2,134,025**	**$2,667,508**	**$3,811,030**	**$1,226,922**	**$2,782,407**	**$3,974,867**	**$3,974,867**	**$3,974,867**
DISBURSEMENTS												
Construction draws	$1,496,941	$1,496,941	$1,496,941	$1,496,941	$1,496,941	$1,496,941	$1,496,941	$4,522,284				
Corn						$515,823	$672,413	$2,689,650	$3,137,925	$2,241,375	$2,241,375	$2,241,375
Fruit Waste						($2,291)	($2,987)	($11,946)	($13,937)	($9,955)	($9,955)	($9,955)
Chemicals and Enzymes							$238,822	$238,822	$238,822	$238,822	$238,822	$238,822
Process water							$15,669	$15,669	$15,669	$15,669	$15,669	$15,669
Waste Water Treatment							$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Electricity	$210,800	$210,800	$210,800	$210,800	$210,800	$210,800	$210,800	$210,800	$210,800	$210,800	$210,800	$210,800
Steam							$655,375	$655,375	$655,375	$655,375	$655,375	$655,375
Maintenance	$0	$0	$0	$0	$0	$0	$17,745	$41,404	$59,149	$59,149	$59,149	$59,149
Plant salaries and benefits	$33,751	$33,150	$33,150	$33,150	$116,566	$116,566	$129,355	$116,566	$116,566	$116,566	$116,566	$116,566
Taxes and insurance	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207	$41,207
Administrative salaries and benefits	$35,209	$35,209	$35,209	$35,209	$35,209	$37,375	$37,375	$37,375	$37,375	$37,375	$37,375	$37,375
Consulting	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142	$18,142
Interest expense	$148,202	$164,738	$181,406	$198,205	$215,160	$232,944	$255,173	$286,932	$288,450	$288,450	$288,450	$288,450
Total disbursements	**$1,984,252**	**$2,000,187**	**$2,016,855**	**$2,033,654**	**$2,134,025**	**$2,667,508**	**$3,811,030**	**$8,887,281**	**$4,830,543**	**$3,937,975**	**$3,937,975**	**$3,937,975**
Beginning cash	$10,000	$10,000	$10,000	$9,002	$10,000	$10,000	$10,000	$10,000	($7,650,358)	($9,698,494)	($9,661,603)	($9,624,711)
Total receipts	$1,984,252	$2,000,187	$2,015,857	$2,034,652	$2,134,025	$2,667,508	$3,811,030	$1,226,922	$2,782,407	$3,974,867	$3,974,867	$3,974,867
Total disbursements	$1,984,252	$2,000,187	$2,016,855	$2,033,654	$2,134,025	$2,667,508	$3,811,030	$8,887,281	$4,830,543	$3,937,975	$3,937,975	$3,937,975
Ending cash	**$10,000**	**$10,000**	**$9,002**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**($7,650,358)**	**($9,698,494)**	**($9,661,603)**	**($9,624,711)**	**($9,587,819)**
Note balance	**$19,768,525**	**$21,768,711**	**$23,784,568**	**$25,819,220**	**$27,953,245**	**$30,620,752**	**$34,431,782**	**$34,613,944**	**$34,613,944**	**$34,613,944**	**$34,613,944**	**$34,613,944**
Interest rate	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Interest expense	$164,738	$181,406	$198,205	$215,160	$232,944	$255,173	$286,932	$288,450	$288,450	$288,450	$288,450	$288,450

Figure E-10, Sources and Application of Funds – Year 2, Base Case

BALANCE SHEET	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12
Assets												
Current Assets												
Cash	$10,000	($12,203,560)	($12,912,508)	($13,544,621)	($14,098,362)	($14,572,160)	($14,964,419)	($15,273,507)	($15,497,761)	($15,635,484)	($15,684,946)	($15,644,381)
Accounts receivable	$0	$3,974,867	$4,054,364	$4,135,452	$4,218,161	$4,302,524	$4,388,574	$4,476,346	$4,565,873	$4,657,190	$4,750,334	$4,845,341
State Producers Incentive	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Inventory	$0	$905,573	$923,685	$942,158	$961,002	$980,222	$999,826	$1,019,823	$1,040,219	$1,061,023	$1,082,244	$1,103,889
Reserve for Capital Expenses		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Current Assets	**$10,000**	**($7,323,120)**	**($7,934,459)**	**($8,467,011)**	**($8,919,200)**	**($9,289,414)**	**($9,576,018)**	**($9,777,338)**	**($9,891,669)**	**($9,917,270)**	**($9,852,368)**	**($9,695,151)**
Property, Plant & Equipment												
Plant equipment	$30,655,707	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233	$46,797,233
Construction in progress												
Accumulated depreciation	$0	$3,119,816	$6,239,632	$9,359,448	$12,479,264	$15,599,080	$18,718,896	$21,838,712	$24,958,528	$28,078,344	$31,198,160	$34,317,976
Net Plant Value	**$30,655,707**	**$43,677,417**	**$40,557,601**	**$37,437,785**	**$34,317,969**	**$31,198,153**	**$28,078,337**	**$24,958,521**	**$21,838,705**	**$18,718,889**	**$15,599,073**	**$12,479,257**
Other Assets												
Organizational costs	$1,260,835	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680
Accumulated amortization	$0	$439,336	$878,672	$1,318,008	$1,757,344	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680	$2,196,680
Loan acquisition costs	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279	$692,279
Accumulated amortization	$46,152	$92,304	$138,456	$184,608	$230,760	$276,912	$323,064	$369,216	$415,368	$461,520	$507,672	$553,824
Total Other Assets	**$1,906,961**	**$2,357,319**	**$1,871,831**	**$1,386,343**	**$900,855**	**$415,367**	**$369,215**	**$323,063**	**$276,911**	**$230,759**	**$184,607**	**$138,455**
Total Assets	**$32,572,668**	**$38,711,617**	**$34,494,974**	**$30,357,118**	**$26,299,625**	**$22,324,106**	**$18,871,534**	**$15,504,246**	**$12,223,947**	**$9,032,378**	**$5,931,312**	**$2,922,561**
Liabilities and Partners' Equity												
Current Liabilities												
Income Taxes Payable												
Current portion of long-term debt		$1,089,432	$1,198,375	$1,318,212	$1,450,033	$1,595,037	$1,754,540	$1,929,994	$2,122,994	$2,335,293	$2,568,823	$2,825,705
Total Current Liabilities	**$0**	**$1,089,432**	**$1,198,375**	**$1,318,212**	**$1,450,033**	**$1,595,037**	**$1,754,540**	**$1,929,994**	**$2,122,994**	**$2,335,293**	**$2,568,823**	**$2,825,705**
Long-Term Liabilities												
Project financing	$17,784,273	$34,613,944	$33,524,513	$32,326,138	$31,007,926	$29,557,892	$27,962,856	$26,208,315	$24,278,321	$22,155,327	$19,820,034	$17,251,211
Subordinated Debt												
Other loan												
Less current portion		($1,089,432)	($1,198,375)	($1,318,212)	($1,450,033)	($1,595,037)	($1,754,540)	($1,929,994)	($2,122,994)	($2,335,293)	($2,568,823)	($2,825,705)
Total Long-Term Liabilities	**$17,784,273**	**$33,524,513**	**$32,326,138**	**$31,007,926**	**$29,557,892**	**$27,962,856**	**$26,208,315**	**$24,278,321**	**$22,155,327**	**$19,820,034**	**$17,251,211**	**$14,425,506**
Partners' Equity												
Equity	$14,834,548	$14,834,548	$14,834,548	$14,834,548	$14,834,548	$14,834,548	$14,834,548	$14,834,548	$14,834,548	$14,834,548	$14,834,548	$14,834,548
Accumulated earnings	($46,152)	($10,736,875)	($13,864,086)	($16,803,567)	($19,542,848)	($22,068,334)	($23,925,869)	($25,538,617)	($26,888,921)	($27,957,497)	($28,723,269)	($29,163,198)
Total Partners' Equity	**$14,788,396**	**$4,097,673**	**$970,461**	**($1,969,020)**	**($4,708,301)**	**($7,233,787)**	**($9,091,322)**	**($10,704,069)**	**($12,054,374)**	**($13,122,949)**	**($13,888,722)**	**($14,328,650)**
Total Liabilities and Equity	**$32,572,668**	**$38,711,617**	**$34,494,974**	**$30,357,118**	**$26,299,625**	**$22,324,106**	**$18,871,534**	**$15,504,246**	**$12,223,947**	**$9,032,378**	**$5,931,312**	**$2,922,561**

Figure E-11, Balance Sheet, Base Case

INCOME STATEMENT	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12
Sales												
Fuel Ethanol	$0	$15,016,580	$36,315,789	$37,042,105	$37,782,947	$38,538,606	$39,309,378	$40,095,566	$40,897,477	$41,715,427	$42,549,736	$43,400,731
Carbon Dioxide	$0	$354,555	$857,464	$874,613	$892,105	$909,947	$928,146	$946,709	$965,643	$984,956	$1,004,655	$1,024,748
DDGS	$0	$4,355,500	$10,525,057	$10,735,558	$10,950,269	$11,169,274	$11,392,659	$11,620,512	$11,852,922	$12,089,980	$12,331,780	$12,578,416
Total Sales	**$0**	**$19,726,635**	**$47,698,311**	**$48,652,276**	**$49,625,321**	**$50,617,827**	**$51,630,183**	**$52,662,787**	**$53,716,042**	**$54,790,363**	**$55,886,171**	**$57,003,895**
State Producers Incentive	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Income	**$0**	**$19,726,635**	**$47,698,311**	**$48,652,276**	**$49,625,321**	**$50,617,827**	**$51,630,183**	**$52,662,787**	**$53,716,042**	**$54,790,363**	**$55,886,171**	**$57,003,895**
Cost of sales												
Corn	$0	$13,739,936	$26,896,503	$27,434,434	$27,983,123	$28,542,785	$29,113,641	$29,695,914	$30,289,832	$30,895,629	$31,513,542	$32,143,813
Fruit Waste	$0	($61,026)	($119,459)	($121,849)	($124,286)	($126,772)	($129,307)	($131,893)	($134,531)	($137,222)	($139,966)	($142,765)
Chemicals and Enzymes	$0	$1,432,932	$2,865,864	$2,923,182	$2,981,646	$3,041,279	$3,102,105	$3,164,147	$3,227,430	$3,291,979	$3,357,819	$3,424,975
Process water	$0	$94,014	$188,025	$191,786	$195,622	$199,534	$203,525	$207,596	$211,748	$215,983	$220,303	$224,709
Waste Water Treatment	$0	$150,000	$300,000	$306,000	$312,120	$318,362	$324,729	$331,224	$337,848	$344,605	$351,497	$358,527
Electricity	$0	$2,529,600	$2,529,600	$2,580,192	$2,631,796	$2,684,432	$2,738,121	$2,792,883	$2,848,741	$2,905,716	$2,963,830	$3,023,107
Natural Gas	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Steam	$0	$3,932,250	$7,864,502	$8,021,792	$8,182,228	$8,345,873	$8,512,790	$8,683,046	$8,856,707	$9,033,841	$9,214,518	$9,398,808
Maintenance	$0	$295,745	$674,298	$687,784	$701,540	$715,571	$729,882	$744,480	$759,370	$774,557	$790,048	$805,849
Plant salaries and benefits	$0	$712,185	$1,398,800	$1,426,776	$1,455,312	$1,484,418	$1,514,106	$1,544,388	$1,575,276	$1,606,782	$1,638,918	$1,671,696
Depreciation	$0	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816
Total Cost of Sales	**$0**	**$25,945,452**	**$45,717,949**	**$46,569,913**	**$47,438,917**	**$48,325,298**	**$49,229,408**	**$50,151,601**	**$51,092,237**	**$52,051,686**	**$53,030,325**	**$54,028,535**
Gross Margin	**$0**	**($6,218,817)**	**$1,980,362**	**$2,082,363**	**$2,186,404**	**$2,292,529**	**$2,400,775**	**$2,511,186**	**$2,623,805**	**$2,738,677**	**$2,855,846**	**$2,975,360**
General & Administrative Costs												
Taxes and insurance		$494,485	$494,485	$504,375	$514,463	$524,752	$535,247	$545,952	$556,871	$568,008	$579,368	$590,955
Administrative salaries and benefits		$437,668	$448,500	$457,470	$466,619	$475,951	$485,470	$495,179	$505,083	$515,185	$525,489	$535,999
Consulting		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous		$217,706	$217,706	$222,060	$226,501	$231,031	$235,652	$240,365	$245,172	$250,075	$255,077	$260,179
Interest expense		$2,836,560	$3,461,394	$3,352,451	$3,232,614	$3,100,793	$2,955,789	$2,796,286	$2,620,832	$2,427,832	$2,215,533	$1,982,003
Amortization-Loan Fees	$46,152	$46,152	$46,152	$46,152	$46,152	$46,152	$46,152	$46,152	$46,152	$46,152	$46,152	$46,152
Amortization-Start-up Expenses	$0	$439,336	$439,336	$439,336	$439,336	$439,336	$0	$0	$0	$0	$0	$0
Total Gen. & Admin. Expenses	**$46,152**	**$4,471,906**	**$5,107,573**	**$5,021,844**	**$4,925,685**	**$4,818,015**	**$4,258,310**	**$4,123,934**	**$3,974,110**	**$3,807,252**	**$3,621,619**	**$3,415,288**
Pre-Tax Income	**($46,152)**	**($10,690,723)**	**($3,127,211)**	**($2,939,481)**	**($2,739,281)**	**($2,525,486)**	**($1,857,535)**	**($1,612,748)**	**($1,350,305)**	**($1,068,575)**	**($765,773)**	**($439,928)**
Income taxes-35%												
Net Income	**($46,152)**	**($10,690,723)**	**($3,127,211)**	**($2,939,481)**	**($2,739,281)**	**($2,525,486)**	**($1,857,535)**	**($1,612,748)**	**($1,350,305)**	**($1,068,575)**	**($765,773)**	**($439,928)**
Cumulative pre-tax earnings	($46,152)	($10,736,875)	($13,864,086)	($16,803,567)	($19,542,848)	($22,068,334)	($23,925,869)	($25,538,617)	($26,888,921)	($27,957,497)	($28,723,269)	($29,163,198)
Cumulative earnings	($46,152)	($10,736,875)	($13,864,086)	($16,803,567)	($19,542,848)	($22,068,334)	($23,925,869)	($25,538,617)	($26,888,921)	($27,957,497)	($28,723,269)	($29,163,198)

Figure E-12, Income Statement, Base Case

CASH FLOW STATEMENT	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12
Cash Flow From Operations												
Net income	($46,152)	($10,690,723)	($3,127,211)	($2,939,481)	($2,739,281)	($2,525,486)	($1,857,535)	($1,612,748)	($1,350,305)	($1,068,575)	($765,773)	($439,928)
Adjustments to Reconcile Net Income												
to Net Cash Provided by Operations												
Depreciation	$0	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816
Amortization	$46,152	$485,488	$485,488	$485,488	$485,488	$485,488	$46,152	$46,152	$46,152	$46,152	$46,152	$46,152
Net (Increase) Decrease in Operating Assets:												
Accounts receivable	$0	($3,974,867)	($79,497)	($81,087)	($82,709)	($84,363)	($86,050)	($87,771)	($89,527)	($91,317)	($93,144)	($95,007)
State Producers Incentive	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Inventories	$0	($905,573)	($18,111)	($18,474)	($18,843)	($19,220)	($19,604)	($19,997)	($20,396)	($20,804)	($21,220)	($21,645)
Net Increase (Decrease) in Operating Liabilities:												
Accounts payable												
Other current liabilities			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Net Cash From Operations	**$0**	**($11,965,859)**	**$380,484**	**$566,262**	**$764,471**	**$976,235**	**$1,202,778**	**$1,445,452**	**$1,705,740**	**$1,985,271**	**$2,285,831**	**$2,609,388**
Cash Flows From Investing Activities												
(Increase) Decrease in Property and Equipment	($30,655,707)	($16,141,526)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
(Increase) Decrease in Organization Costs	($1,260,835)	($935,846)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
(Increase) Decrease in Loan Fees	($692,279)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
(Increase) Decrease in Equipment Reserve												
Cash Flows From Financing Operations												
Increase (Decrease) in Equity	$14,834,548											
Increase (Decrease) in Long-Term Financing	$17,784,273	$16,829,671	($1,089,432)	($1,198,375)	($1,318,212)	($1,450,033)	($1,595,037)	($1,754,540)	($1,929,994)	($2,122,994)	($2,335,293)	($2,568,823)
Net Increase (Decrease) In Cash	**$10,000**	**($12,213,560)**	**($708,947)**	**($632,113)**	**($553,741)**	**($473,798)**	**($392,259)**	**($309,088)**	**($224,254)**	**($137,723)**	**($49,462)**	**$40,565**
Cash Balance - Beginning of Period	**$0**	**$10,000**	**($12,203,560)**	**($12,912,508)**	**($13,544,621)**	**($14,098,362)**	**($14,572,160)**	**($14,964,419)**	**($15,273,507)**	**($15,497,761)**	**($15,635,484)**	**($15,684,946)**
Cash Balance - End of Period	**$10,000**	**($12,203,560)**	**($12,912,508)**	**($13,544,621)**	**($14,098,362)**	**($14,572,160)**	**($14,964,419)**	**($15,273,507)**	**($15,497,761)**	**($15,635,484)**	**($15,684,946)**	**($15,644,381)**

Figure E-13, Cash Flow Statement, Base Case

Sensitivity Analyses – Base Case

Sensitivity tables for the Base Case generated by various corn costs and selling prices for fuel ethanol are provided.

The first table shows the average annual pre-tax income and the second the average annual cash flow for full operating years, with debt service.

The prices for carbon dioxide and the DDGS are assumed to be constant in each table, because the price for each will most probably be set by long-term contracts and will not vary to the extent that a commodity like fuel ethanol will.

