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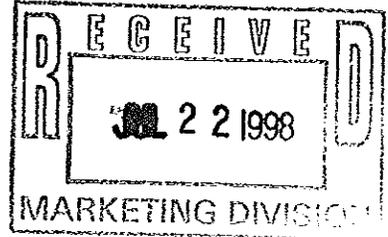
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**SOYBEAN PROCESSING FACILITY:**  
*A FEASIBILITY STUDY*

**Completed By:**  
**Adams County Rural and Industrial Development**  
**Commission**  
**Cooperative Development Services**

## ACKNOWLEDGEMENT

The following analysis is the result of the combined efforts of many dedicated individuals, all of whom were interested in assisting the soybean growers of Wisconsin take a more aggressive role in carving their future via direct participation in the value added manufacturing process.

The most important of these include Bud Schultz and Mike Bandli of the Wisconsin Department of Agriculture, Trade and Consumer Protection. Without their financial support this project would never have been possible. Their continuing guidance and support of our goals were instrumental in the development of Soy-Co and the ensuing jobs created for our rural economy.

A special thank you to Will Hughes and Greg Lawless of the Cooperative Development Services of Madison. Their completion of the market research and survey segment of this analysis proved invaluable in providing the soybean growers of Central Wisconsin with the information necessary to start a soybean processing facility in Adams County. Also, a special thank you to the existing extruder/expeller operators in adjacent states who were willing to share their processing information with us and provide us with valuable insight.

The completion of this study prompted a group of soybean growers from the Juneau, Adams and Marquette County area to form Soy-Co, LLC. Soy-Co was organized in 1997 and is currently managing an extruder/expelled soybean manufacturing facility in Adams, Wisconsin. This facility has created five new jobs for this rural, depressed area of the state as well as provided local growers with the opportunity to create their own destiny by sharing in the revenues available through the value-added stage.

The members of Soy-Co deserve an extraordinary thank you for their unyielding support and sacrifices which they incurred throughout the course of this study and the eventual formation of their company. It was a great honor to work with this dedicated group of growers. The cornerstone of their beliefs, and company, is based upon one simple, yet powerful, philosophy. "*Farmers Helping Farmers.*" We hope that Soy-Co continues to flourish in their industry and serves as a model for other growers willing to assume the risks inherent in such a venture.

  
Kathleen Daniel, for the  
Adams County Rural and Industrial Development Commission

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## I. INTRODUCTION/BACKGROUND

Historically, growers have been responsible for retaining products the longest of any participant in the food processing chain. Unfortunately, they continue to receive a diminishing share of the consumer's dollar following final sale in the retail market. Accordingly, growers must absorb all costs until final sale, such as storage, transportation and interest payments on their products. As large food processors and feed suppliers search for new ways to increase profits, remain globally competitive and adopt "just in time" practices, it is assumed the growers' percentage of profit will continue to diminish unless they take a more aggressive role in their own destiny.

In addition to the above, a further problem has been encountered by the soybean growers of Central Wisconsin. Due to their distance from market, they have traditionally been required to sell their beans at a discount of approximately \$.50 per bushel from the Chicago Board of Trade (CBOT) quoted price. Although some fluctuation in the basis is expected, growers in Central Wisconsin have realized the average has been predominantly negative, in the amount of \$.50/bushel. For the 1996 soybean crop this has resulted in the loss of \$1,600,800 for Central Wisconsin. As this project took place in Adams County, Adams and the adjacent counties of Juneau, Marquette, Portage, Waushara, Wood, Columbia and Sauk, have been defined as Central Wisconsin for purposes of this study.

In an effort to combat the above problems, members of the Juneau, Adams and Marquette Corn and Soybean Growers Association (J.A.M.) agreed to form an organization whose purpose would be to add value to their soybeans, via direct participation in the extruded/expelled processing stage, if it appeared to be a profitable venture. If the study's results indicated such a processing facility could be economically feasible, the growers also hoped to obtain the following goals:

1. Provide a local market for soybeans comparable to CBOT prices
2. Create jobs for this rural, depressed economy
3. Increase the demand for soybeans
4. Assist with the further development of new extruded/expelled soy-based products which replace more hazardous, environmentally-"Un-friendly" products.

Although the discount in basis may be specific to the central region of the State, this study has important implications for all of Wisconsin due to the increasing importance of this crop. Wisconsin's soybean production, crop yields, and values have increased dramatically over the last eight years and this trend is expected to continue. In 1994 the State of Wisconsin produced 36.52 million bushels of soybeans at an average value of \$200,860,000. At this level, Wisconsin had become the 16<sup>th</sup> largest producer in the United States and soybeans had become the third largest value crop in Wisconsin, outpaced only by corn and potatoes. Adams County and the adjacent counties, produced 3,787,400 bushels of soybeans in 1994 for an average value of \$20,830,700. This represented a 99% increase over 1993 production! In comparison, in 1996,

the number of bushels produced in the region dropped slightly to 3,201,600 for an average value of \$17,608,800. When the \$.50 discount per bushel is applied to our central region's production level, a loss of \$1,600,800 was incurred for the 1996 crop year. As these statistics reflect, soybean production is an important crop for Central Wisconsin as well as the State of Wisconsin.