Ethanol ($/gallon)

Corn $/bu	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40
2.75	($14,315,497)	($12,736,550)	($11,157,602)	($9,578,655)	($7,999,708)	**($6,420,760)**	($4,841,813)	($3,262,866)	($1,683,918)	($104,971)	$1,473,977
2.70	($13,743,231)	($12,164,284)	($10,585,336)	($9,006,389)	($7,427,442)	**($5,848,494)**	($4,269,547)	($2,690,599)	($1,111,652)	$467,295	$2,046,243
2.65	($13,170,965)	($11,592,018)	($10,013,070)	($8,434,123)	($6,855,176)	**($5,276,228)**	($3,697,281)	($2,118,333)	($539,386)	$1,039,561	$2,618,509
2.60	($12,598,699)	($11,019,752)	($9,440,804)	($7,861,857)	($6,282,910)	**($4,703,962)**	($3,125,015)	($1,546,067)	$32,880	$1,611,827	$3,190,775
2.55	($12,026,433)	($10,447,486)	($8,868,538)	($7,289,591)	($5,710,643)	**($4,131,696)**	($2,552,749)	($973,801)	$605,146	$2,184,093	$3,763,041
2.50	($11,454,167)	($9,875,220)	($8,296,272)	($6,717,325)	($5,138,377)	**($3,559,430)**	($1,980,483)	($401,535)	$1,177,412	$2,756,359	$4,335,307
2.45	($10,881,901)	($9,302,954)	($7,724,006)	($6,145,059)	($4,566,111)	**($2,987,164)**	($1,408,217)	$170,731	$1,749,678	$3,328,625	$4,907,573
2.40	($10,309,635)	($8,730,688)	($7,151,740)	($5,572,793)	($3,993,845)	**($2,414,898)**	($835,951)	$742,997	$2,321,944	$3,900,891	$5,479,839
2.35	**($9,737,369)**	**($8,158,421)**	**($6,579,474)**	**($5,000,527)**	**($3,421,579)**	**($1,842,632)**	**($263,685)**	**$1,315,263**	**$2,894,210**	**$4,473,157**	**$6,052,105**
2.30	($9,165,103)	($7,586,155)	($6,007,208)	($4,428,261)	($2,849,313)	**($1,270,366)**	$308,581	$1,887,529	$3,466,476	$5,045,424	$6,624,371
2.25	($8,592,837)	($7,013,889)	($5,434,942)	($3,855,995)	($2,277,047)	**($698,100)**	$880,847	$2,459,795	$4,038,742	$5,617,690	$7,196,637
2.20	($8,020,571)	($6,441,623)	($4,862,676)	($3,283,729)	($1,704,781)	**($125,834)**	$1,453,113	$3,032,061	$4,611,008	$6,189,956	$7,768,903
2.15	($7,448,305)	($5,869,357)	($4,290,410)	($2,711,463)	($1,132,515)	**$446,432**	$2,025,379	$3,604,327	$5,183,274	$6,762,222	$8,341,169
2.10	($6,876,039)	($5,297,091)	($3,718,144)	($2,139,197)	($560,249)	**$1,018,698**	$2,597,646	$4,176,593	$5,755,540	$7,334,488	$8,913,435
2.05	($6,303,773)	($4,724,825)	($3,145,878)	($1,566,931)	$12,017	**$1,590,964**	$3,169,912	$4,748,859	$6,327,806	$7,906,754	$9,485,701
2.00	($5,731,507)	($4,152,559)	($2,573,612)	($994,665)	$584,283	**$2,163,230**	$3,742,178	$5,321,125	$6,900,072	$8,479,020	$10,057,967
1.95	($5,159,241)	($3,580,293)	($2,001,346)	($422,398)	$1,156,549	**$2,735,496**	$4,314,444	$5,893,391	$7,472,338	$9,051,286	$10,630,233

Note: Matrix assumes that the selling price of DDGS and carbon dioxide remains constant

Figure E-14, Pricing Sensitivity Matrix, Average Annual Pre-Tax Income (Years 3 through 12), Base Case

Ethanol ($/gallon)

Corn $/bu	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40
2.75	($12,816,947)	($11,238,000)	($9,659,052)	($8,080,105)	($6,501,158)	**($4,922,210)**	($3,343,263)	($1,764,316)	($185,368)	$1,393,579	$2,972,527
2.70	($12,244,681)	($10,665,734)	($9,086,786)	($7,507,839)	($5,928,892)	**($4,349,944)**	($2,770,997)	($1,192,049)	$386,898	$1,965,845	$3,544,793
2.65	($11,672,415)	($10,093,468)	($8,514,520)	($6,935,573)	($5,356,626)	**($3,777,678)**	($2,198,731)	($619,783)	$959,164	$2,538,111	$4,117,059
2.60	($11,100,149)	($9,521,202)	($7,942,254)	($6,363,307)	($4,784,360)	**($3,205,412)**	($1,626,465)	($47,517)	$1,531,430	$3,110,377	$4,689,325
2.55	($10,527,883)	($8,948,936)	($7,369,988)	($5,791,041)	($4,212,093)	**($2,633,146)**	($1,054,199)	$524,749	$2,103,696	$3,682,643	$5,261,591
2.50	($9,955,617)	($8,376,670)	($6,797,722)	($5,218,775)	($3,639,827)	**($2,060,880)**	($481,933)	$1,097,015	$2,675,962	$4,254,909	$5,833,857
2.45	($9,383,351)	($7,804,404)	($6,225,456)	($4,646,509)	($3,067,561)	**($1,488,614)**	$90,333	$1,669,281	$3,248,228	$4,827,175	$6,406,123
2.40	($8,811,085)	($7,232,138)	($5,653,190)	($4,074,243)	($2,495,295)	**($916,348)**	$662,599	$2,241,547	$3,820,494	$5,399,441	$6,978,389
2.35	**($8,238,819)**	**($6,659,871)**	**($5,080,924)**	**($3,501,977)**	**($1,923,029)**	**($344,082)**	**$1,234,865**	**$2,813,813**	**$4,392,760**	**$5,971,707**	**$7,550,655**
2.30	($7,666,553)	($6,087,605)	($4,508,658)	($2,929,711)	($1,350,763)	**$228,184**	$1,807,131	$3,386,079	$4,965,026	$6,543,974	$8,122,921
2.25	($7,094,287)	($5,515,339)	($3,936,392)	($2,357,445)	($778,497)	**$800,450**	$2,379,397	$3,958,345	$5,537,292	$7,116,240	$8,695,187
2.20	($6,522,021)	($4,943,073)	($3,364,126)	($1,785,179)	($206,231)	**$1,372,716**	$2,951,663	$4,530,611	$6,109,558	$7,688,506	$9,267,453
2.15	($5,949,755)	($4,370,807)	($2,791,860)	($1,212,913)	$366,035	**$1,944,982**	$3,523,929	$5,102,877	$6,681,824	$8,260,772	$9,839,719
2.10	($5,377,489)	($3,798,541)	($2,219,594)	($640,647)	$938,301	**$2,517,248**	$4,096,196	$5,675,143	$7,254,090	$8,833,038	$10,411,985
2.05	($4,805,223)	($3,226,275)	($1,647,328)	($68,381)	$1,510,567	**$3,089,514**	$4,668,462	$6,247,409	$7,826,356	$9,405,304	$10,984,251
2.00	($4,232,957)	($2,654,009)	($1,075,062)	$503,885	$2,082,833	**$3,661,780**	$5,240,728	$6,819,675	$8,398,622	$9,977,570	$11,556,517
1.95	($3,660,691)	($2,081,743)	($502,796)	$1,076,152	$2,655,099	**$4,234,046**	$5,812,994	$7,391,941	$8,970,888	$10,549,836	$12,128,783

Note: Matrix assumes that the selling price of DDGS and carbon dioxide remains constant

Figure E-15, Pricing Sensitivity Matrix, Average Annual Cash Flow (Years 3 through 12), Base Case

Pro Forma – Alternative Scenario

Due to the high cost of steam available from the Griffiss Steam Plant, an Alternative Scenario was investigated in which it is assumed that the ethanol facility meets all its steam requirements by producing steam from equipment purchased and installed on site.

Detailed backup is not provided for the Alternative Scenario. However, the net result of adding steam-generation capabilities is a capital cost increase of $3,220,800.

The Alternative Scenario Financial Statements provided in subsequent pages are made up of the following:

Sources and Application of Funds (Year 1)
Sources and Application of Funds (year 2)
Balance Sheet (years 1 through 12)
Income Statement (years 1 through 12)
Cash Flow Statement (years 1 through 12)
Pricing Sensitivity Matrix - Average Annual Pre-tax Income (years 3 through 12)
Pricing Sensitivity Matrix - Average Annual Cash Flow (years 3 through 12)

The Alternative project has steadily increasing positive cash through the years of full operation, averaging $2,054,445 in years 3 through 12. The last year shown in the projections (year 12) has the largest cash flow, $2,688,221.

After-tax income for the project shows steady improvement, averaging $451,327 for years 3 through 12, peaking in year 12 at $2,165,576. The average annual return on investment for the years of full production is 0.9%.

Cumulative earnings at the end of year 12 are -$5,413,848.

SOURCES AND APPLICATION OF FUNDS (YEAR 1)	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Total
CASH INFLOW													
PRODUCTION UNITS													
Fuel Ethanol (gal)													$0
Carbon Dioxide (tons)													$0
DDGS (tons)													$0
INVENTORY-FINISHED PRODUCTS													
Fuel Ethanol (gal)													
Carbon Dioxide (tons)													
DDGS (tons)													
SALES UNITS													
Fuel Ethanol (gal)													$0
Carbon Dioxide (tons)													$0
DDGS (tons)													$0
SALES DOLLARS													
Fuel Ethanol													$0
Carbon Dioxide													$0
DDGS													$0
Total Sales	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
ACCOUNTS RECEIVABLE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
STATE PRODUCERS INCENTIVE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
INCOMING CASH													
COLLECTIONS												$0	$0
EQUITY	$15,897,412												$15,897,412
SUBORDINATED DEBT													$0
OTHER FINANCING													$0
PROJECT FINANCING	$0	$1,104,726	$1,702,835	$1,717,025	$1,777,043	$1,761,852	$1,776,534	$1,791,338	$1,806,266	$1,830,743	$1,849,682	$1,869,429	$18,987,478
Total incoming cash	**$15,897,412**	**$1,104,726**	**$1,702,835**	**$1,717,025**	**$1,777,043**	**$1,761,852**	**$1,776,534**	**$1,791,338**	**$1,806,266**	**$1,830,743**	**$1,849,682**	**$1,869,429**	**$34,884,889**
DISBURSEMENTS													
Construction draws	$14,452,192	$1,604,193	$1,604,193	$1,604,193	$1,604,193	$1,604,193	$1,604,193	$1,604,193	$1,604,193	$1,604,193	$1,604,193	$1,604,193	$32,098,315
Loan commitment fees	$741,879												$741,879
Corn													$0
Fruit Waste													$0
Chemicals and Enzymes													$0
Process water													$0
Waste Water Treatment													$0
Electricity													$0
Natural Gas													$0
Steam													$0
Maintenance													$0
Plant salaries and benefits	$0	$0	$0	$0	$38,667	$8,667	$8,667	$8,667	$8,667	$18,092	$21,775	$26,108	$139,310
Taxes and insurance	$44,159	$44,159	$44,159	$44,159	$44,159	$44,159	$44,159	$44,159	$44,159	$44,159	$44,159	$44,159	$529,914
Administrative salaries and benefits	$43,167	$28,167	$28,167	$28,167	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$35,209	$409,334
Consulting	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous	$17,111	$17,111	$17,111	$17,111	$17,111	$17,111	$17,111	$17,111	$17,111	$17,111	$17,111	$17,111	$205,326
Interest expense	$0	$0	$9,206	$23,396	$37,705	$52,514	$67,196	$82,000	$96,928	$111,980	$127,236	$142,650	$750,811
Total disbursements	**$15,298,508**	**$1,693,629**	**$1,702,835**	**$1,717,025**	**$1,777,043**	**$1,761,852**	**$1,776,534**	**$1,791,338**	**$1,806,266**	**$1,830,743**	**$1,849,682**	**$1,869,429**	**$34,874,889**
Beginning cash	$0	$598,904	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$0
Total receipts	$15,897,412	$1,104,726	$1,702,835	$1,717,025	$1,777,043	$1,761,852	$1,776,534	$1,791,338	$1,806,266	$1,830,743	$1,849,682	$1,869,429	$34,884,889
Total disbursements	$15,298,508	$1,693,629	$1,702,835	$1,717,025	$1,777,043	$1,761,852	$1,776,534	$1,791,338	$1,806,266	$1,830,743	$1,849,682	$1,869,429	$34,874,889
Ending cash	**$598,904**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**
Note balance	**$0**	**$1,104,726**	**$2,807,561**	**$4,524,587**	**$6,301,630**	**$8,063,483**	**$9,840,017**	**$11,631,356**	**$13,437,622**	**$15,268,366**	**$17,118,048**	**$18,987,478**	
Interest rate	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	
Interest expense	$0	$9,206	$23,396	$37,705	$52,514	$67,196	$82,000	$96,928	$111,980	$127,236	$142,650	$158,229	

Figure E-16, Sources and Application of Funds – Year 1, Alternate Scenario

SOURCES AND APPLICATION OF FUNDS (YEAR 2)	Month 13	Month 14	Month 15	Month 16	Month 17	Month 18	Month 19	Month 20	Month 21	Month 22	Month 23
CASH INFLOW											
PRODUCTION UNITS											
Fuel Ethanol (gal)							$789,473.70	$1,842,105.30	$2,631,579.00	$2,631,579.00	$2,631,579.00
Carbon Dioxide (tons)							$2,381.70	$5,557.30	$7,939.00	$7,939.00	$7,939.00
DDGS (tons)							$2,631.30	$6,139.70	$8,771.00	$8,771.00	$8,771.00
INVENTORY-FINISHED PRODUCTS											
Fuel Ethanol (gal)							$100,000.00	$100,000.00	$100,000.00	$100,000.00	$100,000.00
Carbon Dioxide (tons)							$300.00	$300.00	$300.00	$300.00	$300.00
DDGS (tons)							$300.00	$300.00	$300.00	$300.00	$300.00
SALES UNITS											
Fuel Ethanol (gal)							$689,473.70	$1,842,105.30	$2,631,579.00	$2,631,579.00	$2,631,579.00
Carbon Dioxide (tons)							$2,081.70	$5,557.30	$7,939.00	$7,939.00	$7,939.00
DDGS (tons)							$2,331.30	$6,139.70	$8,771.00	$8,771.00	$8,771.00
SALES DOLLARS											
Fuel Ethanol							$792,895.00	$2,118,421.00	$3,026,316.00	$3,026,316.00	$3,026,316.00
Carbon Dioxide							$16,735.00	$50,016.00	$71,451.00	$71,451.00	$71,451.00
DDGS							$233,130.00	$613,970.00	$877,100.00	$877,100.00	$877,100.00
Total Sales							**$1,044,760.00**	**$2,782,407.00**	**$3,974,867.00**	**$3,974,867.00**	**$3,974,867.00**
ACCOUNTS RECEIVABLE	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,044,760.00	$2,782,407.00	$3,974,867.00	$3,974,867.00	$3,974,867.00
STATE PRODUCERS INCENTIVE	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
INCOMING CASH											
COLLECTIONS	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1,044,760.00	$2,782,407.00	$3,974,867.00	$3,974,867.00
EQUITY											
SUBORDINATED DEBT											
OTHER FINANCING											
PROJECT FINANCING	$2,103,451.69	$2,120,379.49	$2,137,051.49	$2,156,855.49	$2,257,247.49	$2,791,757.34	$3,724,283.59	$815,456.10	$0.00	$0.00	$0.00
Total incoming cash	**$2,103,451.69**	**$2,120,379.49**	**$2,137,051.49**	**$2,156,855.49**	**$2,257,247.49**	**$2,791,757.34**	**$3,724,283.59**	**$1,860,216.10**	**$2,782,407.00**	**$3,974,867.00**	**$3,974,867.00**
DISBURSEMENTS											
Construction draws	$1,604,193.00	$1,604,193.00	$1,604,193.00	$1,604,193.00	$1,604,193.00	$1,604,193.00	$1,604,193.00	$4,846,308.33			
Loan commitment fees											
Corn						$515,823.35	$672,412.50	$2,689,650.00	$3,137,925.00	$2,241,375.00	$2,241,375.00
Fruit Waste						($2,291.00)	($2,986.50)	($11,946.00)	($13,937.00)	($9,955.00)	($9,955.00)
Chemicals and Enzymes							$239,202.00	$239,202.00	$239,202.00	$239,202.00	$239,202.00
Process water							$17,362.00	$17,362.00	$17,362.00	$17,362.00	$17,362.00
Waste Water Treatment							$25,000.00	$25,000.00	$25,000.00	$25,000.00	$25,000.00
Electricity	$210,800.00	$210,800.00	$210,800.00	$210,800.00	$210,800.00	$210,800.00	$210,800.00	$210,800.00	$210,800.00	$210,800.00	$210,800.00
Natural Gas							$440,000.00	$440,000.00	$440,000.00	$440,000.00	$440,000.00
Steam							$0.00	$0.00	$0.00	$0.00	$0.00
Maintenance	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$19,016.00	$44,371.00	$63,387.00	$63,387.00	$63,387.00
Plant salaries and benefits	$33,751.20	$33,150.00	$33,150.00	$33,150.00	$116,566.00	$116,566.00	$129,354.60	$116,566.00	$116,566.00	$116,566.00	$116,566.00
Taxes and insurance	$44,159.48	$44,159.48	$44,159.48	$44,159.48	$44,159.48	$44,159.48	$44,159.48	$44,159.48	$44,159.48	$44,159.48	$44,159.48
Administrative salaries and benefits	$35,208.50	$35,208.50	$35,208.50	$35,208.50	$35,208.50	$37,375.00	$37,375.00	$37,375.00	$37,375.00	$37,375.00	$37,375.00
Consulting	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Miscellaneous	$17,110.51	$17,110.51	$17,110.51	$17,110.51	$17,110.51	$17,110.51	$17,110.51	$17,110.51	$17,110.51	$17,110.51	$17,110.51
Interest expense	$158,229.00	$175,758.00	$193,428.00	$211,236.00	$229,210.00	$248,021.00	$271,285.00	$302,321.00	$309,116.00	$309,116.00	$309,116.00
Total disbursements	**$2,103,451.69**	**$2,120,379.49**	**$2,138,049.49**	**$2,155,857.49**	**$2,257,247.49**	**$2,791,757.34**	**$3,724,283.59**	**$9,018,279.32**	**$4,644,065.99**	**$3,751,497.99**	**$3,751,497.99**
Beginning cash	$10,000.00	$10,000.00	$10,000.00	$9,002.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00	($7,148,063.22)	($9,009,722.21)	($8,786,353.20)
Total receipts	$2,103,451.69	$2,120,379.49	$2,137,051.49	$2,156,855.49	$2,257,247.49	$2,791,757.34	$3,724,283.59	$1,860,216.10	$2,782,407.00	$3,974,867.00	$3,974,867.00
Total disbursements	$2,103,451.69	$2,120,379.49	$2,138,049.49	$2,155,857.49	$2,257,247.49	$2,791,757.34	$3,724,283.59	$9,018,279.32	$4,644,065.99	$3,751,497.99	$3,751,497.99
Ending cash	**$10,000.00**	**$10,000.00**	**$9,002.00**	**$10,000.00**	**$10,000.00**	**$10,000.00**	**$10,000.00**	**($7,148,063.22)**	**($9,009,722.21)**	**($8,786,353.20)**	**($8,562,984.19)**
Note balance	**$21,090,929.25**	**$23,211,308.74**	**$25,348,360.23**	**$27,505,215.72**	**$29,762,463.21**	**$32,554,220.55**	**$36,278,504.14**	**$37,093,960.23**	**$37,093,960.23**	**$37,093,960.23**	**$37,093,960.23**
Interest rate	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Interest expense	$175,758	$193,428	$211,236	$229,210	$248,021	$271,285	$302,321	$309,116	$309,116	$309,116	$309,116

Figure E-17, Sources and Application of Funds – Year 2, Alternate Scenario

BALANCE SHEET	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12
Assets												
Current Assets												
Cash	$10,000	($11,042,108)	($9,588,847)	($8,008,986)	($6,299,992)	($4,459,277)	($2,484,212)	($372,108)	$1,879,776	$4,274,234	$6,814,119	$9,502,341
Accounts receivable	$0	$3,974,867	$4,054,364	$4,135,452	$4,218,161	$4,302,524	$4,388,574	$4,476,346	$4,565,873	$4,657,190	$4,750,334	$4,845,341
State Producers Incentive	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PRODUCERS INCENTIVE TOTAL	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Inventory	$0	$905,573	$923,685	$942,158	$961,002	$980,222	$999,826	$1,019,823	$1,040,219	$1,061,023	$1,082,244	$1,103,889
Prepaid expenses												
Reserve for Capital Expenses		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Current Assets	**$10,000**	**($6,161,668)**	**($4,610,798)**	**($2,931,376)**	**($1,120,829)**	**$823,468**	**$2,904,188**	**$5,124,060**	**$7,485,867**	**$9,992,447**	**$12,646,697**	**$15,451,570**
Property, Plant & Equipment												
Plant equipment	$32,849,126	$50,140,667	$50,140,667	$50,140,667	$50,140,667	$50,140,667	$50,140,667	$50,140,667	$50,140,667	$50,140,667	$50,140,667	$50,140,667
Construction in progress												
Accumulated depreciation	$0	$3,342,711	$6,685,422	$10,028,133	$13,370,844	$16,713,555	$20,056,266	$23,398,977	$26,741,688	$30,084,399	$33,427,110	$36,769,821
Net Plant Value	**$32,849,126**	**$46,797,956**	**$43,455,245**	**$40,112,534**	**$36,769,823**	**$33,427,112**	**$30,084,401**	**$26,741,690**	**$23,398,979**	**$20,056,268**	**$16,713,557**	**$13,370,846**
Other Assets												
Organizational costs	$1,283,884	$2,231,255	$2,231,255	$2,231,255	$2,231,255	$2,231,255	$2,231,255	$2,231,255	$2,231,255	$2,231,255	$2,231,255	$2,231,255
Accumulated amortization	$0	$446,251	$892,502	$1,338,753	$1,785,004	$2,231,255	$2,231,255	$2,231,255	$2,231,255	$2,231,255	$2,231,255	$2,231,255
Loan acquisition costs	$741,879	$741,879	$741,879	$741,879	$741,879	$741,879	$741,879	$741,879	$741,879	$741,879	$741,879	$741,879
Accumulated amortization	$49,459	$98,918	$148,377	$197,836	$247,295	$296,754	$346,213	$395,672	$445,131	$494,590	$544,049	$593,508
Total Other Assets	**$1,976,304**	**$2,427,965**	**$1,932,255**	**$1,436,545**	**$940,835**	**$445,125**	**$395,666**	**$346,207**	**$296,748**	**$247,289**	**$197,830**	**$148,371**
Total Assets	**$34,835,430**	**$43,064,253**	**$40,776,702**	**$38,617,703**	**$36,589,829**	**$34,695,706**	**$33,384,256**	**$32,211,958**	**$31,181,595**	**$30,296,005**	**$29,558,085**	**$28,970,788**
Liabilities and Partners' Equity												
Current Liabilities												
Income Taxes Payable												
Current portion of long-term debt		$1,167,487	$1,284,236	$1,412,659	$1,553,925	$1,709,318	$1,880,250	$2,068,274	$2,275,102	$2,502,612	$2,752,873	$3,028,161
Total Current Liabilities	**$0**	**$1,167,487**	**$1,284,236**	**$1,412,659**	**$1,553,925**	**$1,709,318**	**$1,880,250**	**$2,068,274**	**$2,275,102**	**$2,502,612**	**$2,752,873**	**$3,028,161**
Long-Term Liabilities												
Project financing	$18,987,478	$37,093,960	$35,926,473	$34,642,237	$33,229,578	$31,675,653	$29,966,335	$28,086,086	$26,017,811	$23,742,709	$21,240,097	$18,487,224
Subordinated Debt												
Other loan												
Less current portion		($1,167,487)	($1,284,236)	($1,412,659)	($1,553,925)	($1,709,318)	($1,880,250)	($2,068,274)	($2,275,102)	($2,502,612)	($2,752,873)	($3,028,161)
Total Long-Term Liabilities	**$18,987,478**	**$35,926,473**	**$34,642,237**	**$33,229,578**	**$31,675,653**	**$29,966,335**	**$28,086,086**	**$26,017,811**	**$23,742,709**	**$21,240,097**	**$18,487,224**	**$15,459,063**
Partners' Equity												
Equity	$15,897,412	$15,897,412	$15,897,412	$15,897,412	$15,897,412	$15,897,412	$15,897,412	$15,897,412	$15,897,412	$15,897,412	$15,897,412	$15,897,412
Accumulated earnings	($49,459)	($9,927,118)	($11,047,183)	($11,921,946)	($12,537,161)	($12,877,358)	($12,479,491)	($11,771,539)	($10,733,628)	($9,344,116)	($7,579,424)	($5,413,848)
Total Partners' Equity	**$15,847,953**	**$5,970,293**	**$4,850,228**	**$3,975,465**	**$3,360,250**	**$3,020,053**	**$3,417,921**	**$4,125,872**	**$5,163,784**	**$6,553,296**	**$8,317,988**	**$10,483,564**
Total Liabilities and Equity	**$34,835,430**	**$43,064,253**	**$40,776,702**	**$38,617,703**	**$36,589,829**	**$34,695,706**	**$33,384,256**	**$32,211,958**	**$31,181,595**	**$30,296,005**	**$29,558,085**	**$28,970,788**

Figure E-18, Balance Sheet

INCOME STATEMENT	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12
Sales												
Fuel Ethanol	$0	$15,016,580	$36,315,789	$37,042,105	$37,782,947	$38,538,606	$39,309,378	$40,095,566	$40,897,477	$41,715,427	$42,549,736	$43,400,731
Carbon Dioxide	$0	$354,555	$857,464	$874,613	$892,105	$909,947	$928,146	$946,709	$965,643	$984,956	$1,004,655	$1,024,748
DDGS	$0	$4,355,500	$10,525,057	$10,735,558	$10,950,269	$11,169,274	$11,392,659	$11,620,512	$11,852,922	$12,089,980	$12,331,780	$12,578,416
Total Sales	**$0**	**$19,726,635**	**$47,698,311**	**$48,652,276**	**$49,625,321**	**$50,617,827**	**$51,630,183**	**$52,662,787**	**$53,716,042**	**$54,790,363**	**$55,886,171**	**$57,003,895**
State Producers Incentive	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Income	**$0**	**$19,726,635**	**$47,698,311**	**$48,652,276**	**$49,625,321**	**$50,617,827**	**$51,630,183**	**$52,662,787**	**$53,716,042**	**$54,790,363**	**$55,886,171**	**$57,003,895**
Cost of sales												
Corn	$0	$13,739,936	$26,896,503	$27,434,434	$27,983,123	$28,542,785	$29,113,641	$29,695,914	$30,289,832	$30,895,629	$31,513,542	$32,143,813
Fruit Waste	$0	($61,026)	($119,459)	($121,849)	($124,286)	($126,772)	($129,307)	($131,893)	($134,531)	($137,222)	($139,966)	($142,765)
Chemicals and Enzymes	$0	$1,435,212	$2,870,427	$2,927,836	$2,986,393	$3,046,121	$3,107,043	$3,169,184	$3,232,568	$3,297,219	$3,363,163	$3,430,426
Process water	$0	$104,172	$208,338	$212,505	$216,755	$221,090	$225,512	$230,022	$234,622	$239,314	$244,100	$248,982
Waste Water Treatment	$0	$150,000	$300,000	$306,000	$312,120	$318,362	$324,729	$331,224	$337,848	$344,605	$351,497	$358,527
Electricity	$0	$2,529,600	$2,529,600	$2,580,192	$2,631,796	$2,684,432	$2,738,121	$2,792,883	$2,848,741	$2,905,716	$2,963,830	$3,023,107
Natural Gas	$0	$2,640,000	$5,280,000	$5,385,600	$5,493,312	$5,603,178	$5,715,242	$5,829,547	$5,946,138	$6,065,061	$6,186,362	$6,310,089
Steam	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maintenance	$0	$316,935	$722,610	$737,062	$751,803	$766,839	$782,176	$797,820	$813,776	$830,052	$846,653	$863,586
Plant salaries and benefits	$0	$712,185	$1,398,800	$1,426,776	$1,455,312	$1,484,418	$1,514,106	$1,544,388	$1,575,276	$1,606,782	$1,638,918	$1,671,696
Depreciation	$0	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711
Total Cost of Sales	**$0**	**$24,909,725**	**$43,429,530**	**$44,231,267**	**$45,049,039**	**$45,883,164**	**$46,733,974**	**$47,601,800**	**$48,486,981**	**$49,389,867**	**$50,310,810**	**$51,250,172**
Gross Margin	**$0**	**($5,183,090)**	**$4,268,781**	**$4,421,009**	**$4,576,282**	**$4,734,663**	**$4,896,209**	**$5,060,987**	**$5,229,061**	**$5,400,496**	**$5,575,361**	**$5,753,723**
General & Administrative Costs												
Taxes and insurance		$529,914	$529,914	$540,512	$551,322	$562,348	$573,595	$585,067	$596,768	$608,703	$620,877	$633,295
Administrative salaries and benefits		$437,668	$448,500	$457,470	$466,619	$475,951	$485,470	$495,179	$505,083	$515,185	$525,489	$535,999
Consulting		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous		$205,326	$205,326	$209,433	$213,622	$217,894	$222,252	$226,697	$231,231	$235,856	$240,573	$245,384
Interest expense		$3,025,952	$3,709,396	$3,592,647	$3,464,224	$3,322,958	$3,167,565	$2,996,634	$2,808,609	$2,601,781	$2,374,271	$2,124,010
Amortization-Loan Fees	$49,459	$49,459	$49,459	$49,459	$49,459	$49,459	$49,459	$49,459	$49,459	$49,459	$49,459	$49,459
Amortization-Start-up Expenses	$0	$446,251	$446,251	$446,251	$446,251	$446,251	$0	$0	$0	$0	$0	$0
Total Gen. & Admin. Expenses	**$49,459**	**$4,694,569**	**$5,388,846**	**$5,295,772**	**$5,191,497**	**$5,074,860**	**$4,498,341**	**$4,353,036**	**$4,191,150**	**$4,010,984**	**$3,810,669**	**$3,588,147**
Pre-Tax Income	**($49,459)**	**($9,877,659)**	**($1,120,065)**	**($874,763)**	**($615,215)**	**($340,197)**	**$397,868**	**$707,951**	**$1,037,911**	**$1,389,512**	**$1,764,692**	**$2,165,576**
Income taxes-35%												
Net Income	**($49,459)**	**($9,877,659)**	**($1,120,065)**	**($874,763)**	**($615,215)**	**($340,197)**	**$397,868**	**$707,951**	**$1,037,911**	**$1,389,512**	**$1,764,692**	**$2,165,576**
Cumulative pre-tax earnings	($49,459)	($9,927,118)	($11,047,183)	($11,921,946)	($12,537,161)	($12,877,358)	($12,479,491)	($11,771,539)	($10,733,628)	($9,344,116)	($7,579,424)	($5,413,848)
Cumulative earnings	($49,459)	($9,927,118)	($11,047,183)	($11,921,946)	($12,537,161)	($12,877,358)	($12,479,491)	($11,771,539)	($10,733,628)	($9,344,116)	($7,579,424)	($5,413,848)

Figure E-19, Income Statement, Alternate Scenario

CASH FLOW STATEMENT	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12
Cash Flow From Operations												
Net income	($49,459)	($9,877,659)	($1,120,065)	($874,763)	($615,215)	($340,197)	$397,868	$707,951	$1,037,911	$1,389,512	$1,764,692	$2,165,576
Adjustments to Reconcile Net Income												
to Net Cash Provided by Operations												
Depreciation	$0	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711
Amortization	$49,459	$495,710	$495,710	$495,710	$495,710	$495,710	$49,459	$49,459	$49,459	$49,459	$49,459	$49,459
Net (Increase)Decrease in Operating Assets:												
Accounts receivable	$0	($3,974,867)	($79,497)	($81,087)	($82,709)	($84,363)	($86,050)	($87,771)	($89,527)	($91,317)	($93,144)	($95,007)
State Producers Incentive	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Inventories	$0	($905,573)	($18,111)	($18,474)	($18,843)	($19,220)	($19,604)	($19,997)	($20,396)	($20,804)	($21,220)	($21,645)
Net Increase (Decrease) in Operating Liabilities:												
Accounts payable												
Other current liabilities			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Net Cash From Operations	**$0**	**($10,919,679)**	**$2,620,747**	**$2,864,097**	**$3,121,654**	**$3,394,640**	**$3,684,383**	**$3,992,353**	**$4,320,158**	**$4,669,560**	**$5,042,498**	**$5,441,095**
Cash Flows From Investing Activities												
(Increase) Decrease in Property and Equipment	($32,849,126)	($17,291,541)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
(Increase) Decrease in Organization Costs	($1,283,684)	($947,371)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
(Increase) Decrease in Loan Fees	($741,879)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
(Increase) Decrease in Equipment Reserve												
Cash Flows From Financing Operations												
Increase (Decrease) in Equity	$15,897,412											
Increase (Decrease) in Long Term Financing	$18,987,478	$18,106,483	($1,167,487)	($1,284,236)	($1,412,659)	($1,553,925)	($1,709,318)	($1,880,250)	($2,068,274)	($2,275,102)	($2,502,612)	($2,752,873)
Net Increase (Decrease) in Cash	**$10,000**	**($11,052,108)**	**$1,453,260**	**$1,579,861**	**$1,708,995**	**$1,840,715**	**$1,975,065**	**$2,112,104**	**$2,251,884**	**$2,394,458**	**$2,539,886**	**$2,688,221**
Cash Balance - Beginning of Period	**$0**	**$10,000**	**($11,042,108)**	**($9,588,847)**	**($8,008,986)**	**($6,299,992)**	**($4,459,277)**	**($2,484,212)**	**($372,108)**	**$1,879,776**	**$4,274,234**	**$6,814,119**
Cash Balance - End of Period	**$10,000**	**($11,042,108)**	**($9,588,847)**	**($8,008,986)**	**($6,299,992)**	**($4,459,277)**	**($2,484,212)**	**($372,108)**	**$1,879,776**	**$4,274,234**	**$6,814,119**	**$9,502,341**

Figure E-20, Cash Flow Statement, Alternate Scenario

Sensitivity Analyses – Alternative Scenario

Sensitivity tables for the Alternative Scenario generated by various corn costs and selling prices for fuel ethanol are provided.

The first table shows the average annual pre-tax income and the second the average annual cash flow for full operating years, with debt service.

The prices for carbon dioxide and the DDGS are assumed to be constant in each table, because the price for each will most probably be set by long-term contracts and will not vary to the extent that a commodity like fuel ethanol will.

Ethanol ($/gallon)

Corn $/bu	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40
2.75	($12,021,538)	($10,442,591)	($8,863,643)	($7,284,696)	($5,705,749)	**($4,126,801)**	($2,547,854)	($968,907)	$610,041	$2,188,988	$3,767,936
2.70	($11,449,272)	($9,870,325)	($8,291,377)	($6,712,430)	($5,133,483)	**($3,554,535)**	($1,975,588)	($396,640)	$1,182,307	$2,761,254	$4,340,202
2.65	($10,877,006)	($9,298,059)	($7,719,111)	($6,140,164)	($4,561,217)	**($2,982,269)**	($1,403,322)	$175,626	$1,754,573	$3,333,520	$4,912,468
2.60	($10,304,740)	($8,725,793)	($7,146,845)	($5,567,898)	($3,988,951)	**($2,410,003)**	($831,056)	$747,892	$2,326,839	$3,905,786	$5,484,734
2.55	($9,732,474)	($8,153,527)	($6,574,579)	($4,995,632)	($3,416,684)	**($1,837,737)**	($258,790)	$1,320,158	$2,899,105	$4,478,052	$6,057,000
2.50	($9,160,208)	($7,581,261)	($6,002,313)	($4,423,366)	($2,844,418)	**($1,265,471)**	$313,476	$1,892,424	$3,471,371	$5,050,318	$6,629,266
2.45	($8,587,942)	($7,008,995)	($5,430,047)	($3,851,100)	($2,272,152)	**($693,205)**	$885,742	$2,464,690	$4,043,637	$5,622,584	$7,201,532
2.40	($8,015,676)	($6,436,729)	($4,857,781)	($3,278,834)	($1,699,886)	**($120,939)**	$1,458,008	$3,036,956	$4,615,903	$6,194,850	$7,773,798
2.35	**($7,443,410)**	**($5,864,462)**	**($4,285,515)**	**($2,706,568)**	**($1,127,620)**	**$451,327**	**$2,030,274**	**$3,609,222**	**$5,188,169**	**$6,767,116**	**$8,346,064**
2.30	($6,871,144)	($5,292,196)	($3,713,249)	($2,134,302)	($555,354)	**$1,023,593**	$2,602,540	$4,181,488	$5,760,435	$7,339,383	$8,918,330
2.25	($6,298,878)	($4,719,930)	($3,140,983)	($1,562,036)	$16,912	**$1,595,859**	$3,174,806	$4,753,754	$6,332,701	$7,911,649	$9,490,596
2.20	($5,726,612)	($4,147,664)	($2,568,717)	($989,770)	$589,178	**$2,168,125**	$3,747,072	$5,326,020	$6,904,967	$8,483,915	$10,062,862
2.15	($5,154,346)	($3,575,398)	($1,996,451)	($417,504)	$1,161,444	**$2,740,391**	$4,319,338	$5,898,286	$7,477,233	$9,056,181	$10,635,128
2.10	($4,582,080)	($3,003,132)	($1,424,185)	$154,762	$1,733,710	**$3,312,657**	$4,891,605	$6,470,552	$8,049,499	$9,628,447	$11,207,394
2.05	($4,009,814)	($2,430,866)	($851,919)	$727,028	$2,305,976	**$3,884,923**	$5,463,871	$7,042,818	$8,621,765	$10,200,713	$11,779,660
2.00	($3,437,548)	($1,858,600)	($279,653)	$1,299,294	$2,878,242	**$4,457,189**	$6,036,137	$7,615,084	$9,194,031	$10,772,979	$12,351,926
1.95	($2,865,282)	($1,286,334)	$292,613	$1,871,561	$3,450,508	**$5,029,455**	$6,608,403	$8,187,350	$9,766,297	$11,345,245	$12,924,192

Note: Matrix assumes that the selling price of DDGS and carbon dioxide remains constant

Figure E-21, Pricing Sensitivity Matrix, Average Annual Pre-Tax Income (Years 3 through 12), Alternate Scenario

Ethanol ($/gallon)

Corn $ per bu	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40
2.75	($10,418,420)	($8,839,473)	($7,260,525)	($5,681,578)	($4,102,631)	**($2,523,683)**	($944,736)	$634,211	$2,213,159	$3,792,106	$5,371,054
2.70	($9,846,154)	($8,267,207)	($6,688,259)	($5,109,312)	($3,530,365)	**($1,951,417)**	($372,470)	$1,206,478	$2,785,425	$4,364,372	$5,943,320
2.65	($9,273,888)	($7,694,941)	($6,115,993)	($4,537,046)	($2,958,099)	**($1,379,151)**	$199,796	$1,778,744	$3,357,691	$4,936,638	$6,515,586
2.60	($8,701,622)	($7,122,675)	($5,543,727)	($3,964,780)	($2,385,833)	**($806,885)**	$772,062	$2,351,010	$3,929,957	$5,508,904	$7,087,852
2.55	($8,129,356)	($6,550,409)	($4,971,461)	($3,392,514)	($1,813,566)	**($234,619)**	$1,344,328	$2,923,276	$4,502,223	$6,081,170	$7,660,118
2.50	($7,557,090)	($5,978,143)	($4,399,195)	($2,820,248)	($1,241,300)	**$337,647**	$1,916,594	$3,495,542	$5,074,489	$6,653,436	$8,232,384
2.45	($6,984,824)	($5,405,877)	($3,826,929)	($2,247,982)	($669,034)	**$909,913**	$2,488,860	$4,067,808	$5,646,755	$7,225,702	$8,804,650
2.40	($6,412,558)	($4,833,611)	($3,254,663)	($1,675,716)	($96,768)	**$1,482,179**	$3,061,126	$4,640,074	$6,219,021	$7,797,968	$9,376,916
2.35	**($5,840,292)**	**($4,261,344)**	**($2,682,397)**	**($1,103,450)**	**$475,498**	**$2,054,445**	**$3,633,392**	**$5,212,340**	**$6,791,287**	**$8,370,234**	**$9,949,182**
2.30	($5,268,026)	($3,689,078)	($2,110,131)	($531,184)	$1,047,764	**$2,626,711**	$4,205,658	$5,784,606	$7,363,553	$8,942,501	$10,521,448
2.25	($4,695,760)	($3,116,812)	($1,537,865)	$41,082	$1,620,030	**$3,198,977**	$4,777,924	$6,356,872	$7,935,819	$9,514,767	$11,093,714
2.20	($4,123,494)	($2,544,546)	($965,599)	$613,348	$2,192,296	**$3,771,243**	$5,350,190	$6,929,138	$8,508,085	$10,087,033	$11,665,980
2.15	($3,551,228)	($1,972,280)	($393,333)	$1,185,614	$2,764,562	**$4,343,509**	$5,922,456	$7,501,404	$9,080,351	$10,659,299	$12,238,246
2.10	($2,978,962)	($1,400,014)	$178,933	$1,757,880	$3,336,828	**$4,915,775**	$6,494,723	$8,073,670	$9,652,617	$11,231,565	$12,810,512
2.05	($2,406,696)	($827,748)	$751,199	$2,330,146	$3,909,094	**$5,488,041**	$7,066,989	$8,645,936	$10,224,883	$11,803,831	$13,382,778
2.00	($1,834,430)	($255,482)	$1,323,465	$2,902,412	$4,481,360	**$6,060,307**	$7,639,255	$9,218,202	$10,797,149	$12,376,097	$13,955,044
1.95	($1,262,164)	$316,784	$1,895,731	$3,474,679	$5,053,626	**$6,632,573**	$8,211,521	$9,790,468	$11,369,415	$12,948,363	$14,527,310

Note: Matrix assumes that the selling price of DDGS and carbon dioxide remains constant

Figure E-22, Pricing Sensitivity Matrix, Average Annual Cash Flow (Years 3 through 12), Alternate Scenario

APPENDIX F

MILLER BREWERY SITE

Financial Evaluation of an Ethanol Production Facility Located in Volney, New York

Vogelbusch USA was asked by NYSTEC to review certain documentation regarding the suitability of a former Miller Brewery in Volney to be used for a grain alcohol plant.

The alcohol plant size was initially determined to be 15 MGPY and, on this basis, the cost comparison was made on potential savings by eliminating new equipment and using existing equipment in the Miller Brewery.

Vogelbusch USA matched process tanks according to the suitability to replace tanks required for an alcohol plant and, where necessary, made adjustments to increase the number of tanks to fit the total capacity.

Vogelbusch USA also estimated savings in erection costs and savings in concrete foundations for the above tanks. At this stage, it was not possible to estimate any savings for instrumentation, but it can be assumed that a certain amount of instrumentation from the existing brewery could be used.