Research for this study encompassed a review of published material on the subject of extruded/expelled soybeans as well as on-site interviews with existing operators of facilities in other states, original equipment manufacturers, retailers and purchasers of our end products.

## II. EXTRUDED/EXPELLED SOYBEANS -MARKETING RESEARCH

The extruded/expelled soybean process is a relatively new one. At present, there are several facilities located in the neighboring states of Illinois, Indiana and Iowa as well as Nebraska. The majority of these facilities utilize manufacturing equipment produced by Insta-Pro, an original equipment manufacturer located in Des Moines, Iowa. In addition, BRI, a research and development firm headquartered in Bloomington, Illinois has focused its efforts on creating soy-based products which result from the extruded/expelled process.

One of the greatest advantages of the extruded/expelled manufacturing process is that it is a "natural" process and therefore, does not contain any hazardous components, such as the traditional hexane procedure, currently utilized by high volume producers like Archer Daniels Midland. Accordingly, the proposed process results in two *natural* products, soybean meal and oil.

The Cooperative Development Services (CDS) of Madison, Wisconsin completed the market research component of this study. Their research included a preliminary product and market profile of the soybean meal and oil, a discussion of margins, market environment, competitors, and a survey of potential buyers.

### A. Extruded/Expelled Soy Meal

Preliminary research completed by CDS indicated the extruded/expelled soybean meal was superior to the traditional chemical extracted process. It was hoped this would be an attractive selling point to purchasers of the meal as a feed for dairy and other ruminant animals. Specifically, the following feed profile (approximate numbers) was determined.

	Proposed Meal	Standard Soy Meal
Crude Protein	45%	44%
UIP (Bypass protein)	55	35
Fat	7%	2%
TDN	90	84

As can be seen from this table, the proposed meal offers higher bypass protein and fat in a very palatable form. This combination is valued as a feed supplement for the first half to two thirds of lactation. Although the extruded/expelled meal could substitute for soymeal in some situations, it is more likely to be used as a protein supplement along with regular soymeal where it is blended to achieve a desired bypass protein level.

At a probable feeding rate of 3 lbs per cow per day (1 to 5 lbs range) the 3,200 tons of soymeal produced annually by the proposed facility (see financial projections) would feed approximately 5,850 cows per day, or 58-60 farms with 100 cows.

Using the University of Wisconsin's *Feed Val Program*, and assuming \$550/ton for blood meal, \$300/ton for urea, \$3/bu for corn, and \$0.25/lb. for tallow, the proposed meal meeting the above protein/fat/energy profile, generates a feed value of \$295/ton versus \$227/ton for 44% soy meal and \$241/ton for 48% soy meal. Therefore, the growers could expect to deliver \$50 to \$75 per ton extra feed value over soymeal at these product specifications and alternative feed source values.

## **B. Feed Margins**

When estimating margins for the meal side of the facility, we must consider that the local cash basis for soybeans runs \$.35 to \$.55 per bushel. Soybeans purchased by area dealers will increase the baseline soybean cost by approximately \$.15/bu. A reasonable cash basis adjustment would suggest \$.15 to \$.20 from CBOT forecasts given a blend of direct purchases from producers and some through dealers.

Other considerations include, monthly cash flows may need to be adjusted by seasonal price trends as summarized by historical Agricultural Statistics. Soymeal margins should be budgeted relative to CBOT 44% soymeal prices with a wholesale and retail mark-up factored into the sales estimates.

## **C. Market Environment**

CDS' research of the markets suggested the following characteristics exist for the proposed meal product:

1. Broad recognition that bypass protein supplements are an important feed Ingredient for dairy cattle, particularly in the first half of lactation
2. Sources of bypass protein include cottonseed, roasted beans, bone/blood Meal and some corn and grain byproducts
3. Extruder/expelled meal may provide an excellent, palatable source of bypass Protein with increased feed value relative to 44% protein soy meal
4. Feed Trial Analysis proves the feed value benefits of extruded/expelled soymeal-

If proper heat treatment is applied during processing

5. Large dairy farms using TMR and nutrition consulting services are the growers' Most likely candidates for customers
6. Large dairy farmers may be reached directly or via feed dealers
7. Soy Plus is currently the leading commercial brand source of soy bypass protein. At present it is available through approximately one-third of Wisconsin feed dealers
8. Consistent higher feed value, at the lowest cost, is the driving force behind purchases. Accordingly, a new company's product must compete with established competitors in both cost and performance.

#### D. Dairy Market Profile

As the local dairy markets appeared to offer the most immediate potential for product sales, an analysis was completed of existing dairy farms in the counties comprising the J.A.M. group as well as neighboring counties. This analysis resulted in the following findings:

	Number of Dairy Farms in 1995	Percent of 1985 Farms
Juneau	230	60%
Adams	49	49%
Marquette	99	59%

As the above indicates, the J.A.M. region is not a high density dairy production area. In addition, dairy farms in the local vicinity are exiting at a somewhat greater rate than the state's average.

When the analysis is extended to counties adjacent to J.A.M., the results are as follows:

	Number of Dairy Farms in 1995	Percent of 1985 Farms
Columbia	365	66%
Jackson	326	70%
Monroe	739	73%
Portage	309	61%
Sauk	529	64%
Vernon	918	70%
Waushara	169	56%
Wood	473	70%

As the previous table exemplifies, the adjacent counties offer greater market potential than the J.A.M. counties, and should therefore be included in the targeted sales area.

Taking the analysis to a further level, the large herd profiles for J.A.M. counties are as follows:

	County Farms With 90-120 Cows	County Farms With More than 120 Cows	County Total
Juneau	5 (7% of total)	4 (6%)	67
Adams	0	0	17
Marquette	7 (11%)	8 (13%)	62
Total:	12	12	146 *

\*Source: DHIA herds only

Profiles for surrounding counties include:

	County Farms With 90 - 120 Cows	County Farms With More Than 120 Cows	County Total
Columbia	20	7	169
Jackson	8	2	85
Monroe	14	5	242
Portage	4	5	70
Sauk	18	8	216
Vernon	10	6	259
Waushara	9	3	67
Wood	7	8	131
Total:	90	44	1,239*

\* Source: DHIA herds only

### E. Survey of Potential Buyers

A market analysis of local feed dealers, including farm supply co-ops and feed mills, was conducted within a 20 mile radius of Mauston, in Juneau County. This survey found that 80% of the respondents currently carry a soy meal product with high bypass protein. **Soy Plus** and **Sure Pro** were the most frequently mentioned products within this class. Other high bypass protein products mentioned by respondents included roasted beans and a soy amino balancer.

The dealers also indicated that, on average, about one-third of their customers are currently using these products. They further stated many producers don't know about soy meal products as a source of bypass protein; others choose to use a lower cost product; and some producers are just not interested in changing their habits.

The extent to which their customers used these products appeared to be dependent upon how enthusiastic the feed staff were in promoting it, and their level of knowledge on the product itself. Another variable was the amount of dairying in the local area of each dealer.

Respondents were also asked their opinion on whether the market for such products was growing, staying the same, or diminishing. The assessment on this was somewhat mixed, with several respondents reflecting an opinion the market would stay the same, and several believing it would increase. Interestingly enough, none of the respondents believed the market would decline.

Reasons why respondents cited a growing market included the following:

1. Cost effectiveness
2. Changing attitudes toward bone/blood meal
3. Application for large herds

Reasons why respondents believed the market would decline included:

1. Cost of product (i.e., more expensive than alternatives)
2. "Not much dairying in this area."

The majority of respondents indicated they would be willing to consider carrying a new soy meal high bypass protein product. However, they clearly stated the product must be able to prove its worth to their customers in order to find room for it on their display shelves.

## **F. Competitive Analysis**

As mentioned above, there are several existing competitors in the extruded/expelled soybean meal market. Each is listed below, with a cursory review of their products.

### **1. Soy Plus**

This product is manufactured in Ralston, Iowa, by the West Central Cooperative. Soy Plus is currently the market leader and primary competitor. It is a well marketed product with high bypass protein content, being sold primarily through feed dealers. SoyPlus commands a \$30 to \$40 per ton price advantage over 44% soy meal at retail. The company is expanding its West Central plant, and volume in 1996 increased by 23% to bring total sales to 145,000 tons.

The company does an excellent job of promoting its product and training staff at the marketing outlets. Soy Plus has gained significant market share through implementation of this strategy.

Accordingly, a new product would have to work hard to become entrenched in the marketplace.

## 2. Sure Pro

This product is made by Cenex and distributed through local Cenex/LandO'Lakes farm supply cooperatives. SurePro is a soy meal product with ligno sulfate added to increase bypass protein. This product is comparably priced to Soy Plus.

## 3. Frontier Feeds

Frontier Feeds markets two products, one is extruded and one is extruded and expelled. In 1996 they sold 1,000 tons of their extruded product and 2,000 tons of their extruded/expelled product. *1996 was the first year the extruded/expelled product was on the market.* Approximately 99% of Frontier's sales are direct to farmers, with one-third of its product sold as a component in a mix, and the remainder sold outright.

## 4. SoyBest

This product is currently manufactured in Nebraska, and is similar to SoyPlus. In fact, these two products directly compete with each other in many parts of the Midwest. However, at present, SoyBest is not marketed significantly in Wisconsin.

## 5. Roasted Soybeans

Roasted beans are also a good source of bypass protein. However, the main disadvantage of roasted beans is their high fat content compared to commercial sources of bypass protein such as Soy Plus. Although roasted beans offer high feed value, they are less palatable and tend to produce oil in excess of dairy cows' needs. Roasted beans are readily available in Wisconsin.

## 6. Other Products

Several other products are also being used by dairy farmers in the central part of the state as sources of bypass protein. These include corn and animal byproducts, cottonseed and brewers grain. These products should also be considered a form of competition to the proposed facility.