A further estimate was made to place a value on existing utilities that would be re-used in an alcohol plant.

Lastly, an estimate was made for site improvements and buildings.

The total savings as calculated would reduce the cost of a new 15-MGPY plant by approximately $8 million, or about 30%. Since a price of $16 million was mentioned in the documentation as a purchase price for the site, this option as investigated would not provide economic justification.

The capacity of the utilities and process equipment of the brewery would support a considerably larger alcohol plant, and the economics of such a plant would be greatly improved.

NYSTEC **VOGELBUSCH U.S.A.,INC.**

VB PROJ.: 9907 DATE : 12/14/99

Potential Savings for a 15-MGPY Plant at the Miller Brewery in Fulton NY

1. Process Equipment

The information received indicates a large number of 304 SS tanks, which appear to be suitable for an alcohol plant, as follows:

Original Equipment	No	Capacity (gals)	Replace by tank	Capacity (gals)	Savings Equ. Cost	Savings Erection	Savings Concrete	Total Savings
T 1201	1	16,291	Grain silo		$ 16,500	15%	10%	$ 20,625
T 1201	1	26,068	Grain silo		$ 20,000	15%	10%	$ 25,000
						Subtotal Area 1200 :		**$ 45,625**
						% of Equ	% of Equ	
T 1301	1	17,000	Vert/No jacket	184,140	$ 34,000	20%	20%	$ 47,600
T 1303	1	20,400	Hor/No jacket	24,800	$ 38,000	20%	20%	$ 53,200
T 1304	1	101,600	Vert/Jacket	205,685	$ 102,000	20%	20%	$ 142,800
E 1303	2	Heat Exch.	Jacket T 1304		$ 62,166	20%	20%	$ 87,032
T 1309	1	6,000	Hor/No jacket	24,800	$ 18,500	20%	20%	$ 25,900
T 1311	1	6,000	Hor/No jacket	24,800	$ 18,500	20%	20%	$ 25,900
						Subtotal Area 1300 :		**$ 382,432**
T 1400	1	121,500	Vert/Jacket	205,685	$ 114,000	20%	25%	$ 165,300
T 1401	1	285,800	Vert/Jacket	205,685	$ 209,000	20%	25%	$ 303,050
T 1402	1	285,800	Vert/Jacket	205,685	$ 209,000	20%	25%	$ 303,050
T 1403	1	285,800	Vert/Jacket	205,685	$ 209,000	20%	25%	$ 303,050
T 1404	1	285,800	Vert/Jacket	205,685	$ 209,000	20%	25%	$ 303,050
T 1405	1	285,800	Vert/Jacket	205,685	$ 209,000	20%	25%	$ 303,050
New	1		Vert/Jacket	205,685				
E- 1402	1	Heat Exch.	Jacket T-1402		$ 25,250	15%	15%	$ 32,825
E-1403	1	Heat Exch.	Jacket T-1403		$ 25,250	15%	15%	$ 32,825
E-1404	1	Heat Exch.	Jacket T-1404		$ 25,250	15%	15%	$ 32,825
						Subtotal Area 1400 :		**$ 1,779,025**
T-1601	1	120,300	Vert/No jacket	184,140	$ 113,000	20%	25%	$ 163,850
T-1650	1	35,200	Vert/No jacket	65,100	$ 59,000	20%	25%	$ 85,550
						Subtotal Area 1600 :		**$ 249,400**
T 1701	1	126,000	Vert/No jacket	184,140	$ 116,300	20%	25%	$ 168,635
T 1702	1	20,150	Hor/No jacket	24,800	$ 38,200	20%	25%	$ 55,390
						Subtotal Area 1700 :		**$ 224,025**
T 1901	1	4,700	Hor/No jacket	24,800	$ 12,000	20%	25%	$ 17,400
T 1902	1	15,040	Vert/No jacket	65,100	$ 31,000	20%	25%	$ 44,950
T 1903	1	15,040	V/Stm Jacket	9,300	$ 31,000	20%	25%	$ 44,950
T 1905	1	4,700	Hor/No jacket	24,800	$ 17,000	20%	25%	$ 24,650
T 1906	1	4,700	Hor/No jacket	24,800	$ 12,000	20%	25%	$ 17,400
						Subtotal Area 1900 :		**$ 149,350**
T 2201	2	203,740	GRAIN SILOS		$ 180,000	15%	10%	$ 225,000
						Subtotal Area 2201 :		**$ 225,000**
						Total Process Tanks:		**$ 3,054,857**

2. Utilities

The following utilities were listed as available and have more than required capacity. Depending on the state of repair, they would not be required to be purchased new.

	Savings Equ. Cost	Savings Erection % of Equ	Savings Concrete % of Equ	Total Savings
Boiler & BFW Systems	$ 800,000	60%	40%	$ 1,600,000
Cooling Tower/Refrigeration Plant	$ 400,000	60%	40%	$ 800,000
Air Compressors	$ 100,000	60%	50%	$ 210,000
Waste Water TMT	$ 800,000	40%	100%	$ 1,920,000
			Total Utilities:	**$ 4,530,000**

3. Buildings and Site Improvements:

The property is fully developed and has all administrative buildings, including laboratories. The site is developed for rail, barge, and truck loading, and includes electrical substations and a gas supply main.

	Savings Equ. Cost	Savings Erection % of Equ	Savings Concrete % of Equ	Total Savings
Buildings & Site Improvements	**$ 500,000**			**$ 500,000**

Summary:

Total Process Tanks:	**$ 3,054,857**
Total Utilities:	**$ 4,530,000**
Buildings and Site:	**$ 500,000**
Total Facility:	**$ 8,084,857**

APPENDIX G

Innovative Processes of Vogelbusch USA

In addition to its extensive knowledge of basic ethanol-processing technologies, Vogelbusch USA brings to the table a unique set of innovative processes of value to the NYCGA team. These processes are outlined below.

- Continuous hot grain mash conversion process (U.S. Patent No. 5,114,491) - a continuous starch-to-sugar conversion process used to prepare whole grains such as corn, milo, wheat, and barley for microbial fermentation to alcohol. This process is energy efficient and optimizes steam and enzyme consumption.
- Molasses feed-preparation process - removes insoluble inorganic salts prior to distillation to minimize scaling and fouling and recovers sugar or alcohol.
- High-sugar-containing fruits and vegetables feed-preparation process - has been used on materials such as sugar beets and dates. Countercurrent extraction is the basis used to recover sugar from various raw materials.
- Starch-containing-tuber feed-preparation process - used to convert materials such as potatoes, cassava, and sweet potatoes to sugars for the fermentation. These materials have a higher moisture content than whole grains, and this must be addressed in the upstream processing.
- Residual starch feed-preparation process - residual starch or byproducts from wet milling plants are typical feedstocks for the large North American producers. Vogelbusch USA uses a technology very similar to its patented hot-mash-conversion process for preparing these streams. Also, starch-containing waste products from the feed industry are processed using this technology.
- Continuous Fermentation to Alcohol with yeast (Licensed technology) and also bacteria (U.S. Patent No. 4,876,196) - Vogelbusch USA pioneered the MULTICONT fermentation process, a continuous fermentation process for growth of the organism (yeast or bacteria) and production of alcohol. This process requires less capital investment and has operating costs lower than the traditional batch-fermentation process. Vogelbusch USA has, in operation, continuous-fermentation plants as large as 100 MGPY.
- Batch Fermentation to Alcohol - traditional batch-fermentation systems designed by Vogelbusch USA, when requested to do so by the client. These systems are most typical in small (<5 MGPY), specialty "grain neutral spirits" alcohol plants.
- Semi-Continuous Fermentation to Alcohol - a Vogelbusch USA-developed hybrid technology for clients that request a batch process but require a larger production scale (e.g., 15 MGPY). This process continuously grows the yeast required to make the larger-scale batches. This reduces overall operating costs.
- Fuel Alcohol Distillation Multi-Pressure system - a multi-column, multi-pressure fuel alcohol distillation system to reduce energy costs while maintaining competitive capital-investment costs.
- Fuel Alcohol Dehydration (Molecular Sieve) - a two-bed pressure swing absorption (PSA) molecular-sieve dehydration unit integrated into the Vogelbusch USA multi-pressure distillation system — the current standard for the North American fuel-alcohol industry. This system is easier to operate and has lower energy, operating, and capital costs than the traditional cyclohexane dehydration systems. However, if an application warrants it, Vogelbusch USA also designs cyclohexane dehydration systems.

- Stillage Clarification – Decantation - Vogelbusch USA defines the overall decantation system from the whole-stillage feed tank to the required interlocks on the decanters for safe operation. As part of the design package, Vogelbusch USA also defines the specific requirements and parameters that determine the model of decanter that is best suited for a given application.
- Integrated Evaporation - Vogelbusch USA-designed multi-effect evaporation systems using a combination of falling-film and forced-circulation evaporators. These units are integrated into the Vogelbusch USA distillation system for energy optimization.

APPENDIX H

Evans Mills Base Pro Forma

	Equipment Cost	Total Cost
Site and Buildings	$153,575	$153,575
Fruit Waste Storage	$0	$0
Milling	$129,834	$262,265
Preparation/Mashing	$415,484	$984,697
Fermentation	$856,321	$1,806,837
Distillation	$821,160	$2,036,477
MS Dehydration	$511,918	$793,473
Evaporation	$657,731	$1,499,627
Decanting	$468,138	$917,550
DDGS Drying	$791,930	$1,385,878
CIP and Chemicals	$180,362	$458,119
Grain Storage	$85,320	$179,172
Alcohol Storage and Loading	$360,146	$702,285
DDGS Storage and Loading	$190,246	$351,955
DCS Computer	$153,574	$307,147
Cooling Tower	$102,384	$204,767
Boiler and BFW	$409,535	$900,976
Instrument and Plant Air	$51,192	$107,503
Waste Water Treatment	$409,535	$1,023,836
Direct Field Cost		$14,076,139
Start-up, Testing & Training		Excluded
Temporary Facilities		Included Above
Construction Equipment, Tools, Supplies		Included Above
Field Staff and Legalities		Included Above
Indirect Field Cost		$0
Total Field Cost		$14,076,139
Engineering		$770,000
Total Field and Home Office		$14,846,139
Taxes		$0
Insurance		Included Above
Permits		Included Above
Craft Causal Overtime		Included Above
Contingency		$1,407,614
Escalation		$0
Subtotal		$16,253,753
Detailed Engineering and Construction		$1,689,137
Total		$17,942,890

Figure H-1, Evans Mills Pro Forma, Capital and Site Review

			Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Long-term debt											
		Debt Balance:	$17,784,273	$34,613,944	$13,816,025	$12,376,696	$10,460,950	$7,911,091	$4,517,230	$0	$0
A	Amortize	Interest Rate above inflation(%):	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Term (Years):	15	Interest Pmt:	$851,606	$1,150,134	$1,381,602	$1,237,670	$1,046,095	$791,109	$451,723	$0	$0
Cost of Capital and Site Work:	$17,942,890	Principal Pmt:	($851,606)	$0	$434,842	$578,775	$770,350	$1,025,336	$1,364,722	($0)	($0)
Up-Front Payment:	$5,921,154	Additional Principal Pmt:									
Working Capital	$1,794,289	**Sub-Total Payment:**	$0	$1,150,134	$1,816,445	$1,816,445	$1,816,445	$1,816,445	$1,816,445	$0	$0
Original Balance:	$13,816,025	**Amoritization of Loan Fees:**	$18,421	$18,421	$18,421	$18,421	$18,421	$18,421	$18,421	$0	$0
Balloon Pmt:	$0	**Total Payment:**	$18,421	$1,168,555	$1,834,866	$1,834,866	$1,834,866	$1,834,866	$1,834,866	$0	$0
			into depr. Exp.								
Debt / Equity Ratio:	2.33										
Long-term debt Summary											
		Opening Balance:	$17,784,273	$34,613,944	$13,816,025	$12,376,696	$10,460,950	$7,911,091	$4,517,230	$0	$0
		Total Interest Pmts:	$851,606	$1,150,134	$1,381,602	$1,237,670	$1,046,095	$791,109	$451,723	$0	$0
		Total Principal Pmts:	-$851,606	$0	$434,842	$578,775	$770,350	$1,025,336	$1,364,722	($0)	($0)
		Additional Principal Pmts:	$0	$0	$0	$0	$0	$0	$0	$0	$0
		Total Payments:	$0	$1,150,134	$1,816,445	$1,816,445	$1,816,445	$1,816,445	$1,816,445	$0	$0
		Closing Balance:	$18,635,879	$34,613,944	$13,381,182	$11,797,921	$9,690,600	$6,885,756	$3,152,508	$0	$0
		Avg Annualized Rate Pd.:	4.79%	3.32%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Effect of Depreciation											
Total Value of Depreciation:	$18,707,004										
Depreciation based on:	15	year straightline method									
Plant and Equipment Value at start of year			$18,635,879	$34,613,944	$17,459,870	$13,718,469	$9,977,069	$6,235,668	$2,494,267	($0)	($0)
Less Accumulated Depreciation:			$0	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$0	$0
Plant and Equipment Value After Year:			$18,635,879	$33,366,810	$16,212,736	$12,471,336	$8,729,935	$4,988,534	$1,247,134	$0	$0
Start-up Expenses											
		Debt Balance:	$0	$1,490,815	$1,192,652	$298,163	$0	$0	$0	$0	$0
		Interest Rate above inflation(%):	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Years to Pay-off	5	Interest Pmt:	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cost of Startup:	$1,490,815	Principal Pmt:	$0	$298,163	$298,163	$298,163	$0	$0	$0	$0	$0
Interest Rate (above Inflation) used:	0.00%	Additional Principal Pmt:									
		Sub-Total Payment:	$0	$298,163	$298,163	$298,163	$0	$0	$0	$0	$0
		Amoritization of Loan Fees:	$0	$0	$0	$0	$0	$0	$0	$0	$0
		Total Payment:	$0	$298,163	$298,163	$298,163	$0	$0	$0	$0	$0
Conversion to Baseline Year Dollars											
Discount Factor:			1.00	1.00	1.00	0.94	0.89	0.84	0.79	0.74	0.69
Depreciation in Current-Year Dollars:			$0	$1,247,134	$1,247,134	$1,175,202	$1,107,419	$1,043,546	$983,356	$0	$0
Interest Payment in Current-Year Dollars:			$851,606	$1,150,134	$1,381,602	$1,166,284	$928,902	$661,965	$356,180	$0	$0
Amoritization of Loan Fees:			$18,421	$18,421	$18,421	$17,359	$16,358	$15,414	$14,525	$0	$0
Principal in Current Dollars:			-$851,606	$0	$434,842	$545,393	$684,049	$857,955	$1,076,074	$0	$0
Total Loan Payment in Current-Year Dollars:			$18,421	$1,168,555	$1,834,866	$1,729,036	$1,629,309	$1,535,334	$1,446,780	$0	$0
Start-up Expenses in Actual-Year Dollars:			$0	$298,163	$298,163	$298,163	$0	$0	$0	$0	$0
Start-up Expenses in Baseline-Year Dollars:			$0	$298,163	$298,163	$280,966	$0	$0	$0	$0	$0

Figure H-2, Evans Mills Pro Forma, Debt Schedule

	Amount	Unit	Cost	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Feedstock												
Corn	106,870,229	pounds/year	$0.04	$0	$2,291,002	$4,484,733	$4,484,733	$4,484,733	$4,484,733	$4,484,733	$4,484,733	$4,484,733
Fruit Waste	0	pounds/year	-$0.03	$0	$0	$0	$0	$0	$0	$0	$0	$0
Operating Chemicals												
Alpha-amylase	84,802	pounds/year	$1.10	$0	$46,641	$93,282	$93,282	$93,282	$93,282	$93,282	$93,282	$93,282
Gluco-amylase	26,172	pounds/year	$3.70	$0	$48,418	$96,836	$96,836	$96,836	$96,836	$96,836	$96,836	$96,836
Sulfuric Acid	0	pounds/year	$0.04	$0	$0	$0	$0	$0	$0	$0	$0	$0
Caustic Soda	518,000	pounds/year	$0.15	$0	$38,850	$77,700	$77,700	$77,700	$77,700	$77,700	$77,700	$77,700
Ammonia	238,000	pounds/year	$0.13	$0	$15,470	$30,940	$30,940	$30,940	$30,940	$30,940	$30,940	$30,940
Nutrients	0	pounds/year	$0.12	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ammonium Sulfate	112,000	pounds/year	$0.07	$0	$3,696	$7,392	$7,392	$7,392	$7,392	$7,392	$7,392	$7,392
Antifoam	0	pounds/year	$0.25	$0	$0	$0	$0	$0	$0	$0	$0	$0
Gasoline	1,675,559	pounds/year	$0.10	$0	$81,546	$163,093	$163,093	$163,093	$163,093	$163,093	$163,093	$163,093
Diesel	0	pounds/year	$0.06	$0	$0	$0	$0	$0	$0	$0	$0	$0
BFW Chemicals	784	pounds/year	$0.97	$0	$380	$760	$760	$760	$760	$760	$760	$760
CW Chemicals	8,400	pounds/year	$1.00	$0	$4,200	$8,400	$8,400	$8,400	$8,400	$8,400	$8,400	$8,400
WWT Nutrients	0	pounds/year	$0.11	$0	$0	$0	$0	$0	$0	$0	$0	$0
WWT Chemicals	0	pounds/year	$2.50	$0	$0	$0	$0	$0	$0	$0	$0	$0
Process Water												
Make-up Water	53,803	pounds/hour	$0.00	$0	$48,829	$97,659	$97,659	$97,659	$97,659	$97,659	$97,659	$97,659
Steam												
Steam	0	pounds/hour	$0.01	$0	$0	$0	$0	$0	$0	$0	$0	$0
Natural Gas												
Natural Gas	33	mcf/hr	$3.20	$0	$440,000	$880,000	$880,000	$880,000	$880,000	$880,000	$880,000	$880,000
Disposal Costs												
Landfill	0	pounds/hr	$0.00	$0	$0	$0	$0	$0	$0	$0	$0	$0
Electricity												
Electric				$0	$544,000	$544,000	$544,000	$544,000	$544,000	$544,000	$544,000	$544,000
Waste Water Treatment												
WWT				$0	$25,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Maintenance Materials												
Maintenance				$0	$118,045	$269,143	$269,143	$269,143	$269,143	$269,143	$269,143	$269,143
Miscellaneous Incidentals												
Miscellaneous				$0	$44,243	$44,243	$44,243	$44,243	$44,243	$44,243	$44,243	$44,243
Total Cost				**$0**	**$3,750,321**	**$6,848,181**	**$6,848,181**	**$6,848,181**	**$6,848,181**	**$6,848,181**	**$6,848,181**	**$6,848,181**
Adjusted Total Cost				**$0**	**$3,750,321**	**$6,848,181**	**$6,848,181**	**$6,848,181**	**$6,848,181**	**$6,848,181**	**$6,848,181**	**$6,848,181**

Figure H-3, Evans Mills Pro Forma, Annual Materials Costs

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Production									
Number of Employees:	2.8	27.8	36	36	36	36	36	36	36
Avg. Salary/Wage per Employee:	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889
Employer Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Employer Contribution ($):	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967
Per Employee Total:	$38,856	$33,856	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856
Production Salary/Wage Total:	$83,928	$829,596	$1,076,000	$1,076,000	$1,076,000	$1,076,000	$1,076,000	$1,076,000	$1,076,000
Employer Contribution Total:	$25,178	$248,879	$322,800	$322,800	$322,800	$322,800	$322,800	$322,800	$322,800
Department Total:	$109,106	$1,078,475	$1,398,800	$1,398,800	$1,398,800	$1,398,800	$1,398,800	$1,398,800	$1,398,800
General & Administrative									
Number of Employees:	6.2	6.8	7	7	7	7	7	7	7
Avg. Salary/Wage per Employee:	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286
Employer Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Employer Contribution ($):	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786
Per Employee Total:	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071
General & Administrative	$303,600	$336,375	$345,000	$345,000	$345,000	$345,000	$345,000	$345,000	$345,000
Employer Contribution Total:	$91,080	$100,913	$103,500	$103,500	$103,500	$103,500	$103,500	$103,500	$103,500
Department Total:	$394,680	$437,288	$448,500	$448,500	$448,500	$448,500	$448,500	$448,500	$448,500
All Employees:									
Total Number of Employees:	9	35	43	43	43	43	43	43	43
Avg. Salary/Wage per Employee:	$43,212	$33,717	$33,047	$33,047	$33,047	$33,047	$33,047	$33,047	$33,047
Avg. per Employee Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Avg. per Employee Contribution ($):	$12,964	$10,115	$9,914	$9,914	$9,914	$9,914	$9,914	$9,914	$9,914
Total Salary/Wage Expense:	$387,528	$1,165,971	$1,421,000	$1,421,000	$1,421,000	$1,421,000	$1,421,000	$1,421,000	$1,421,000
Total Employer Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Total Employer Contribution ($):	$116,258	$349,791	$426,300	$426,300	$426,300	$426,300	$426,300	$426,300	$426,300
Total Employee Expense:	**$503,786**	**$1,515,762**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**
Attributed to Start-up Costs:	**$503,786**	**$365,909**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Employee Salary and Benefits:	**$0**	**$1,149,853**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**