In summary, there would appear to be an opportunity for an extruded/expelled soybean manufacturing facility in Wisconsin as none of the identified competitors currently has a facility in Wisconsin. Additionally, there may be an opportunity for the new company to provide transportation cost savings compared to meal imported from other states as well as provide a higher feed value source of bypass protein relative to Soy Plus.

## **G. Marketing Strategy**

The research completed by CDS suggested three possible outlets for the proposed company's marketing strategy, namely, feed companies, independent consultants and direct sales to farmers. Advantages and disadvantages of each are discussed below.

### **1. Feed Companies**

Feed companies represent the largest potential volume and existing outlet. The greatest advantages of selling product through feed dealerships would include their ability to provide in-house staff to market the product as well as storage and delivery services. Both of these opportunities would allow the new company to save on initial capital expenditures.

As a majority of farmers obtain their feed supplies at such dealers, the amount of exposure available at this type of location would be of paramount importance to a new company.

Additional opportunities available at this outlet would be staff education and point of purchase information/displays for marketing purposes.

Conversely, these sites may offer several disadvantages in that competitors have already established strong market positions, hence, there may be a lack of available bin space. In addition, there is no control over the efforts made by on-site staff to promote the product. In fact, in-house staff and nutritionists may have entrenched loyalties to other products or, may resist the introduction of a new product. As existing competitors already have a market presence, it will take a significant amount of marketing effort to carve a niche and gain market share. Regardless, area feed dealers should be considered one facet of the company's overall marketing strategy.

### **2. Independent Consultants**

Consultants and nutritionists are increasingly being utilized by dairy farmers in Wisconsin. Due to this increase, they represent a potentially effective marketing tool for the new company. Although independent consultants are unlikely to sell the new product on a commission basis, they may serve as an effective carrier of product information.

The primary advantages available through this medium include an ability to have direct face to face contact with farmers and an intimate knowledge of each farmer's overall operation. Additionally, and perhaps most importantly, an independent consultant may be perceived as having an unsolicited opinion, as they do not have any reason to promote a particular product. As the use of consultants in the dairy industry continues to increase, this medium becomes more important.

Disadvantages of this source would include a lack of centralized control over sales and marketing, as well as a variation in the level of skill, knowledge or ability. Accordingly, consultants may be more likely to be allies and sources of production information than actual

sales agents.

### **3. Selling Direct to Farmers**

As one of the original goals of this project was to have farmers work together to strengthen each other, the ability of soybean growers to direct market their products to fellow dairymen would be of paramount interest. A primary advantage of utilizing this medium to sell product includes the ability to communicate directly to farmers to discuss the product's superiority. This would allow the new company to have complete control over the amount of effort put into marketing. Unfortunately, there are several barriers to this method, the most predominant of which is the lack of a concentration of large dairy farms in any particular area. Thus, this method would require a very labor intensive marketing effort. In addition, these farmers often purchase enhanced protein soymeal in a pre-mixed format and many lack sufficient bin space to store the product. These problems would be difficult for a new company, with limited cash flow, to overcome.

#### **Summary of Soybean Meal Marketing Analysis**

The preliminary analysis on soybean meal completed by CDS suggested two predominant factors would determine a new company's success, namely, consistency of product and aggressive, knowledgeable, sales support. As a relatively dense dairy base is not available in the J.A.M. area, distribution channels into adjacent counties must be formed.

A combination of wholesale sales to dealers and retail sales to farmers will need to be implemented. Transportation and labor costs will require wholesale sales to dealers generally remain within 100 miles of the facility, while direct sales to farmers be held within 50 miles.

As similar products currently exist on the market, a new product must aggressively command shelf space, and it must be clearly differentiated from competing products. Existing competitors have achieved success through educationally based product promotions.

CDS' specific recommendations for the new company include:

1. Utilize a combination of two marketing channels, feed dealers and direct sales.
2. Initiate a well-funded, strategic marketing campaign, based on an education of the product's superiority in the marketplace
3. Obtain and publish feed sample testing results, and quality controls  
For independent consultants as well as the public
4. Offer feed efficiency demonstrations to help support company claims
5. Provide training sessions for staff, salespeople, and feed store outlets

## B. Extruded/Expelled Soybean Oil

Discussions with existing expeller operators in other states implied that receiving a premium over CBOT soy oil prices was the key to running a profitable facility. The financial projections completed as part of this study corroborate this statement.

Although all operators agreed the expelled oil could be readily sold at CBOT prices to large scale food processors for further refinement, receiving a premium for the oil becomes more difficult. One of the focuses of this study was to research general information on potential markets for expelled oil in a variety of use categories. A review of existing information on the subject and our discussions with existing operators in other states revealed one common tenet, namely, *nearly every potential market will require additional development before value added potential can be realized on a sustainable basis*. In a bittersweet twist to our research, we did become aware of several immediate market opportunities for expelled soy oil at the required premium, such as its use as a cutting oil in the auto industry. However, even if all existing operators in the United States formed an expeller consortium there would still not be enough capacity in the industry to satisfy the demand for one General Motors plant. Accordingly, we chose to concentrate our efforts on identifying smaller, niche markets which either the proposed facility alone, or a consortium of expellers, could satisfy demand.

The Table in Exhibit A serves to exemplify the many diverse end-products that are currently manufactured from soy oil and/or its by-products. Unfortunately, capacity of the proposed facility cannot satisfy all of these markets. In fact, an observation of the marketplace determined that large-scale operations dominate the huge commercial food and industrial markets, thus leaving the smaller scale expeller plants to focus on value-added niche products and markets. For purposes of this study, we have reduced the potential niche markets into three segments for further discussion. These include expelled soybean oil for human consumption; animal feed/on-farm uses, and industrial uses.

### 1. Soybean Oil For Human Consumption

Soybean oil produced via the extruded/expelled process is recognized by a variety of names, such as “cold pressed”, “squeeze pressed”, “natural pressed” and “expeller” oil. However, in the context of soy oil for human consumption, it is essentially *crude oil*. While crude oil may be safely consumed if sufficiently filtered or settled, most buyers of food grade oil require additional, more complex refining. Discussions with potential buyers of this oil determined that **clarity** was of particular importance to them. Clarity is typically achieved in processing through further centrifuging and filtering. Interestingly enough, existing expeller operators in other states have suggested that sufficient “settling” can achieve the desired results. Research completed at the University of Nebraska determined that the “fines” or “fuzzies” which occur in the manufacturing process of naturally pressed oils are not gums, but, merely meal particles that bond together.

De-gumming is the first stage that occurs in either the solvent extraction or mechanical pressing of raw soybeans. An Iowa manufacturer of extruder/expelled equipment stated that natural

pressed soy oil may be preferable to solvent extracted crude oil in this respect because it is actually de-gummed once. Further, the National Oilseed Processors Association (NOPA) generates standards which include specifications for crude de-gummed oil. Crude expelled oil has been found unacceptable for use as a deep-frying oil, as it requires a higher flashpoint and a more sophisticated and refined (i.e. bleached and deodorized) process.

On a more positive note, there appears to be several nutritional aspects available through refined expelled soybean oil. One Nebraska expeller claimed this oil is an excellent source of Vitamin E, a benefit which is largely removed in the traditional solvent extraction process. In addition to the obvious human health benefits, Vitamin E is a natural anti-oxidant, which makes naturally pressed oils more stable. If this were a proven fact it could result in other positive advantages such as an increased shelf-life for the product, less perishability once opened, and the absence of nitrogen for packaging. These benefits are not available through the solvent extracted processing method.

An additional market opportunity may be available if the existing operators' claim that pressed oil provides a natural source of estrogen is proven. As expelled oil does not utilize solvent extraction techniques, it is fair to assume it is completely free of hexane residues. Accordingly, the product would be an attractive alternative to health conscious consumers concerned with breast cancer and other "environmental illnesses." Although a respectable amount of research has been completed in this area, further work must be analyzed prior to accessing this market. The potential premium paid for expelled oil in this niche would be significant.

In summary, at present, the marketing alternatives for human consumption appear to be limited. Although there is a readily available market for selling the expelled oil at CBOT prices to large volume purchasers for food processing uses, transportation costs play a pivotal role. The closest large scale buyer of expelled oil for a Central Wisconsin facility would be A.C. Humko (formerly Kraft, Foods) in Jacksonville, Illinois. Preliminary discussion with existing operators indicated that the price paid by large scale buyers tends to vary. As an example, when CDS contacted A.C. Humko a company representative stated they would pay \$.02 under CBOT prices for the purchase of expelled oil.

Although this is a readily available market and one which would provide the proposed facility with a source of cash flow until other opportunities became available, there are other issues involved with a new, small company selling product to a larger, well-established company such as Humko. For example, Humko may not be a guaranteed, regular purchaser of the oil, and they may have an ability to "reject" a delivery without warning. An on-site interview with an existing expeller operator in southern Illinois indicated that this had happened to them more than once. These types of issues would be problematic to a new, growing company with limited cash flow. Accordingly, smaller, niche markets appeared to offer the best opportunity for the proposed facility.

With this in mind, CDS next contacted smaller food processors within Wisconsin to determine their interest in expelled soybean oil. Their survey included both large and small scale manufacturers. One manufacturer was already using a supplier of soy oil from Minnesota and

was interested in changing sources. Another stated they preferred to use corn or canola oil rather than soy oil, due to its "bitter, fishy taste." Most of the respondents stated that if they did use soybean oil, it would have to be refined further, basically, just one notch lower than grocery store cooking oil.

The survey concluded that the purchase of additional refining equipment would be required to accommodate the demands of these markets. More disturbing, even if the facility were capable of providing the additional refining, it is unlikely it would be cost effective, as the larger scale purchasers were only paying \$.04 over CBOT prices. In comparison, a cursory review of the cost of purchasing the additional equipment required to provide the necessary refining would be approximately \$300,000. Although opportunities for hiring custom refineries may exist, our research did not uncover any sources in the State of Wisconsin.

With this in mind, the smaller "natural foods markets" were researched to determine if there was any interest in a new, hexane-free, grower produced cooking oil. Surprisingly, the response was not overly positive in this market. Further, it was apparent that natural food brokers play a critical role in entering this market due to their established distribution channels, contacts and sampling allowances.