Figure H-4, Evans Mills Pro Forma, Employee Forecast

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Taxable income in actual year dollars	($18,421)	($4,646,137)	($3,886,905)	($3,800,605)	($3,372,027)	($3,181,945)	($2,911,435)	($1,267,249)	($1,371,711)
Cumulative taxable income	($18,421)	($4,664,558)	($8,551,463)	($20,047,948)	($30,305,791)	($40,057,028)	($49,082,465)	($54,537,671)	($59,865,236)
Discount Factor	1.00	1.00	1.00	0.94	0.89	0.84	0.79	0.74	0.69
Federal Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
State Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sales Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
Property Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
Incentives	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Tax Burden	$0	$0	$0	$0	$0	$0	$0	$0	$0
Jobs Created	9	35	43	43	43	43	43	43	43
Multiplier Jobs	11	41	52	52	52	52	52	52	52
On-Farm Jobs	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
State/Local Job Impact	$570	$1,715	$2,091	$2,091	$2,091	$2,091	$2,091	$2,091	$2,091
Total Impact Value	$11,248	$130,499	$197,762	$197,762	$197,762	$197,762	$197,762	$197,762	$197,762

Figure H-5, Evans Mills Pro Forma, Tax Impacts

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Alcohol	$0	$2,406,926	$6,052,632	$6,052,632	$6,052,632	$6,052,632	$6,052,632	$6,052,632	$6,052,632
Electricity	$0	$0	$0	$0	$0	$0	$0	$0	$0
CO_2 Sales	$0	$56,835	$142,911	$142,911	$142,911	$142,911	$142,911	$142,911	$142,911
DDGS	$0	$701,500	$1,755,725	$1,755,725	$1,755,725	$1,755,725	$1,755,725	$1,755,725	$1,755,725
Total Gross Revenues	**$0**	**$3,165,261**	**$7,951,268**	**$7,951,268**	**$7,951,268**	**$7,951,268**	**$7,951,268**	**$7,951,268**	**$7,951,268**
Returns/Allowances (%)	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Adjusted Revenues	**$0**	**$3,165,261**	**$7,951,268**	**$7,951,268**	**$7,951,268**	**$7,951,268**	**$7,951,268**	**$7,951,268**	**$7,951,268**
Cost of alcohol after producer credit:	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150

Figure H-6, Evans Mills Pro Forma, Revenue Forecast

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Income / Expenses in Baseline Year Dollars									
Total Income									
Sales of Ethanol and Co-Products	$0	$3,165,261	$7,951,268	$7,951,268	$7,951,268	$7,951,268	$7,951,268	$7,951,268	$7,951,268
Total	$0	$3,165,261	$7,951,268	$7,951,268	$7,951,268	$7,951,268	$7,951,268	$7,951,268	$7,951,268
Total Expenses									
Feedstock	$0	$2,291,002	$4,484,733	$4,484,733	$4,484,733	$4,484,733	$4,484,733	$4,484,733	$4,484,733
Operating Chemicals	$0	$239,202	$478,404	$478,404	$478,404	$478,404	$478,404	$478,404	$478,404
Process Water	$0	$48,829	$97,659	$97,659	$97,659	$97,659	$97,659	$97,659	$97,659
Natural Gas	$0	$440,000	$880,000	$880,000	$880,000	$880,000	$880,000	$880,000	$880,000
Disposal Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Water Treatment	$0	$25,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Electricity	$0	$544,000	$544,000	$544,000	$544,000	$544,000	$544,000	$544,000	$544,000
Steam	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maintenance	$0	$118,045	$269,143	$269,143	$269,143	$269,143	$269,143	$269,143	$269,143
Miscellaneous Incidentals	$0	$44,243	$44,243	$44,243	$44,243	$44,243	$44,243	$44,243	$44,243
Salaries/Wages	$0	$1,149,853	$1,847,300	$1,847,300	$1,847,300	$1,847,300	$1,847,300	$1,847,300	$1,847,300
Depreciation	$0	$1,247,134	$1,247,134	$1,175,202	$1,107,419	$1,043,546	$983,356	$0	$0
Interest Expense	$0	$1,150,134	$1,381,602	$1,166,284	$928,902	$661,965	$356,180	$0	$0
Amoritization of Loan Fees	$18,421	$18,421	$18,421	$17,359	$16,358	$15,414	$14,525	$0	$0
Insurance	$0	$197,372	$197,372	$197,372	$197,372	$197,372	$197,372	$197,372	$197,372
Amoritization of Start-up Expenses	$0	$298,163	$298,163	$280,966	$0	$0	$0	$0	$0
Total	$18,421	$7,811,398	$11,838,173	$11,532,662	$10,945,531	$10,613,777	$10,246,914	$8,892,852	$8,892,852
Pre-Tax Profit	($18,421)	($4,646,137)	($3,886,905)	($3,581,395)	($2,994,264)	($2,662,509)	($2,295,646)	($941,585)	($941,585)
Income Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
State Tax, Sales Tax, Property Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0
Profit After Taxes	($18,421)	($4,646,137)	($3,886,905)	($3,581,395)	($2,994,264)	($2,662,509)	($2,295,646)	($941,585)	($941,585)

Figure H-7, Evans Mills Pro Forma, Income Statement (page 1 of 3)

Income / Expenses in Actual Year Dollars	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Discount Factor:	1.00	1.00	1.00	0.94	0.89	0.84	0.79	0.74	0.69
Total Income									
Sales of Ethanol and Co-Products	$0	$3,165,261	$7,951,268	$8,437,949	$8,954,419	$9,502,501	$10,084,130	$10,701,359	$11,583,496
Total	$0	$3,165,261	$7,951,268	$8,437,949	$8,954,419	$9,502,501	$10,084,130	$10,701,359	$11,583,496
Total Expenses									
Feedstock	$0	$2,291,002	$4,484,733	$4,759,234	$5,050,537	$5,359,671	$5,687,726	$6,035,860	$6,533,409
Operating Chemicals	$0	$239,202	$478,404	$507,686	$538,760	$571,737	$606,731	$643,868	$696,944
Process Water	$0	$48,829	$97,659	$103,636	$109,979	$116,711	$123,855	$131,436	$142,270
Natural Gas	$0	$440,000	$880,000	$933,863	$991,022	$1,051,681	$1,116,052	$1,184,364	$1,281,993
Disposal Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Water Treatment	$0	$25,000	$50,000	$53,060	$56,308	$59,755	$63,412	$67,293	$72,841
Electricity	$0	$544,000	$544,000	$577,297	$612,632	$650,130	$689,924	$732,152	$792,505
Steam	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maintenance	$0	$118,045	$269,143	$285,617	$303,099	$321,651	$341,338	$362,231	$392,091
Miscellaneous Incidentals	$0	$44,243	$44,243	$46,951	$49,825	$52,874	$56,111	$59,545	$64,454
Salaries/Wages	$0	$1,149,853	$1,847,300	$1,960,369	$2,080,359	$2,207,694	$2,342,823	$2,486,222	$2,691,167
Depreciation	$0	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$0	$0
Interest Expense	$0	$1,150,134	$1,381,602	$1,237,670	$1,046,095	$791,109	$451,723	$0	$0
Amoritization of Loan Fees	$18,421	$18,421	$18,421	$18,421	$18,421	$18,421	$18,421	$0	$0
Insurance	$0	$197,372	$197,372	$209,453	$222,273	$235,878	$250,315	$265,637	$287,534
Amoritization of Start-up Expenses	$0	$298,163	$298,163	$298,163	$0	$0	$0	$0	$0
Total	$18,421	$7,811,398	$11,838,173	$12,238,554	$12,326,446	$12,684,446	$12,995,565	$11,968,608	$12,955,207
Pre-Tax Profit	($18,421)	($4,646,137)	($3,886,905)	($3,800,605)	($3,372,027)	($3,181,945)	($2,911,435)	($1,267,249)	($1,371,711)
Income Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
State Tax, Sales Tax, Property Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0
Profit After Taxes	($18,421)	($4,646,137)	($3,886,905)	($3,800,605)	($3,372,027)	($3,181,945)	($2,911,435)	($1,267,249)	($1,371,711)

Figure H-8, Evans Mills Pro Forma, Income Statement (page 2 of 3)

Value of Assets at Year End in Individual Year $	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Fixed Assets									
Plant and Equipment	$18,635,879	$34,613,944	$17,459,870	$13,718,469	$9,977,069	$6,235,668	$2,494,267	($0)	($0)
Less Accumulated Depreciation	$0	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$1,247,134	$0	$0
Other	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Long-term Assets	$18,635,879	$33,366,810	$16,212,736	$12,471,336	$8,729,935	$4,988,534	$1,247,134	($0)	($0)
Net Present Value Analysis									
Discount Factor = 1 (all data above is already discounted)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adjusted Total Profit	($18,421)	($4,646,137)	($3,886,905)	($3,581,395)	($2,994,264)	($2,662,509)	($2,295,646)	($941,585)	($941,585)
Adjusted Value of Profit minus Debt Payment	$0	($2,230,448)	($1,239,748)	($1,222,550)	($941,585)	($941,585)	($941,585)	($941,585)	($941,585)
Adjusted Value of Capital Investment plus Interest	$0	$1,150,134	$1,816,445	$1,816,445	$1,816,445	$1,816,445	$1,816,445	$0	$0

Present Value (PV) of Profit	($52,410,627)
PV of Capital Investment	$19,737,179
PV of Profit minus Debt Payment	($22,220,169)
PV of Capital Investment Plus Interest	$28,396,809
Baseline Cost per Gallon of Ethanol	$1.15

First-Year Cost-per-Gallon Analysis

Expense Category	Year-One Cost	Cost per Gallon
Feedstock	$4,484,733	$0.701
Operating Chemicals	$478,404	$0.075
Process Water	$97,659	$0.015
Natural Gas	$880,000	$0.138
Disposal Costs	$0	$0.000
Maintenance Materials	$269,143	$0.042
Miscellaneous Incidentals	$44,243	$0.007
Salaries/Wages	$1,847,300	$0.289
Depreciation	$1,247,134	$0.195
Interest Expense	$1,381,602	$0.216
Amoritization of Loan Fees	$18,421	$0.003
Insurance	$197,372	$0.031
Amoritization of Start-up Expenses	$298,163	$0.047
Profit	-$3,886,905	-$0.608
Total	$7,357,268	$1.150

Figure H-9, Evans Mills Pro Forma, Income Statement (page 3 of 3)

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Cost of transport									
Ethanol from Plant to Consumer	$0	$121,074	$302,684	$302,684	$302,684	$302,684	$302,684	$302,684	$302,684
CO_2 from Plant to Consumer	$0	$0	$0	$0	$0	$0	$0	$0	$0
Feedstock from Farm to Plant	$0	$200,633	$392,748	$392,748	$392,748	$392,748	$392,748	$392,748	$392,748
DDGS from Plant to Farm	$0	$51,560	$129,046	$129,046	$129,046	$129,046	$129,046	$129,046	$129,046
Total Yearly Transport Costs	$0	$373,268	$824,478	$824,478	$824,478	$824,478	$824,478	$824,478	$824,478

Figure H-10, Evans Mills Pro Forma, Summary of Transportation Costs

APPENDIX I

Griffiss Base Pro Forma

	Equipment Cost	Total Cost
Site and Buildings	$450,000	$450,000
Fruit Waste Storage	$60,222	$96,355
Milling	$289,909	$585,616
Preparation/Mashing	$964,611	$2,286,128
Fermentation	$2,635,516	$5,560,939
Distillation	$1,966,486	$4,876,885
MS Dehydration	$1,500,000	$2,325,000
Evaporation	$1,914,176	$4,364,321
Decanting	$1,647,583	$3,229,263
DDGS Drying	$2,703,121	$4,730,462
CIP and Chemicals	$275,745	$700,392
Grain Storage	$250,000	$525,000
Alcohol Storage and Loading	$719,156	$1,402,354
DDGS Storage and Loading	$316,775	$586,034
DCS Computer	$250,000	$500,000
Cooling Tower	$300,000	$600,000
Boiler and BFW	$0	$0
Instrument and Plant Air	$150,000	$315,000
Waste Water Treatment	$1,200,000	$3,000,000
Direct Field Cost		$36,133,749
Start-up, Testing & Training		Excluded
Temporary Facilities		Included Above
Construction Equipment, Tools, Supplies		Included Above
Field Staff and Legalities		Included Above
Indirect Field Cost		$0
Total Field Cost		$36,133,749
Engineering		$870,000
Total Field and Home Office		$37,003,749
Taxes		$0
Insurance		Included Above
Permits		Included Above
Craft Causal Overtime		Included Above
Contingency		$3,613,375
Escalation		$0
Subtotal		$40,617,124
Detailed Engineering and Construction		$4,336,050
Total		$44,953,174

Figure I-1, Griffiss Pro Forma, Capital and Site Review

			Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Long-term debt											
		Debt Balance:	$17,784,273	$34,613,944	$34,613,944	$31,007,926	$26,208,315	$19,820,033	$11,317,231	$0	$0
A	Amortize	Interest Rate above inflation(%):	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Term (Years):	15	Interest Pmt:	$851,606	$2,836,560	$3,461,394	$3,100,793	$2,620,832	$1,982,003	$1,131,723	$0	$0
Cost of Capital and Site Work:	$44,953,174	Principal Pmt:	($851,606)	$0	$1,089,432	$1,450,033	$1,929,994	$2,568,823	$3,419,103	($0)	($0)
Up-Front Payment:	$14,834,547	Additional Principal Pmt:									
Working Capital	$4,495,317	**Sub-Total Payment:**	$0	$2,836,560	$4,550,826	$4,550,826	$4,550,826	$4,550,826	$4,550,826	$0	$0
Original Balance:	$34,613,944	**Amoritization of Loan Fees:**	$46,152	$46,152	$46,152	$46,152	$46,152	$46,152	$46,152	$0	$0
Balloon Pmt:	$0	**Total Payment:**	$46,152	$2,882,712	$4,596,978	$4,596,978	$4,596,978	$4,596,978	$4,596,978	$0	$0
			into depr. Exp.								
Debt / Equity Ratio:	2.33										
Long-term debt Summary											
		Opening Balance:	$17,784,273	$34,613,944	$34,613,944	$31,007,926	$26,208,315	$19,820,033	$11,317,231	$0	$0
		Total Interest Pmts:	$851,606	$2,836,560	$3,461,394	$3,100,793	$2,620,832	$1,982,003	$1,131,723	$0	$0
		Total Principal Pmts:	-$851,606	$0	$1,089,432	$1,450,033	$1,929,994	$2,568,823	$3,419,103	($0)	($0)
		Additional Principal Pmts:	$0	$0	$0	$0	$0	$0	$0	$0	$0
		Total Payments:	$0	$2,836,560	$4,550,826	$4,550,826	$4,550,826	$4,550,826	$4,550,826	$0	$0
		Closing Balance:	$18,635,879	$34,613,944	$33,524,512	$29,557,892	$24,278,321	$17,251,211	$7,898,128	$0	$0
		Avg Annualized Rate Pd.:	4.79%	8.19%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Effect of Depreciation											
Total Value of Depreciation:	$46,797,233										
Depreciation based on:	15	year straightline method									
Plant and Equipment Value at start of year			$18,635,879	$34,613,944	$43,677,417	$34,317,971	$24,958,524	$15,599,078	$6,239,631	$0	$0
Less Accumulated Depreciation:			$0	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$0	$0
Plant and Equipment Value After Year:			$18,635,879	$31,494,128	$40,557,602	$31,198,155	$21,838,709	$12,479,262	$3,119,816	$0	$0
Start-up Expenses											
		Debt Balance:	$0	$2,196,680	$1,757,344	$439,336	$0	$0	$0	$0	$0
		Interest Rate above inflation(%):	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Years to Pay-off	5	Interest Pmt:	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cost of Startup:	$2,196,680	Principal Pmt:	$0	$439,336	$439,336	$439,336	$0	$0	$0	$0	$0
Interest Rate (above Inflation) used:	0.00%	Additional Principal Pmt:									
		Sub-Total Payment:	$0	$439,336	$439,336	$439,336	$0	$0	$0	$0	$0
		Amoritization of Loan Fees:	$0	$0	$0	$0	$0	$0	$0	$0	$0
		Total Payment:	$0	$439,336	$439,336	$439,336	$0	$0	$0	$0	$0
Conversion to Baseline Year Dollars											
		Discount Factor:	1.00	1.00	1.00	0.94	0.89	0.84	0.79	0.74	0.69
		Depreciation in Current-Year Dollars:	$0	$3,119,816	$3,119,816	$2,939,872	$2,770,307	$2,610,522	$2,459,953	$0	$0
		Interest Payment in Current-Year Dollars:	$851,606	$2,836,560	$3,461,394	$2,921,946	$2,327,223	$1,658,452	$892,356	$0	$0
		Amoritization of Loan Fees:	$46,152	$46,152	$46,152	$43,490	$40,982	$38,618	$36,390	$0	$0
		Principal in Current Dollars:	-$851,606	$0	$1,089,432	$1,366,399	$1,713,780	$2,149,476	$2,695,939	$0	$0
		Total Loan Payment in Current-Year Dollars:	$46,152	$2,882,712	$4,596,978	$4,331,835	$4,081,985	$3,846,545	$3,624,686	$0	$0
		Start-up Expenses in Actual-Year Dollars:	$0	$439,336	$439,336	$439,336	$0	$0	$0	$0	$0
		Start-up Expenses in Baseline-Year Dollars:	$0	$439,336	$439,336	$413,996	$0	$0	$0	$0	$0

Figure I-2, Griffiss Pro Forma, Debt Schedule

	Amount	Unit	Cost	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Feedstock												
Corn	640,937,954	pounds/year	$0.04	$0	$13,739,936	$26,896,503	$26,896,503	$26,896,503	$26,896,503	$26,896,503	$26,896,503	$26,896,503
Fruit Waste	4,778,378	pounds/year	-$0.03	$0	-$61,026	($119,459)	($119,459)	($119,459)	($119,459)	($119,459)	($119,459)	($119,459)
Operating Chemicals												
Alpha-amylase	508,810	pounds/year	$1.10	$0	$279,846	$559,691	$559,691	$559,691	$559,691	$559,691	$559,691	$559,691
Gluco-amylase	157,034	pounds/year	$3.70	$0	$290,513	$581,026	$581,026	$581,026	$581,026	$581,026	$581,026	$581,026
Sulfuric Acid	0	pounds/year	$0.04	$0	$0	$0	$0	$0	$0	$0	$0	$0
Caustic Soda	3,108,000	pounds/year	$0.15	$0	$233,100	$466,200	$466,200	$466,200	$466,200	$466,200	$466,200	$466,200
Ammonia	1,428,000	pounds/year	$0.13	$0	$92,820	$185,640	$185,640	$185,640	$185,640	$185,640	$185,640	$185,640
Nutrients	0	pounds/year	$0.12	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ammonium Sulfate	672,000	pounds/year	$0.07	$0	$22,176	$44,352	$44,352	$44,352	$44,352	$44,352	$44,352	$44,352
Antifoam	0	pounds/year	$0.25	$0	$0	$0	$0	$0	$0	$0	$0	$0
Gasoline	10,053,353	pounds/year	$0.10	$0	$489,278	$978,555	$978,555	$978,555	$978,555	$978,555	$978,555	$978,555
Diesel	0	pounds/year	$0.06	$0	$0	$0	$0	$0	$0	$0	$0	$0
BFW Chemicals	0	pounds/year	$0.97	$0	$0	$0	$0	$0	$0	$0	$0	$0
CW Chemicals	50,400	pounds/year	$1.00	$0	$25,200	$50,400	$50,400	$50,400	$50,400	$50,400	$50,400	$50,400
WWT Nutrients	0	pounds/year	$0.11	$0	$0	$0	$0	$0	$0	$0	$0	$0
WWT Chemicals	0	pounds/year	$2.50	$0	$0	$0	$0	$0	$0	$0	$0	$0
Process Water												
Make-up Water	291,341	pounds/hour	$0.00	$0	$94,012	$188,025	$188,025	$188,025	$188,025	$188,025	$188,025	$188,025
Steam												
Steam	165,708	pounds/hour	$0.01	$0	$3,932,251	$7,864,502	$7,864,502	$7,864,502	$7,864,502	$7,864,502	$7,864,502	$7,864,502
Natural Gas												
Natural Gas	0	therms/hr	$0.00	$0	$0	$0	$0	$0	$0	$0	$0	$0
Disposal Costs												
Landfill	0	pounds/hr	$0.00	$0	$0	$0	$0	$0	$0	$0	$0	$0
Electricity												
Electric				$0	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600
Waste Water Treatment												
WWT				$0	$150,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000
Maintenance Materials												
Maintenance				$0	$295,745	$674,298	$674,298	$674,298	$674,298	$674,298	$674,298	$674,298
Miscellaneous Incedentals												
Miscellaneous				$0	$217,706	$217,706	$217,706	$217,706	$217,706	$217,706	$217,706	$217,706
Total Cost				**$0**	**$22,331,156**	**$41,417,038**	**$41,417,038**	**$41,417,038**	**$41,417,038**	**$41,417,038**	**$41,417,038**	**$41,417,038**
Adjusted Total Cost				**$0**	**$22,331,156**	**$41,417,038**	**$41,417,038**	**$41,417,038**	**$41,417,038**	**$41,417,038**	**$41,417,038**	**$41,417,038**