In brief, if there are niche markets for human consumption of natural pressed oils, additional research well beyond the scope of this study must be completed.

### **Soybean Oil as a Feed Additive/Other Farm Uses**

While outlets like A.C. Humko may provide the proposed facility with short-term options, developing and accessing local, farm-related markets closer to the proposed manufacturing site appeared to be the best alternative. Although development of these markets would require time and labor intensive activities, such as meeting buyer specifications, packaging and marketing, the end result may be a higher price and diminished transportation costs.

### **Feed Additive**

Preliminary research completed by CDS indicated farm-related markets may provide the best short-term opportunities for the proposed facility. Specifically, markets included feed manufacturers, nutritionists, and large livestock farms which could incorporate the oil as a feed additive or dust suppressant. Unfortunately, many of the sources we contacted believed that soybean oil was an inappropriate additive for dairy cows and other ruminant livestock (i.e., cattle, sheep, goats, deer) One of these proponents was Dr. Randy Shaver of the University of Wisconsin-Madison, Animal Science Department. Dr. Shaver believed that soybean oil (he referred to it as "free oil") is especially inappropriate for dairy cattle due to the bacterial fermentation in the rumen, the trouble with fiber digestion and a negative impact on fat tests.

Dr. Michael Hutjens of the University of Illinois concurred with Dr. Shaver's opinion. He stated that pure soybean oil has no discernable advantage in dairy rations, except to control dust and bind fine particles. He suggested limiting unsaturated oils as free oil to ½ pound per cow per day, because it would reduce fiber digestion in the rumen and lead to rumen acidosis.

Throughout the scope of this project, existing expellers in other states have frequently promoted the possible presence of by-pass proteins in expelled meal and oil. While limited research has been completed on soybean meal other sources expressed caution in claiming that expelled oil is superior to its hexane extracted counterpart. In defense of their position, they cited the lack of hard evidence substantiating their claims. Accordingly, the proclaimed by-pass capabilities of expelled oil will need to be proven; the testing for which may prove to be very expensive.

In light of the current concerns with issues such as "Mad Cow Disease", Dr. Shaver was asked if the new regulations limiting the use of animal proteins in feeds would lead to an increase in vegetable-based protein sources, such as expelled soybean oil. Shaver did not expect the rulings to restrict the use of animal fats currently being used in dairy feed manufacturing.

If soybean oil is an inappropriate additive in the feed of ruminant livestock, the possibility of its use for non-ruminant animals, particularly the swine market, was explored. One existing expeller in Nebraska currently markets 70% of their oil locally to swine nutritionists, with the balance going to A.C. Humko. This particular processor hauls a tank with a pump to various nutritionists within the State of Nebraska. Although they are receiving the same price offered by A.C. Humko, they are not incurring the transportation costs to Illinois (currently \$.02/lb). In addition, this processor stated there are several reasons nutritionists buy the expelled oil. First, they value the oil as a feed additive because it offers more available metabolizing energy and higher fat content. Second, several end-customers have switched from rendered product (lard and tallow) to soy oil as sources of fat due to perceptions that "Mad Cow Disease" and related problems may be avoided. Finally, customers find soy oil easier to handle than lards or tallow and believe the expelled soybean meal and oil increases the palatability of animal feed, which can translate to more rapid weight gain and less waste.

When the preceding comments were presented to Drs. Vern Leibrandt and Tom Crenshaw, Swine Nutrition Specialists at the University of Wisconsin at Madison's Animal Sciences Department, they were skeptical of the marketability of soy oil as a feed additive in Wisconsin. Both believed "economics" would be the greatest barrier and there was a limit to the amount of fat which could be added to a hog's diet without incurring a problem referred to as "soft pork." The limit is usually 3-5% of the diet. They also believed that hog producers would prefer to utilize less expensive sources, such as lard and tallow, which sell for \$.14-\$.20 per pound. The fact that Nebraska is a much larger hog producing state than Wisconsin may account for the Nebraska expeller's ability to successfully market expelled oil as a feed additive.

Another potential feed market considered for the proposed facility was Wisconsin's larger poultry producers. Dr. Mark Cook, a Nutrition Specialist with the University of Wisconsin-Madison, stated that soybean oil would be an excellent additive for broilers, layers, ducks and turkeys. There are currently six poultry producing companies in Wisconsin which make up a

significant percentage of this ½ billion dollar industry. Unfortunately, as was the case with hogs, Dr. Cook noted that too much oil in a bird's diet may cause problems. However, even at a 2% limit, just one company near Racine would require 1,800 tons of oil per year--more than the capacity of the proposed extruder/expeller facility!

Unfortunately, when one of these companies was contacted, (Golden Plump of Arcadia) their Nutrition Consultant, Dr. Paul Twining, stated the benefits of soybean oil (i.e. dust control, higher fat content, ) would not justify even a \$.05/lb premium over alternative rendered animal fat products.

Other potential markets worthy of mention include the emerging emu, ostrich, red deer, elk, bison, and aquaculture industries of Wisconsin. Emu and ostrich producers work with nutritionists to obtain feed mix blends through local suppliers. Although soybean meal is a feed component there is no apparent advantage for expelled soybean meal. Red deer and elk producers do not appear to feed much protein, only small amounts of soybean meal in concentrate. While bison feeds regularly include soybean meal as a protein, the aquaculture industry uses some soybean meal, primarily fish meal, and most aquaculture feed is purchased out of state, primarily Pennsylvania and Idaho. In brief, it may be worthwhile to follow any new developments in these smaller niche markets. However, it is unlikely any of these would serve as major markets for the proposed facility.

### **Dust Suppressants**

While a number of feed dealers CDS contacted expressed limited interest in the proposed facility's oil as a feed additive, many seemed genuinely interested in finding a way to work the expelled oil into their retail operations. There appears to be a strong sentiment among retailers, and their customers, to support local, grower-oriented businesses.

The greatest amount of research on this subject was completed by Erickson in his book, the "Practical Handbook of Soybean Processing and Utilization." The following excerpt from page 419 of his book best describes the potential for soybean oil as a dust suppressant:

"Airborne grain dust in a confined space can cause a disastrous explosion when present in sufficient concentration and in the presence of oxygen and an ignition source. Every year about 30 explosions are attributed to grain dust...Soybean oil reduces dust in elevators by 94%. Spraying soybean oil is an inexpensive means of reducing the risk of dust explosion, and the investment in equipment to use soybean oil has been estimated to cost about 1% of that need for dust collection equipment."

"Incorporating 1 to 2% soybean oil in livestock feeds also greatly reduces hog house dust and often gives 5 to 10% increase in weight gains. Normally, degummed oil is used. Controlling dust levels in hog houses leads to healthier pigs, improved weaning rates, and reduced odor (hog house odor is attributed to airborne dust). The market for using soybean oil to control dust in hog houses and in grain elevators has been estimated to be 1.3 billion lbs.

“Recently, interest has developed in using soybean oil soapstock in similar dust control applications. Excellent control of road dust has been achieved by spraying soybean refinery byproducts onto gravel roads.” (Erickson, p. 419)

### **Herbicide and Insecticide Carriers**

A review of Erickson’s work, as well as that of others, suggests that soybean oil may be useful in crop applications. If this is true, environmental advantages would accrue in applications where soybean oil could be substituted for its more hazardous counterpart, petroleum. Herbicides and insecticides must first be diluted in a carrier so that they can be uniformly applied. Water has been almost exclusively used for insecticides, and the relatively large volumes used require frequent, time consuming refilling of spray tanks. The advent of rotary atomizing nozzles has facilitated the application of very small carrier volumes. This has made it practical to use soybean oil as a carrier. Additional benefits include reduced drift, evaporative losses and increased penetration, which may reduce effective application rates.

Due to the acceptance of no-till and other soil conservation tillage methods there has been a growing, widespread use of postemergence herbicides on crops. Phytobland petroleum oil is currently used as the carrier and is used in sprays applied at about 2.5L/ha with rotary nozzle sprayers. Soybean oil has similar flow properties and, unlike petroleum products, is completely biodegradable. However, Erickson has cautioned, that spray equipment may need to be cleaned more frequently (because oil films can build up on equipment) and those applying the spray should wear protective clothing as soybean oil may increase the absorption of active ingredients through the skin. Erickson found soybean oil to be a superior carrier for agricultural chemicals with probable environmental benefits. However, he believed it is not widely used, because its cost is greater than that of the petroleum products it replaces.

An additional advantage soybean oil-based carriers may have over their petroleum counterparts is that they reduce spray drift and act as a sticking agent. According to David Trevor, of Insta-Pro (an original equipment manufacturer of expeller equipment) crop oil may sell anywhere from \$5 to \$14 per gallon. He suggested that \$2/gallon crude oil, combined with \$1.00 to \$1.50 emulsifier, can be retailed at \$6 to \$8 per gallon. If true, this would result in a significant margin for the proposed facility. Unfortunately, according to Bob Leader, of Producers Natural Processors (an organization dedicated to developing expeller driven markets) there are currently 337 companies who make crop oil. Therefore, the market may already be saturated. Leader further suggested that the value-added potential with crop oil was significant, particularly in light of the alternatives.

### **Irrigation Drip Oil**

It is a proven fact that irrigation wells require lubricants dripped down the well shaft to operate properly. As these lubricants ultimately discharge into the aquifer, the use of an expelled, biodegradable soybean oil in this type of application would appear to be superior to its petroleum counterpart.

A University of Nebraska study, by the Industrial Agricultural Products Center, determined that irrigation pumps in Nebraska annually consume between 375,000 and 525,000 gallons of drip oil. Although soybean oil must compete with petroleum-based products selling for much less, soybean oil's biodegradability provides it with an advantage over conventional oils. Further, in states where petroleum products have already been banned, soybean oils compete only with the more expensive synthetic oils. **This market warrants considerable scrutiny as industry analysts predict that petroleum-based oils will be regulated in all farming states within five years.** The Nebraska Center has committed a significant amount of its resources to assisting manufacturers in developing strategies to help these environmentally safe oils compete on today's markets. Magnum Manufacturing of Colorado devised one such strategy when it began marketing an eleven gallon oil reservoir prepackaged with lubricant--eleven gallons will keep most pumps lubricated throughout an entire irrigation season.