Figure I-3, Griffiss Pro Forma, Annual Materials Costs

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Production									
Number of Employees:	2.8	27.8	36	36	36	36	36	36	36
Avg. Salary/Wage per Employee:	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889
Employer Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Employer Contribution ($):	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967
Per Employee Total:	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856
Production Salary/Wage Total:	$83,928	$829,596	$1,076,000	$1,076,000	$1,076,000	$1,076,000	$1,076,000	$1,076,000	$1,076,000
Employer Contribution Total:	$25,178	$248,879	$322,800	$322,800	$322,800	$322,800	$322,800	$322,800	$322,800
Department Total:	$109,106	$1,078,475	$1,398,800	$1,398,800	$1,398,800	$1,398,800	$1,398,800	$1,398,800	$1,398,800
General & Administrative									
Number of Employees:	6.2	6.8	7	7	7	7	7	7	7
Avg. Salary/Wage per Employee:	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286
Employer Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Employer Contribution ($):	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786
Per Employee Total:	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071
General & Administrative	$303,600	$336,375	$345,000	$345,000	$345,000	$345,000	$345,000	$345,000	$345,000
Employer Contribution Total:	$91,080	$100,913	$103,500	$103,500	$103,500	$103,500	$103,500	$103,500	$103,500
Department Total:	$394,680	$437,288	$448,500	$448,500	$448,500	$448,500	$448,500	$448,500	$448,500
All Employees									
Total Number of Employees:	9	35	43	43	43	43	43	43	43
Avg. Salary/Wage per Employee:	$43,212	$33,717	$33,047	$33,047	$33,047	$33,047	$33,047	$33,047	$33,047
Avg. per Employee Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Avg. per Employee Contribution ($):	$12,964	$10,115	$9,914	$9,914	$9,914	$9,914	$9,914	$9,914	$9,914
Total Salary/Wage Expense:	$387,528	$1,165,971	$1,421,000	$1,421,000	$1,421,000	$1,421,000	$1,421,000	$1,421,000	$1,421,000
Total Employer Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Total Employer Contribution ($):	$116,258	$349,791	$426,300	$426,300	$426,300	$426,300	$426,300	$426,300	$426,300
Total Employee Expense:	**$503,786**	**$1,515,762**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**
Attributed to Start-up Costs:	**$503,786**	**$365,909**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Employee Salary and Benefits:	**$0**	**$1,149,853**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**

Figure I-4, Griffiss Pro Forma, Employee Forecast

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Taxable income in actual year dollars	($46,152)	($10,690,723)	($3,127,210)	($2,525,480)	($1,350,296)	($439,918)	$698,532	$5,302,032	$5,739,090
Cumulative taxable income	($46,152)	($10,736,875)	($13,864,085)	($22,068,317)	($26,888,882)	($29,163,129)	($28,263,732)	($16,990,823)	$5,299,131
Discount Factor	1.00	1.00	1.00	0.94	0.89	0.84	0.79	0.74	0.69
Federal Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$1,273,120
State Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sales Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
Property Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
Incentives	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Tax Burden	$0	$0	$0	$0	$0	$0	$0	$0	$1,273,120
Jobs Created	9	35	43	43	43	43	43	43	43
Multiplier Jobs	11	41	52	52	52	52	52	52	52
On-Farm Jobs	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
State/Local Job Impact	$570	$1,715	$2,091	$2,091	$2,091	$2,091	$2,091	$2,091	$2,091
Total Impact Value	$11,248	$130,499	$197,762	$197,762	$197,762	$197,762	$197,762	$197,762	$1,470,883

Figure I-5, Griffiss Pro Forma, Tax Impacts

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Alcohol	$0	$15,016,580	$36,315,789	$36,315,789	$36,315,789	$36,315,789	$36,315,789	$36,315,789	$36,315,789
Electricity	$0	$0	$0	$0	$0	$0	$0	$0	$0
CO_2 Sales	$0	$354,555	$857,464	$857,464	$857,464	$857,464	$857,464	$857,464	$857,464
DDGS	$0	$4,355,500	$10,525,057	$10,525,057	$10,525,057	$10,525,057	$10,525,057	$10,525,057	$10,525,057
Total Gross Revenues	**$0**	**$19,726,635**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**
Returns/Allowances (%)	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Adjusted Revenues	**$0**	**$19,726,635**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**
Cost of alcohol after producer credit:	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150

Figure I-6, Griffiss Pro Forma, Revenue Forecast

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Income/Expenses in Baseline Year Dollars									
Total Income									
Sales of Ethanol and Co-Products	$0	$19,726,635	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310
Total	$0	$19,726,635	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310
Total Expenses									
Feedstock	$0	$13,678,910	$26,777,044	$26,777,044	$26,777,044	$26,777,044	$26,777,044	$26,777,044	$26,777,044
Operating Chemicals	$0	$1,432,932	$2,865,864	$2,865,864	$2,865,864	$2,865,864	$2,865,864	$2,865,864	$2,865,864
Process Water	$0	$94,012	$188,025	$188,025	$188,025	$188,025	$188,025	$188,025	$188,025
Natural Gas	$0	$0	$0	$0	$0	$0	$0	$0	$0
Disposal Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Water Treatment	$0	$150,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000
Electricity	$0	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600
Steam	$0	$3,932,251	$7,864,502	$7,864,502	$7,864,502	$7,864,502	$7,864,502	$7,864,502	$7,864,502
Maintenance	$0	$295,745	$674,298	$674,298	$674,298	$674,298	$674,298	$674,298	$674,298
Miscellaneous Incidentals	$0	$217,706	$217,706	$217,706	$217,706	$217,706	$217,706	$217,706	$217,706
Salaries / Wages	$0	$1,149,853	$1,847,300	$1,847,300	$1,847,300	$1,847,300	$1,847,300	$1,847,300	$1,847,300
Depreciation	$0	$3,119,816	$3,119,816	$2,939,872	$2,770,307	$2,610,522	$2,459,953	$0	$0
Interest Expense	$0	$2,836,560	$3,461,394	$2,921,946	$2,327,223	$1,658,452	$892,356	$0	$0
Amoritization of Loan Fees	$46,152	$46,152	$46,152	$43,490	$40,982	$38,618	$36,390	$0	$0
Insurance	$0	$494,485	$494,485	$494,485	$494,485	$494,485	$494,485	$494,485	$494,485
Amoritization of Start-up Expenses	$0	$439,336	$439,336	$413,996	$0	$0	$0	$0	$0
Total	$46,152	$30,417,358	$50,825,520	$50,078,126	$48,897,334	$48,066,414	$47,147,522	$43,758,822	$43,758,822
Pre-Tax Profit	($46,152)	($10,690,723)	($3,127,210)	($2,379,816)	($1,199,024)	($368,104)	$550,788	$3,939,488	$3,939,488
Income Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$1,273,120
State Tax, Sales Tax, Property Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0
Profit After Taxes	($46,152)	($10,690,723)	($3,127,210)	($2,379,816)	($1,199,024)	($368,104)	$550,788	$3,939,488	$2,666,367

Figure I-7, Griffiss Pro Forma, Income Statement (page 1 of 3)

Income/Expenses in Actual Year Dollars	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Discount Factor:	1.00	1.00	1.00	0.94	0.89	0.84	0.79	0.74	0.69
Total Income									
Sales of Ethanol and Co-Products	$0	$19,726,635	$47,698,310	$50,617,828	$53,716,044	$57,003,896	$60,492,990	$64,195,645	$69,487,431
Total	$0	$19,726,635	$47,698,310	$50,617,828	$53,716,044	$57,003,896	$60,492,990	$64,195,645	$69,487,431
Total Expenses									
Feedstock	$0	$13,678,910	$26,777,044	$28,416,013	$30,155,300	$32,001,046	$33,959,766	$36,038,375	$39,009,096
Operating Chemicals	$0	$1,432,932	$2,865,864	$3,041,278	$3,227,428	$3,424,973	$3,634,608	$3,857,076	$4,175,023
Process Water	$0	$94,012	$188,025	$199,533	$211,746	$224,707	$238,461	$253,056	$273,916
Natural Gas	$0	$0	$0	$0	$0	$0	$0	$0	$0
Disposal Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Water Treatment	$0	$150,000	$300,000	$318,362	$337,849	$358,528	$380,473	$403,761	$437,043
Electricity	$0	$2,529,600	$2,529,600	$2,684,432	$2,848,740	$3,023,106	$3,208,144	$3,404,509	$3,685,150
Steam	$0	$3,932,251	$7,864,502	$8,345,872	$8,856,706	$9,398,808	$9,974,090	$10,584,584	$11,457,094
Maintenance	$0	$295,745	$674,298	$715,570	$759,369	$805,849	$855,173	$907,516	$982,325
Miscellaneous Incidentals	$0	$217,706	$217,706	$231,031	$245,172	$260,179	$276,104	$293,004	$317,157
Salaries/Wages	$0	$1,149,853	$1,847,300	$1,960,369	$2,080,359	$2,207,694	$2,342,823	$2,486,222	$2,691,167
Depreciation	$0	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$0	$0
Interest Expense	$0	$2,836,560	$3,461,394	$3,100,793	$2,620,832	$1,982,003	$1,131,723	$0	$0
Amoritization of Loan Fees	$46,152	$46,152	$46,152	$46,152	$46,152	$46,152	$46,152	$0	$0
Insurance	$0	$494,485	$494,485	$524,751	$556,870	$590,955	$627,127	$665,512	$720,371
Amoritization of Start-up Expenses	$0	$439,336	$439,336	$439,336	$0	$0	$0	$0	$0
Total	$46,152	$30,417,358	$50,825,520	$53,143,308	$55,066,340	$57,443,814	$59,794,458	$58,893,614	$63,748,341
Pre-Tax Profit	($46,152)	($10,690,723)	($3,127,210)	($2,525,480)	($1,350,296)	($439,918)	$698,532	$5,302,032	$5,739,090
Income Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$1,854,696
State Tax, Sales Tax, Property Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0
Profit After Taxes	($46,152)	($10,690,723)	($3,127,210)	($2,525,480)	($1,350,296)	($439,918)	$698,532	$5,302,032	$3,884,394

Figure I-8, Griffiss Pro Forma, Income Statement (page 2 of 3)

Value of Assets at Year End in Individual Year $	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Fixed Assets									
Plant and Equipment	$18,635,879	$34,613,944	$43,677,417	$34,317,971	$24,958,524	$15,599,078	$6,239,631	$0	$0
Less Accumulated Depreciation	$0	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$3,119,816	$0	$0
Other	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Long-term Assets	$18,635,879	$31,494,128	$40,557,602	$31,198,155	$21,838,709	$12,479,262	$3,119,816	$0	$0
Net Present Value Analysis									
Discount Factor = 1 (all data above is already discounted)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adjusted Total Profit	(46,151.93)	(10,690,722.69)	(3,127,210.23)	(2,379,816.43)	(1,199,024.25)	(368,104.05)	550,787.98	3,939,487.63	2,666,367.27
Adjusted Value of Profit minus Debt Payment	0.00	(4,688,195.23)	3,500,151.63	3,525,491.50	3,939,487.63	3,939,487.63	3,939,487.63	3,939,487.63	2,666,367.27
Adjusted Value of Capital Investment plus Interest	0.00	2,836,560.00	4,550,825.95	4,550,825.95	4,550,825.95	4,550,825.95	4,550,825.95	0.00	0.00

Present Value (PV) of Profit	($4,407,987)
PV of Capital Investment	$49,448,491
PV of Profit minus Debt Payment	$71,122,107
PV of Capital Investment Plus Interest	$71,098,949
Baseline Cost per Gallon of Ethanol	$1.15

First-Year Cost-per-Gallon Analysis

Expense Category	Year-One Cost	Cost per Gallon
Feedstock	$26,777,044	$0.832
Operating Chemicals	$2,865,864	$0.089
Process Water	$188,025	$0.006
Natural Gas	$0	$0.000
Disposal Costs	$0	$0.000
Maintenance Materials	$674,298	$0.021
Miscellaneous Incidentals	$217,706	$0.007
Salaries/Wages	$1,847,300	$0.057
Depreciation	$3,119,816	$0.097
Interest Expense	$3,461,394	$0.108
Amoritization of Loan Fees	$46,152	$0.001
Insurance	$494,485	$0.015
Amoritization of Start-up Expenses	$439,336	$0.014
Profit	(3,127,210.23)	(0.10)
Total	$37,004,208	$1.150

Figure I-9, Griffiss Pro Forma, Income Statement (page 3 of 3)

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Cost of transport									
Ethanol from Plant to Consumer	$0	$726,442	$1,816,106	$1,816,106	$1,816,106	$1,816,106	$1,816,106	$1,816,106	$1,816,106
CO_2 from Plant to Consumer	$0	$0	$0	$0	$0	$0	$0	$0	$0
Feedstock from Farm to Plant	$0	$1,203,268	$2,355,447	$2,355,447	$2,355,447	$2,355,447	$2,355,447	$2,355,447	$2,355,447
DDGS from Plant to Farm	$0	$320,129	$773,592	$773,592	$773,592	$773,592	$773,592	$773,592	$773,592
Total Yearly Transport Costs	$0	$2,249,839	$4,945,145	$4,945,145	$4,945,145	$4,945,145	$4,945,145	$4,945,145	$4,945,145

Figure I-10, Griffiss Pro Forma, Summary of Transportation Costs

APPENDIX J

Griffiss Alternate Pro Forma

	Equipment Cost	Total Cost
Site and Buildings	$450,000	$450,000
Fruit Waste Storage	$60,222	$96,355
Milling	$289,909	$585,616
Preparation/Mashing	$964,611	$2,286,128
Fermentation	$2,635,516	$5,560,939
Distillation	$1,966,486	$4,876,885
MS Dehydration	$1,500,000	$2,325,000
Evaporation	$1,914,176	$4,364,321
Decanting	$1,647,583	$3,229,263
DDGS Drying	$2,703,121	$4,730,462
CIP and Chemicals	$275,745	$700,392
Grain Storage	$250,000	$525,000
Alcohol Storage and Loading	$719,156	$1,402,354
DDGS Storage and Loading	$316,775	$586,034
DCS Computer	$250,000	$500,000
Cooling Tower	$300,000	$600,000
Boiler and BFW	$1,500,000	$3,220,800
Instrument and Plant Air	$150,000	$315,000
Direct Field Cost		$39,354,549
Start-up, Testing & Training		Excluded
Temporary Facilities		Included Above
Construction Equipment, Tools, Supplies		Included Above
Field Staff and Legalities		Included Above
Indirect Field Cost		$0
Total Field Cost		$39,354,549
Engineering		$870,000
Total Field and Home Office		$40,224,549
Taxes		$0
Insurance		Included Above
Permits		Included Above
Craft Causal Overtime		Included Above
Contingency		$3,613,375
Escalation		$0
Substotal		$43,837,924
Detailed Engineering and Construction		$4,336,050
Total		$48,173,974

FigureJ-1, Griffiss Alternate Pro Forma, Capital and Site Review

			Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Long-term debt											
		Debt Balance:	$17,784,273	$34,613,944	$37,093,960	$33,229,578	$28,086,085	$21,240,097	$12,128,086	$0	$0
A	Amortize	Interest Rate above inflation(%):	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Term (Years):	15	Interest Pmt:	$851,606	$3,025,952	$3,709,396	$3,322,958	$2,808,609	$2,124,010	$1,212,809	$0	$0
Cost of Capital and Site Work:	$48,173,974	Principal Pmt:	($851,606)	$0	$1,167,487	$1,553,925	$2,068,274	$2,752,873	$3,664,074	($0)	($0)
Up-Front Payment:	$15,897,411	Additional Principal Pmt:									
Working Capital	$4,817,397	**Sub-Total Payment:**	$0	$3,025,952	$4,876,883	$4,876,883	$4,876,883	$4,876,883	$4,876,883	$0	$0
Original Balance:	$37,093,960	**Amoritization of Loan Fees:**	$49,459	$49,459	$49,459	$49,459	$49,459	$49,459	$49,459	$0	$0
Balloon Pmt:	$0	**Total Payment:**	$49,459	$3,075,411	$4,926,342	$4,926,342	$4,926,342	$4,926,342	$4,926,342	$0	$0
			into depr. Exp.								
Debt/Equity Ratio:	2.33										
Long-term debt Summary											
		Opening Balance:	$17,784,273	$34,613,944	$37,093,960	$33,229,578	$28,086,085	$21,240,097	$12,128,086	$0	$0
		Total Interest Pmts:	$851,606	$3,025,952	$3,709,396	$3,322,958	$2,808,609	$2,124,010	$1,212,809	$0	$0
		Total Principal Pmts:	-$851,606	$0	$1,167,487	$1,553,925	$2,068,274	$2,752,873	$3,664,074	($0)	($0)
		Additional Principal Pmts:	$0	$0	$0	$0	$0	$0	$0	$0	$0
		Total Payments:	$0	$3,025,952	$4,876,883	$4,876,883	$4,876,883	$4,876,883	$4,876,883	$0	$0
		Closing Balance:	$18,635,879	$34,613,944	$35,926,473	$31,675,653	$26,017,811	$18,487,224	$8,464,012	$0	$0
		Avg Annualized Rate Pd.:	4.79%	8.74%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Effect of Depreciation											
Total Value of Depreciation:	$50,140,665										
Depreciation based on:	15	year straightline method									
Plant and Equipment Value at start of year			$18,635,879	$34,613,944	$46,797,954	$36,769,821	$26,741,688	$16,713,555	$6,685,422	$0	$0
Less Accumulated Depreciation:			$0	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$0	$0
Plant and Equipment Value After Year:			$18,635,879	$31,271,233	$43,455,243	$33,427,110	$23,398,977	$13,370,844	$3,342,711	$0	$0
Start-up Expenses											
		Debt Balance:	$0	$2,231,255	$1,785,004	$446,251	$0	$0	$0	$0	$0
		Interest Rate above inflation(%):	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Years to Pay-off	5	Interest Pmt:	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cost of Startup:	$2,231,255	Principal Pmt:	$0	$446,251	$446,251	$446,251	$0	$0	$0	$0	$0
Interest Rate (above Inflation) used:	0.00%	Additional Principal Pmt:									
		Sub-Total Payment:	$0	$446,251	$446,251	$446,251	$0	$0	$0	$0	$0
		Amoritization of Loan Fees:	$0	$0	$0	$0	$0	$0	$0	$0	$0
		Total Payment:	$0	$446,251	$446,251	$446,251	$0	$0	$0	$0	$0
Conversion to Baseline Year Dollars											
		Discount Factor:	1.00	1.00	1.00	0.94	0.89	0.84	0.79	0.74	0.69
		Depreciation in Current-Year Dollars:	$0	$3,342,711	$3,342,711	$3,149,911	$2,968,232	$2,797,031	$2,635,705	$0	$0
		Interest Payment in Current-Year Dollars:	$851,606	$3,025,952	$3,709,396	$3,131,297	$2,493,964	$1,777,276	$956,291	$0	$0
		Amoritization of Loan Fees:	$49,459	$49,459	$49,459	$46,606	$43,918	$41,385	$38,998	$0	$0
		Principal in Current Dollars:	-$851,606	$0	$1,167,487	$1,464,298	$1,836,569	$2,303,481	$2,889,098	$0	$0
		Total Loan Payment in Current-Year Dollars:	$49,459	$3,075,411	$4,926,342	$4,642,202	$4,374,450	$4,122,142	$3,884,387	$0	$0
		Start-up Expenses in Actual-Year Dollars:	$0	$446,251	$446,251	$446,251	$0	$0	$0	$0	$0
		Start-up Expenses in Baseline-Year Dollars:	$0	$446,251	$446,251	$420,512	$0	$0	$0	$0	$0

Figure J-2, Griffiss Alternate Pro Forma, Debt Schedule

	Amount	Unit	Cost	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Feedstock												
Corn	#########	pounds/year	$0.04	$0	$13,739,936	$26,896,503	$26,896,503	$26,896,503	$26,896,503	$26,896,503	$26,896,503	$26,896,503
Fruit Waste	4,778,378	pounds/year	-$0.03	$0	-$61,026	($119,459)	($119,459)	($119,459)	($119,459)	($119,459)	($119,459)	($119,459)
Operating Chemicals												
Alpha-amylase	508,810	pounds/year	$1.10	$0	$279,846	$559,691	$559,691	$559,691	$559,691	$559,691	$559,691	$559,691
Gluco-amylase	157,034	pounds/year	$3.70	$0	$290,513	$581,026	$581,026	$581,026	$581,026	$581,026	$581,026	$581,026
Sulfuric Acid	0	pounds/year	$0.04	$0	$0	$0	$0	$0	$0	$0	$0	$0
Caustic Soda	3,108,000	pounds/year	$0.15	$0	$233,100	$466,200	$466,200	$466,200	$466,200	$466,200	$466,200	$466,200
Ammonia	1,428,000	pounds/year	$0.13	$0	$92,820	$185,640	$185,640	$185,640	$185,640	$185,640	$185,640	$185,640
Nutrients	0	pounds/year	$0.12	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ammonium Sulfate	672,000	pounds/year	$0.07	$0	$22,176	$44,352	$44,352	$44,352	$44,352	$44,352	$44,352	$44,352
Antifoam	0	pounds/year	$0.25	$0	$0	$0	$0	$0	$0	$0	$0	$0
Gasoline	10,053,353	pounds/year	$0.10	$0	$489,278	$978,555	$978,555	$978,555	$978,555	$978,555	$978,555	$978,555
Diesel	0	pounds/year	$0.06	$0	$0	$0	$0	$0	$0	$0	$0	$0
BFW Chemicals	4,704	pounds/year	$0.97	$0	$2,281	$4,563	$4,563	$4,563	$4,563	$4,563	$4,563	$4,563
CW Chemicals	50,400	pounds/year	$1.00	$0	$25,200	$50,400	$50,400	$50,400	$50,400	$50,400	$50,400	$50,400
WWT Nutrients	0	pounds/year	$0.11	$0	$0	$0	$0	$0	$0	$0	$0	$0
WWT Chemicals	0	pounds/year	$2.50	$0	$0	$0	$0	$0	$0	$0	$0	$0
Process Water												
Make-up Water	322,817	pounds/hour	$0.00	$0	$104,169	$208,338	$208,338	$208,338	$208,338	$208,338	$208,338	$208,338
Steam												
Steam	0	pounds/hour	$0.01	$0	$0	$0	$0	$0	$0	$0	$0	$0
Natural Gas												
Natural Gas	196	mcf/hr	$3.20	$0	$2,640,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000
Disposal Costs												
Landfill	0	pounds/hr	$0.00	$0	$0	$0	$0	$0	$0	$0	$0	$0
Electricity												
Electric				$0	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600
Waste Water Treatment												
WWT				$0	$150,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000
Maintenance Materials												
Maintenance				$0	$316,935	$722,610	$722,610	$722,610	$722,610	$722,610	$722,610	$722,610
Miscellaneous Incidentals												
Miscellaneous				$0	$205,326	$205,326	$205,326	$205,326	$205,326	$205,326	$205,326	$205,326
Total Cost				**$0**	**$21,060,154**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**
Adjusted Total Cost				**$0**	**$21,060,154**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**

Figure J-3, Griffiss Alternate Pro Forma, Annual Materials Costs

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Production									
Number of Employees:	2.8	27.8	36	36	36	36	36	36	36
Avg. Salary/Wage per Employee:	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889
Employer Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Employer Contribution ($):	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967
Per Employee Total:	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856
Production Salary/Wage Total:	$83,928	$829,596	$1,076,000	$1,076,000	$1,076,000	$1,076,000	$1,076,000	$1,076,000	$1,076,000
Employer Contribution Total:	$25,178	$248,879	$322,800	$322,800	$322,800	$322,800	$322,800	$322,800	$322,800
Department Total:	$109,106	$1,078,475	$1,398,800	$1,398,800	$1,398,800	$1,398,800	$1,398,800	$1,398,800	$1,398,800
General & Administrative									
Number of Employees:	6.2	6.8	7	7	7	7	7	7	7
Avg. Salary/Wage per Employee:	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286
Employer Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Employer Contribution ($):	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786
Per Employee Total:	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071
General & Administrative	$303,600	$336,375	$345,000	$345,000	$345,000	$345,000	$345,000	$345,000	$345,000
Employer Contribution Total:	$91,080	$100,913	$103,500	$103,500	$103,500	$103,500	$103,500	$103,500	$103,500
Department Total:	$394,680	$437,288	$448,500	$448,500	$448,500	$448,500	$448,500	$448,500	$448,500
All Employees									
Total Number of Employees:	9	35	43	43	43	43	43	43	43
Avg. Salary/Wage per Employee:	$43,212	$33,717	$33,047	$33,047	$33,047	$33,047	$33,047	$33,047	$33,047
Avg. per Employee Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Avg. per Employee Contribution ($):	$12,964	$10,115	$9,914	$9,914	$9,914	$9,914	$9,914	$9,914	$9,914
Total Salary/Wage Expense:	$387,528	$1,165,971	$1,421,000	$1,421,000	$1,421,000	$1,421,000	$1,421,000	$1,421,000	$1,421,000
Total Employer Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Total Employer Contribution ($):	$116,258	$349,791	$426,300	$426,300	$426,300	$426,300	$426,300	$426,300	$426,300
Total Employee Expense:	**$503,786**	**$1,515,762**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**
Attributed to Start-up Costs:	**$503,786**	**$365,909**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Employee Salary and Benefits:	**$0**	**$1,149,853**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**

Figure J-4, Griffiss Alternate Pro Forma, Employee Forecast

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Taxable income in actual year dollars	($49,459)	($9,877,658)	($1,120,065)	($340,197)	$1,037,914	$2,165,579	$3,546,965	$8,650,907	$9,364,020
Cumulative taxable income	($49,459)	($9,927,117)	($11,047,182)	($12,877,352)	($10,733,613)	($5,413,824)	$3,781,667	$24,596,373	$60,965,135
Discount Factor	1.00	1.00	1.00	0.94	0.89	0.84	0.79	0.74	0.69
Federal Taxes	$0	$0	$0	$0	$0	$0	$978,865	$2,249,713	$2,249,713
State Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sales Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
Property Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
Incentives	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Tax Burden	$0	$0	$0	$0	$0	$0	$978,865	$2,249,713	$2,249,713
Jobs Created	9	35	43	43	43	43	43	43	43
Multiplier Jobs	11	41	52	52	52	52	52	52	52
On-Farm Jobs	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
State/Local Job Impact	$570	$1,715	$2,091	$2,091	$2,091	$2,091	$2,091	$2,091	$2,091
Total Impact Value	$11,248	$130,499	$197,762	$197,762	$197,762	$197,762	$1,176,627	$2,447,475	$2,447,475

Figure J-5, Griffiss Alternate Pro Forma, Tax Impacts

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Alcohol	$0	$15,016,580	$36,315,789	$36,315,789	$36,315,789	$36,315,789	$36,315,789	$36,315,789	$36,315,789
Electricity	$0	$0	$0	$0	$0	$0	$0	$0	$0
CO_2 Sales	$0	$354,555	$857,464	$857,464	$857,464	$857,464	$857,464	$857,464	$857,464
DDGS	$0	$4,355,500	$10,525,057	$10,525,057	$10,525,057	$10,525,057	$10,525,057	$10,525,057	$10,525,057
Total Gross Revenues	**$0**	**$19,726,635**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**
Returns/Allowances (%)	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Adjusted Revenues	**$0**	**$19,726,635**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**
Cost of alcohol after producer credit:	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150

Figure J-6, Griffiss Alternate Pro Forma, Revenue Forecast

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Income/Expenses In Baseline Year Dollars									
Total Income									
Sales of Ethanol and Co-Products	$0	$19,726,635	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310
Total	$0	$19,726,635	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310
Total Expenses									
Feedstock	$0	$13,678,910	$26,777,044	$26,777,044	$26,777,044	$26,777,044	$26,777,044	$26,777,044	$26,777,044
Operating Chemicals	$0	$1,435,213	$2,870,427	$2,870,427	$2,870,427	$2,870,427	$2,870,427	$2,870,427	$2,870,427
Process Water	$0	$104,169	$208,338	$208,338	$208,338	$208,338	$208,338	$208,338	$208,338
Natural Gas	$0	$2,640,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000
Disposal Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Water Treatment	$0	$150,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000
Electricity	$0	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600
Steam	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maintenance	$0	$316,935	$722,610	$722,610	$722,610	$722,610	$722,610	$722,610	$722,610
Miscellaneous Incidentals	$0	$205,326	$205,326	$205,326	$205,326	$205,326	$205,326	$205,326	$205,326
Salaries / Wages	$0	$1,149,853	$1,847,300	$1,847,300	$1,847,300	$1,847,300	$1,847,300	$1,847,300	$1,847,300
Depreciation	$0	$3,342,711	$3,342,711	$3,149,911	$2,968,232	$2,797,031	$2,635,705	$0	$0
Interest Expense	$0	$3,025,952	$3,709,396	$3,131,297	$2,493,964	$1,777,276	$956,291	$0	$0
Amoritization of Loan Fees	$49,459	$49,459	$49,459	$46,606	$43,918	$41,385	$38,998	$0	$0
Insurance	$0	$529,914	$529,914	$529,914	$529,914	$529,914	$529,914	$529,914	$529,914
Amoritization of Start-up Expenses	$0	$446,251	$446,251	$420,512	$0	$0	$0	$0	$0
Total	$49,459	$29,604,293	$48,818,375	$48,018,885	$46,776,672	$45,886,251	$44,901,552	$41,270,558	$41,270,558
Pre-Tax Profit	($49,459)	($9,877,658)	($1,120,065)	($320,575)	$921,638	$1,812,060	$2,796,758	$6,427,752	$6,427,752
Income Taxes	$0	$0	$0	$0	$0	$0	$978,865	$2,249,713	$2,249,713
State Tax, Sales Tax, Property Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0
Profit After Taxes	($49,459)	($9,877,658)	($1,120,065)	($320,575)	$921,638	$1,812,060	$1,817,892	$4,178,039	$4,178,039

Figure J-7 Griffiss Alternate Pro Forma, Income Statement (page 1 of 3)

Income/Expenses In Actual Year Dollars	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Discount Factor:	1.00	1.00	1.00	0.94	0.89	0.84	0.79	0.74	0.69
Total Income									
Sales of Ethanol and Co-Products	$0	$19,726,635	$47,698,310	$50,617,828	$53,716,044	$57,003,896	$60,492,990	$64,195,645	$69,487,431
Total	$0	$19,726,635	$47,698,310	$50,617,828	$53,716,044	$57,003,896	$60,492,990	$64,195,645	$69,487,431
Total Expenses									
Feedstock	$0	$13,678,910	$26,777,044	$28,416,013	$30,155,300	$32,001,046	$33,959,766	$36,038,375	$39,009,096
Operating Chemicals	$0	$1,435,213	$2,870,427	$3,046,120	$3,232,567	$3,430,426	$3,640,395	$3,863,217	$4,181,670
Process Water	$0	$104,169	$208,338	$221,090	$234,623	$248,984	$264,223	$280,396	$303,510
Natural Gas	$0	$2,640,000	$5,280,000	$5,603,178	$5,946,138	$6,310,089	$6,696,317	$7,106,185	$7,691,963
Disposal Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Water Treatment	$0	$150,000	$300,000	$318,362	$337,849	$358,528	$380,473	$403,761	$437,043
Electricity	$0	$2,529,600	$2,529,600	$2,684,432	$2,848,740	$3,023,106	$3,208,144	$3,404,509	$3,685,150
Steam	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maintenance	$0	$316,935	$722,610	$766,840	$813,776	$863,586	$916,444	$972,538	$1,052,706
Miscellaneous Incidentals	$0	$205,326	$205,326	$217,894	$231,230	$245,384	$260,403	$276,342	$299,121
Salaries / Wages	$0	$1,149,853	$1,847,300	$1,960,369	$2,080,359	$2,207,694	$2,342,823	$2,486,222	$2,691,167
Depreciation	$0	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$0	$0
Interest Expense	$0	$3,025,952	$3,709,396	$3,322,958	$2,808,609	$2,124,010	$1,212,809	$0	$0
Amoritization of Loan Fees	$49,459	$49,459	$49,459	$49,459	$49,459	$49,459	$49,459	$0	$0
Insurance	$0	$529,914	$529,914	$562,349	$596,769	$633,296	$672,059	$713,194	$771,985
Amoritization of Start-up Expenses	$0	$446,251	$446,251	$446,251	$0	$0	$0	$0	$0
Total	$49,459	$29,604,293	$48,818,375	$50,958,025	$52,678,130	$54,838,317	$56,946,025	$55,544,738	$60,123,411
Pre-Tax Profit	($49,459)	($9,877,658)	($1,120,065)	($340,197)	$1,037,914	$2,165,579	$3,546,965	$8,650,907	$9,364,020
Income Taxes	$0	$0	$0	$0	$0	$0	$1,241,438	$3,027,818	$3,277,407
State Tax, Sales Tax, Property Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0
Profit After Taxes	($49,459)	($9,877,658)	($1,120,065)	($340,197)	$1,037,914	$2,165,579	$2,305,527	$5,623,090	$6,086,613

Figure J-8, Griffiss Alternate Pro Forma, Income Statement (page 2of 3)

Value of Assets at Year End in Individual Year $	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Fixed Assets									
Plant and Equipment	$18,635,879	$34,613,944	$46,797,954	$36,769,821	$26,741,688	$16,713,555	$6,685,422	$0	$0
Less Accumulated Depreciation	$0	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$3,342,711	$0	$0
Other	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Long-term Assets	$18,635,879	$31,271,233	$43,455,243	$33,427,110	$23,398,977	$13,370,844	$3,342,711	$0	$0
Net Present Value Analysis									
Adjusted Total Profit	($49,459)	($9,877,658)	($1,120,065)	($320,575)	$921,638	$1,812,060	$1,817,892	$4,178,039	$4,178,039
Adjusted Value of Profit minus Debt Payment	$0	($3,459,537)	$5,981,501	$6,007,239	$6,427,752	$6,427,752	$5,448,886	$4,178,039	$4,178,039
Adjusted Value of Capital Investment plus Interest	$0	$3,025,952	$4,876,883	$4,876,883	$4,876,883	$4,876,883	$4,876,883	$0	$0

Present Value (PV) of Profit	$26,901,020
PV of Capital Investment	$52,991,371
PV of Profit minus Debt Payment	$107,820,399
PV of Capital Investment Plus Interest	$76,179,197
Baseline Cost per Gallon of Ethanol	$1.15

First-Year Cost-per-Gallon Analysis

Expense Category	Year-One Cost	Cost per Gallon
Feedstock	$26,777,044	$0.686
Operating Chemicals	$2,870,427	$0.074
Process Water	$208,338	$0.005
Natural Gas	$5,280,000	$0.135
Disposal Costs	$0	$0.000
Maintenance Materials	$722,610	$0.019
Miscellaneous Incidentals	$205,326	$0.005
Salaries / Wages	$1,847,300	$0.047
Depreciation	$3,342,711	$0.086
Interest Expense	$3,709,396	$0.095
Amoritization of Loan Fees	$49,459	$0.001
Insurance	$529,914	$0.014
Amoritization of Start-up Expenses	$446,251	$0.011
Profit	($1,120,065.01)	($0.03)
Total	$44,868,710	$1.150

Figure J-9, Griffiss Alternate Pro Forma, Income Statement (page 3 of 3)

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Cost of transport									
Ethanol from Plant to Consumer	$0	$726,442	$1,816,106	$1,816,106	$1,816,106	$1,816,106	$1,816,106	$1,816,106	$1,816,106
CO_2 from Plant to Consumer	$0	$0	$0	$0	$0	$0	$0	$0	$0
Feedstock from Farm to Plant	$0	$1,203,268	$2,355,447	$2,355,447	$2,355,447	$2,355,447	$2,355,447	$2,355,447	$2,355,447
DDGS from Plant to Farm	$0	$320,129	$773,592	$773,592	$773,592	$773,592	$773,592	$773,592	$773,592
Total Yearly Transport Costs	$0	$2,249,839	$4,945,145	$4,945,145	$4,945,145	$4,945,145	$4,945,145	$4,945,145	$4,945,145

Figure J-10, Griffiss Alternate Pro Forma, Summary of Transportation Costs

APPENDIX K

Miller Brewery Site Pro Forma

	Equipment Cost	Total Cost
Site and Buildings	$0	$0
Fruit Waste Storage	$60,222	$96,355
Milling	$216,909	$494,366
Preparation/Mashing	$418,279	$1,521,264
Fermentation	$166,016	$2,002,889
Distillation	$1,966,486	$4,876,885
MS Dehydration	$1,500,000	$2,325,000
Evaporation	$1,570,176	$3,865,521
Decanting	$1,338,583	$2,781,213
DDGS Drying	$2,703,121	$4,730,462
CIP and Chemicals	$69,745	$401,692
Grain Storage	$250,000	$525,000
Alcohol Storage and Loading	$359,156	$952,354
DDGS Storage and Loading	$316,775	$586,034
DCS Computer	$250,000	$500,000
Cooling Tower	$0	$0
Boiler and BFW	$0	$0
Instrument and Plant Air	$0	$0
Waste Water Treatment	$0	$0
Direct Field Cost		$25,659,035
Start-up, Testing & Training		Excluded
Temporary Facilities		Included Above
Construction Equipment, Tools, Supplies		Included Above
Field Staff and Legalities		Included Above
Indirect Field Cost		$0
Total Field Cost		$25,659,035
Taxes		$0
Insurance		Included Above
Permits		Included Above
Craft Causal Overtime		Included Above
Contingency, Escalation, Engineering, and Site Acquisition		$16,319,425
Total		$41,978,460

Figure K-1, Miller Brewery Pro Forma, Capital and Site Review

			Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Long-term debt											
		Debt Balance:	$17,784,273	$34,613,944	$32,323,414	$28,956,019	$24,474,016	$18,508,470	$10,568,329	$0	$0
A	Amortize	Interest Rate above inflation(%):	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Term (Years):	15	Interest Pmt:	$851,606	$2,648,855	$3,232,341	$2,895,602	$2,447,402	$1,850,847	$1,056,833	$0	$0
Cost of Capital and Site Work:	$41,978,460	Principal Pmt:	($851,606)	$0	$1,017,340	$1,354,079	$1,802,280	$2,398,834	$3,192,848	($0)	($0)
Up-Front Payment:	$13,852,892	Additional Principal Pmt:									
Working Capital	$4,197,846	**Sub-Total Payment:**	$0	$2,648,855	$4,249,681	$4,249,681	$4,249,681	$4,249,681	$4,249,681	$0	$0
Original Balance:	$32,323,414	**Amoritization of Loan Fees:**	$43,098	$43,098	$43,098	$43,098	$43,098	$43,098	$43,098	$0	$0
Balloon Pmt:	$0	**Total Payment:**	$43,098	$2,691,953	$4,292,779	$4,292,779	$4,292,779	$4,292,779	$4,292,779	$0	$0
			into depr. Exp.								
Debt / Equity Ratio:	2.33										
Long-term debt Summary											
		Opening Balance:	$17,784,273	$34,613,944	$32,323,414	$28,956,019	$24,474,016	$18,508,470	$10,568,329	$0	$0
		Total Interest Pmts:	$851,606	$2,648,855	$3,232,341	$2,895,602	$2,447,402	$1,850,847	$1,056,833	$0	$0
		Total Principal Pmts:	-$851,606	$0	$1,017,340	$1,354,079	$1,802,280	$2,398,834	$3,192,848	($0)	($0)
		Additional Principal Pmts:	$0	$0	$0	$0	$0	$0	$0	$0	$0
		Total Payments:	$0	$2,648,855	$4,249,681	$4,249,681	$4,249,681	$4,249,681	$4,249,681	$0	$0
		Closing Balance:	$18,635,879	$34,613,944	$31,306,074	$27,601,940	$22,671,736	$16,109.636	$7,375,480	$0	$0
		Avg Annualized Rate Pd.:	4.79%	7.65%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Effect of Depreciation											
Total Value of Depreciation:	$43,700,491										
Depreciation based on:	15	year straightline method									
Plant and Equipment Value at start of year			$18,635,879	$34,613,944	$40,787,125	$32,047,027	$23,306,929	$14,566,830	$5,826,732	$0	$0
Less Accumulated Depreciation:			$0	$2,913,366	$2,913,366	$2,913,366	$2,913,366	$2,913,366	$2,913,366	$0	$0
Plant and Equipment Value After Year:			$18,635,879	$31,700,578	$37,873,759	$29,133,661	$20,393,562	$11,653,464	$2,913,366	$0	$0
Start-up Expenses											
		Debt Balance:	$0	$2,231,255	$1,785,004	$446,251	$0	$0	$0	$0	$0
		Interest Rate above inflation(%):	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Years to Pay-off	5	Interest Pmt:	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cost of Startup:	$2,231,255	Principal Pmt:	$0	$446,251	$446,251	$446,251	$0	$0	$0	$0	$0
Interest Rate (above Inflation) used:	0.00%	Additional Principal Pmt:									
		Sub-Total Payment:	$0	$446,251	$446,251	$446,251	$0	$0	$0	$0	$0
		Amoritization of Loan Fees:	$0	$0	$0	$0	$0	$0	$0	$0	$0
		Total Payment:	$0	$446,251	$446,251	$446,251	$0	$0	$0	$0	$0
Conversion to Baseline Year Dollars											
Discount Factor:			1.00	1.00	1.00	0.94	0.89	0.84	0.79	0.74	0.69
Depreciation in Current-Year Dollars:			$0	$2,913,366	$2,913,366	$2,745,330	$2,586,986	$2,437,774	$2,297,169	$0	$0
Interest Payment in Current-Year Dollars:			$851,606	$2,648,855	$3,232,341	$2,728,590	$2,173,223	$1,548,706	$833,305	$0	$0
Amoritization of Loan Fees:			$43,098	$43,098	$43,098	$40,612	$38,270	$36,062	$33,982	$0	$0
Principal in Current Dollars:			-$851,606	$0	$1,017,340	$1,275,979	$1,600,373	$2,007,237	$2,517,539	$0	$0
Total Loan Payment in Current-Year Dollars:			$43,098	$2,691,953	$4,292,779	$4,045,182	$3,811,865	$3,592,006	$3,384,827	$0	$0
Start-up Expenses in Actual-Year Dollars:			$0	$446,251	$446,251	$446,251	$0	$0	$0	$0	$0
Start-up Expenses in Baseline-Year Dollars:			$0	$446,251	$446,251	$420,512	$0	$0	$0	$0	$0

Figure K-2, Miller Brewery Pro Forma, Debt Schedule

	Amount	Unit	Cost	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Feedstock												
Corn	640,937,954	pounds/year	$0.04	$0	$13,739,936	$26,896,503	$26,896,503	$26,896,503	$26,896,503	$26,896,503	$26,896,503	$26,896,503
Fruit Waste	4,778,378	pounds/year	-$0.03	$0	($61,026)	($119,459)	($119,459)	($119,459)	($119,459)	($119,459)	($119,459)	($119,459)
Operating Chemicals												
Alpha-amylase	508,810	pounds/year	$1.10	$0	$279,846	$559,691	$559,691	$559,691	$559,691	$559,691	$559,691	$559,691
Gluco-amylase	157,034	pounds/year	$3.70	$0	$290,513	$581,026	$581,026	$581,026	$581,026	$581,026	$581,026	$581,026
Sulfuric Acid	0	pounds/year	$0.04	$0	$0	$0	$0	$0	$0	$0	$0	$0
Caustic Soda	3,108,000	pounds/year	$0.15	$0	$233,100	$466,200	$466,200	$466,200	$466,200	$466,200	$466,200	$466,200
Ammonia	1,428,000	pounds/year	$0.13	$0	$92,820	$185,640	$185,640	$185,640	$185,640	$185,640	$185,640	$185,640
Nutrients	0	pounds/year	$0.12	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ammonium Sulfate	672,000	pounds/year	$0.07	$0	$22,176	$44,352	$44,352	$44,352	$44,352	$44,352	$44,352	$44,352
Antifoam	0	pounds/year	$0.25	$0	$0	$0	$0	$0	$0	$0	$0	$0
Gasoline	10,053,353	pounds/year	$0.10	$0	$489,278	$978,555	$978,555	$978,555	$978,555	$978,555	$978,555	$978,555
Diesel	0	pounds/year	$0.06	$0	$0	$0	$0	$0	$0	$0	$0	$0
BFW Chemicals	4,704	pounds/year	$0.97	$0	$2,281	$4,563	$4,563	$4,563	$4,563	$4,563	$4,563	$4,563
CW Chemicals	50,400	pounds/year	$1.00	$0	$25,200	$50,400	$50,400	$50,400	$50,400	$50,400	$50,400	$50,400
WWT Nutrients	0	pounds/year	$0.11	$0	$0	$0	$0	$0	$0	$0	$0	$0
WWT Chemicals	0	pounds/year	$2.50	$0	$0	$0	$0	$0	$0	$0	$0	$0
Process Water												
Make-up Water	322,817	pounds/hour	$0.00	$0	$104,169	$208,338	$208,338	$208,338	$208,338	$208,338	$208,338	$208,338
Steam												
Steam	0	pounds/hour	$0.01	$0	$0	$0	$0	$0	$0	$0	$0	$0
Natural Gas												
Natural Gas	196	mcf/hr	$3.20	$0	$2,640,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000
Disposal Costs												
Landfill	0	pounds/hr	$0.00	$0	$0	$0	$0	$0	$0	$0	$0	$0
Electricity												
Electric				$0	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600
Waste Water Treatment												
WWT				$0	$150,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000
Maintenance Materials												
Maintenance				$0	$316,935	$722,610	$722,610	$722,610	$722,610	$722,610	$722,610	$722,610
Miscellaneous Incidentals												
Miscellaneous				$0	$205,326	$205,326	$205,326	$205,326	$205,326	$205,326	$205,326	$205,326
Total Cost				**$0**	**$21,060,154**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**
Adjusted Total Cost				**$0**	**$21,060,154**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**	**$38,893,345**

Figure K-3, Miller Brewery Pro Forma, Annual Materials Costs

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Production									
Number of Employees:	2.8	27.8	36	36	36	36	36	36	36
Avg. Salary/Wage per Employee:	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889	$29,889
Employer Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Employer Contribution ($):	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967	$8,967
Per Employee Total:	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856	$38,856
Production Salary/Wage Total:	$83,928	$829,596	$1,076,000	$1,076,000	$1,076,000	$1,076,000	$1,076,000	$1,076,000	$1,076,000
Employer Contribution Total:	$25,178	$248,879	$322,800	$322,800	$322,800	$322,800	$322,800	$322,800	$322,800
Department Total:	$109,106	$1,078,475	$1,398,800	$1,398,800	$1,398,800	$1,398,800	$1,398,800	$1,398,800	$1,398,800
General & Administrative									
Number of Employees:	6.2	6.8	7	7	7	7	7	7	7
Avg. Salary/Wage per Employee:	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286	$49,286
Employer Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Employer Contribution ($):	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786	$14,786
Per Employee Total:	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071	$64,071
General & Administrative	$303,600	$336,375	$345,000	$345,000	$345,000	$345,000	$345,000	$345,000	$345,000
Employer Contribution Total:	$91,080	$100,913	$103,500	$103,500	$103,500	$103,500	$103,500	$103,500	$103,500
Department Total:	$394,680	$437,288	$448,500	$448,500	$448,500	$448,500	$448,500	$448,500	$448,500
All Employees									
Total Number of Employees:	9	35	43	43	43	43	43	43	43
Avg. Salary/Wage per Employee:	$43,212	$33,717	$33,047	$33,047	$33,047	$33,047	$33,047	$33,047	$33,047
Avg. per Employee Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Avg. per Employee Contribution ($):	$12,964	$10,115	$9,914	$9,914	$9,914	$9,914	$9,914	$9,914	$9,914
Total Salary/Wage Expense:	$387,528	$1,165,971	$1,421,000	$1,421,000	$1,421,000	$1,421,000	$1,421,000	$1,421,000	$1,421,000
Total Employer Contribution (%):	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Total Employer Contribution ($):	$116,258	$349,791	$426,300	$426,300	$426,300	$426,300	$426,300	$426,300	$426,300
Total Employee Expense:	**$503,786**	**$1,515,762**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**
Attributed to Start-up Costs:	**$503,786**	**$365,909**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Employee Salary and Benefits:	**$0**	**$1,149,853**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**	**$1,847,300**

Figure K-4, Miller Brewery Pro Forma, Employee Forecast

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Taxable income in actual year dollars	($43,098)	($9,064,856)	($207,305)	$522,865	$1,834,827	$2,874,447	$4,138,646	$8,650,907	$9,364,020
Cumulative taxable income	($43,098)	($9,107,953)	($9,315,258)	($8,503,392)	($3,898,570)	$3,641,455	$14,736,612	$36,146,535	$72,515,297
Discount Factor	1.00	1.00	1.00	0.94	0.89	0.84	0.79	0.74	0.69
Federal Taxes	$0	$0	$0	$0	$0	$841,823	$1,142,153	$2,249,713	$2,249,713
State Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sales Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
Property Taxes	$0	$0	$0	$0	$0	$0	$0	$0	$0
Incentives	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Tax Burden	$0	$0	$0	$0	$0	$841,823	$1,142,153	$2,249,713	$2,249,713
Jobs Created	9	35	43	43	43	43	43	43	43
Multiplier Jobs	11	41	52	52	52	52	52	52	52
On-Farm Jobs	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
State/Local Job Impact	$570	$1,715	$2,091	$2,091	$2,091	$2,091	$2,091	$2,091	$2,091
Total Impact Value	$11,248	$130,499	$197,762	$197,762	$197,762	$1,039,585	$1,339,915	$2,447,475	$2,447,475

Figure K-5, Miller Brewery Pro Forma, Tax Impacts

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Alcohol	$0	$15,016,580	$36,315,789	$36,315,789	$36,315,789	$36,315,789	$36,315,789	$36,315,789	$36,315,789
Electricity	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rent of Nearby Land and Buildings	$0	$0	$0	$0	$0	$0	$0	$0	$0
CO_2 Sales	$0	$354,555	$857,464	$857,464	$857,464	$857,464	$857,464	$857,464	$857,464
DDGS	$0	$4,355,500	$10,525,057	$10,525,057	$10,525,057	$10,525,057	$10,525,057	$10,525,057	$10,525,057
Total Gross Revenues	**$0**	**$19,726,635**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**
Returns/Allowances (%)	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Adjusted Revenues	**$0**	**$19,726,635**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**	**$47,698,310**
Cost of alcohol after producer credit:	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150	$1.150

Figure K-6, Miller Brewery Pro Forma, Revenue Forecast

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Income/Expenses in Baseline Year Dollars									
Total Income									
Sales of Ethanol and Co-Products	$0	$19,726,635	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310
Total	$0	$19,726,635	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310	$47,698,310
Total Expenses									
Feedstock	$0	$13,678,910	$26,777,044	$26,777,044	$26,777,044	$26,777,044	$26,777,044	$26,777,044	$26,777,044
Operating Chemicals	$0	$1,435,213	$2,870,427	$2,870,427	$2,870,427	$2,870,427	$2,870,427	$2,870,427	$2,870,427
Process Water	$0	$104,169	$208,338	$208,338	$208,338	$208,338	$208,338	$208,338	$208,338
Natural Gas	$0	$2,640,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000	$5,280,000
Disposal Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Water Treatment	$0	$150,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000	$300,000
Electricity	$0	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600	$2,529,600
Steam	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maintenance	$0	$316,935	$722,610	$722,610	$722,610	$722,610	$722,610	$722,610	$722,610
Miscellaneous Incidentals	$0	$205,326	$205,326	$205,326	$205,326	$205,326	$205,326	$205,326	$205,326
Salaries / Wages	$0	$1,149,853	$1,847,300	$1,847,300	$1,847,300	$1,847,300	$1,847,300	$1,847,300	$1,847,300
Depreciation	$0	$2,913,366	$2,913,366	$2,745,330	$2,586,986	$2,437,774	$2,297,169	$0	$0
Interest Expense	$0	$2,648,855	$3,232,341	$2,728,590	$2,173,223	$1,548,706	$833,305	$0	$0
Amoritizaïion of Loan Fees	$43,098	$43,098	$43,098	$40,612	$38,270	$36,062	$33,982	$0	$0
Insurance	$0	$529,914	$529,914	$529,914	$529,914	$529,914	$529,914	$529,914	$529,914
Amoritization of Start-up Expenses	$0	$446,251	$446,251	$420,512	$0	$0	$0	$0	$0
Total	$43,098	$28,791,491	$47,905,615	$47,205,603	$46,069,036	$45,293,101	$44,435,016	$41,270,558	$41,270,558
Pre-Tax Profit	($43,098)	($9,064,856)	($207,305)	$492,707	$1,629,274	$2,405,209	$3,263,294	$6,427,752	$6,427,752
Income Taxes	$0	$0	$0	$0	$0	$841,823	$1,142,153	$2,249,713	$2,249,713
State Tax, Sales Tax, Property Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0
Profit After Taxes	($43,098)	($9,064,856)	($207,305)	$492,707	$1,629,274	$1,563,386	$2,121,141	$4,178,039	$4,178,039

Figure K-7, Miller Brewery Pro Forma, Income Statement (page 1 of 3)

Income/Expenses in Actual Year Dollars	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Discount Factor:	1.00	1.00	1.00	0.94	0.89	0.84	0.79	0.74	0.69
Total Income									
Sales of Ethanol and Co-Products	$0	$19,726,635	$47,698,310	$50,617,828	$53,716,044	$57,003,896	$60,492,990	$64,195,645	$69,487,431
Total	$0	$19,726,635	$47,698,310	$50,617,828	$53,716,044	$57,003,896	$60,492,990	$64,195,645	$69,487,431
Total Expenses									
Feedstock	$0	$13,678,910	$26,777,044	$28,416,013	$30,155,300	$32,001,046	$33,959,766	$36,038,375	$39,009,096
Operating Chemicals	$0	$1,435,213	$2,870,427	$3,046,120	$3,232,567	$3,430,426	$3,640,395	$3,863,217	$4,181,670
Process Water	$0	$104,169	$208,338	$221,090	$234,623	$248,984	$264,223	$280,396	$303,510
Natural Gas	$0	$2,640,000	$5,280,000	$5,603,178	$5,946,138	$6,310,089	$6,696,317	$7,106,185	$7,691,963
Disposal Costs	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Water Treatment	$0	$150,000	$300,000	$318,362	$337,849	$358,528	$380,473	$403,761	$437,043
Electricity	$0	$2,529,600	$2,529,600	$2,684,432	$2,848,740	$3,023,106	$3,208,144	$3,404,509	$3,685,150
Steam	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maintenance	$0	$316,935	$722,610	$766,840	$813,776	$863,586	$916,444	$972,538	$1,052,706
Miscellaneous Incidentals	$0	$205,326	$205,326	$217,894	$231,230	$245,384	$260,403	$276,342	$299,121
Salaries / Wages	$0	$1,149,853	$1,847,300	$1,960,369	$2,080,359	$2,207,694	$2,342,823	$2,486,222	$2,691,167
Depreciation	$0	$2,913,366	$2,913,366	$2,913,366	$2,913,366	$2,913,366	$2,913,366	$0	$0
Interest Expense	$0	$2,648,855	$3,232,341	$2,895,602	$2,447,402	$1,850,847	$1,056,833	$0	$0
Amoritization of Loan Fees	$43,098	$43,098	$43,098	$43,098	$43,098	$43,098	$43,098	$0	$0
Insurance	$0	$529,914	$529,914	$562,349	$596,769	$633,296	$672,059	$713,194	$771,985
Amoritization of Start-up Expenses	$0	$446,251	$446,251	$446,251	$0	$0	$0	$0	$0
Total	$43,098	$28,791,491	$47,905,615	$50,094,964	$51,881,218	$54,129,449	$56,354,344	$55,544,738	$60,123,411
Pre-Tax Profit	($43,098)	($9,064,856)	($207,305)	$522,865	$1,834,827	$2,874,447	$4,138,646	$8,650,907	$9,364,020
Income Taxes	$0	$0	$0	$0	$0	$1,006,057	$1,448,526	$3,027,818	$3,277,407
State Tax, Sales Tax, Property Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0
Profit After Taxes	($43,098)	($9,064,856)	($207,305)	$522,865	$1,834,827	$1,868,391	$2,690,120	$5,623,090	$6,086,613

Figure K-8, Miller Brewery Pro Forma, Income Statement (page 2 of 3)

Value of Assets at Year End in Individual Year Dollar	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Fixed Assets									
Plant and Equipment	$18,635,879	$34,613,944	$40,787,125	$32,047,027	$23,306,929	$14,566,830	$5,826,732	$0	$0
Less Accumulated Depreciation	$0	$2,913,366	$2,913,366	$2,913,366	$2,913,366	$2,913,366	$2,913,366	$0	$0
Other	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Long-term Assets	$18,635,879	$31,700,578	$37,873,759	$29,133,661	$20,393,562	$11,653,464	$2,913,366	$0	$0
Net Present Value Analysis									
Discount Factor = 1 (all data above is already discou	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adjusted Total Profit	($43,098)	($9,064,856)	($207,305)	$492,707	$1,629,274	$1,563,386	$2,121,141	$4,178,039	$4,178,039
Adjusted Value of Profit minus Debt Payment	$0	($3,459,537)	$5,981,501	$6,007,239	$6,427,752	$5,585,929	$5,285,599	$4,178,039	$4,178,039
Adjusted Value of Capital Investment plus Interest	$0	$2,648,855	$4,249,681	$4,249,681	$4,249,681	$4,249,681	$4,249,681	$0	$0

Present Value (PV) of Profit	$33,982,897
PV of Capital Investment	$46,176,306
PV of Profit minus Debt Payment	$104,514,892
PV of Capital Investment Plus Interest	$66,394,075
Baseline Cost per Gallon of Ethanol	$1.15

First-Year Cost-per-Gallon Analysis

Expense Category	Year-One Cost	Cost per Gallon
Feedstock	$26,777,044	$0.686
Operating Chemicals	$2,870,427	$0.074
Process Water	$208,338	$0.005
Natural Gas	$5,280,000	$0.135
Disposal Costs	$0	$0.000
Maintenance Materials	$722,610	$0.019
Miscellaneous Incidentals	$205,326	$0.005
Salaries / Wages	$1,847,300	$0.047
Depreciation	$2,913,366	$0.075
Interest Expense	$3,232,341	$0.083
Amoritization of Loan Fees	$43,098	$0.001
Insurance	$529,914	$0.014
Amoritization of Start-up Expenses	$446,251	$0.011
Profit	(207,304.77)	(0.01)
Total	$44,868,710	$1.150

Figure K-9, Miller Brewery Pro Forma, Income Statement (page 3 of 3)

	Const. Yr 1	Const. Yr 2	Year 1	Year 4	Year 7	Year 10	Year 13	Year 16	Year 20
Cost of transport									
Ethanol from Plant to Consumer	$0	$726,442	$1,816,106	$1,816,106	$1,816,106	$1,816,106	$1,816,106	$1,816,106	$1,816,106
CO_2 from Plant to Consumer	$0	$0	$0	$0	$0	$0	$0	$0	$0
Feedstock from Farm to Plant	$0	$1,203,268	$2,355,447	$2,355,447	$2,355,447	$2,355,447	$2,355,447	$2,355,447	$2,355,447
DDGS from Plant to Farm	$0	$320,129	$773,592	$773,592	$773,592	$773,592	$773,592	$773,592	$773,592
Total Yearly Transport Costs	$0	$2,249,839	$4,945,145	$4,945,145	$4,945,145	$4,945,145	$4,945,145	$4,945,145	$4,945,145

Figure K-10, Miller Brewery Pro Forma, Summary of Transportation Costs

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COMMERCIALIZATION OF CORN TO ETHANOL IN NEW YORK STATE

REPORT 00-13

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