Existing expeller operations in Nebraska have stated that additional filtering of soybean oil is required to access this market. Nonetheless, this market appears to be one of the most promising for the proposed facility and merits further research.

### **Miscellaneous Farm Uses**

A former expeller operator in Illinois manufactured a product called "Natural Shine" which was used to shine horses' coats. According to this operator, his product sold wholesale for \$8.65 in ½ gallon containers. Other potential uses mentioned throughout the course of our study include using the expelled oil as a cut flower preservative to be marketed to nurseries.

### **INDUSTRIAL USES FOR SOYBEAN OIL**

It is interesting to note that soybean oil accounts for over 50% of the total fats and oils consumed in the United States, yet it provides less than 10% of our industrial needs for fats and oils. Once again, Erickson is a foremost authority on the subject, "Soybean oil is often regarded as being too viscous and reactive to atmospheric oxygen to be used as fuels, cosmetics, lubricants and chemical additives, but not reactive enough for most paint and coating applications. However, more stringent environmental standards, rising costs for competing petroleum-derived products, ability to tailor soybean oil for improved performance properties, and more cost-effective chemical conversion processes are leading to increased attention on soybean oil as a feedstock for industrial products." (Erickson page 400)

The various industrial products that can be made from soybean oil require different processes and additives as well as differing levels of quality, crude oil and specifications. Those considered as a component of this study encompass industrial uses such as lubricants, fluids, greases, and cooling oils.

As Erickson states in his book, "Vegetable oils were once widely used for industrial lubrication fluids; but today, petroleum-derived mineral oils have largely supplanted vegetable oils. The principal advantage of vegetable oils is their superiority in clinging to metal surfaces in very thin films, while they also have problems in that under extreme conditions they can hydrolyze and

become acid and corrosive. Today, most of the fats and oils used for lubricating oils and greases are animal fats or castor oil.”

Dr. Lou Honary, of the University of Northern Iowa, and his program, the Ag-Based Industrial Lubricants Program (ABIL) have become the recognized leaders in testing soybean oil as a lubricant. Due to Dr. Honary’s work from 1991 to 1994, he studied, developed and tested soybean-based hydraulic oil. ABIL’s work is intended to help advance the use of vegetable oils as a renewable, biodegradable, home-grown source for industrial lubricants. ABIL’s work involves the research and testing of vegetable-based oils for use in industrial lubricant and hydraulic oil applications. All testing is done according to ASTM industry standards. Testing and research seeks to verify biodegradability, biotoxicity and ecotoxicity . Honary’s work to date has encompassed developing baseline data for various commodity soybean oils, ( i.e., genetically modified/identity-preserved) and then attempts to match the oils with various industrial applications, such as quench oil, way-oil and cooling oil. To date, all of the vegetable oils that have been tested have performed well in terms of wear protection in ASTM requirements.

Although there are no definitive findings from testing to date, the expelled soybean oil, as mentioned earlier in this study, has the advantage in this area, as it is a biodegradeable, environmentally friendly substitute for the more hazardous petroleum counterparts.

## CONCLUSION

In summary, there are a variety of potential applications for expelled soybean oil, none of which provide a readily available market at the desired price. Short-term options such as A.C. Humko offer the proposed facility an opportunity to sell product until a more viable solution can be found. However, additional research must be completed on the markets most likely to be accessed at a premium over CBOT prices. Those offering the greatest potential appear to be irrigation drip oils, crop oil , dust suppressants and, perhaps, niche markets for non-traditional livestock such as ostrich, emus, elk, and bison.

### III. TYPE OF ENTITY

The growers found the preliminary market research and financial projections completed as part of this study convincing enough for the growers to take the next step and form an organization which would eventually be called Soy-Co. Prior to the formation of Soy-Co, the growers allocated a substantial amount of time to research the alternative forms of structure, discussed below, as well as sought counsel from attorneys who specialized in corporate organization.

Interestingly enough, at this project's inception, the growers assumed a New Generation Cooperative" (NGC) would be the preferred form of organization. However, as the study progressed, the members of Soy-Co decided upon a Limited Liability Company (LLC) as its form of organization. Alternative forms which the group considered in addition to the LLC and NCG included limited partnerships, "C" and "S" Corporations. A brief description of the advantages and disadvantages of each follows. In addition, the *Comparison of Five Business Structure Alternatives for Closely-Held Joint Ventures*, found under Exhibit B, outlines the advantages of each form in an easy to read chart. Greg Lawless, who assisted with CDS' portion of this study, prepared this chart for an earlier analysis he completed on multi-generational dairy farms. He welcomed our use of it for purposes of this project.

#### 1. Limited Liability Company (LLC) And S Corporations

The Limited Liability Company (LLC) is a relatively new form of organization which is a hybrid between a corporation and a partnership. Investors in the organization are termed "Members" rather than partners or shareholders. LLC's provide their members with both the limited liability characteristics of corporations and the pass-through tax treatment of partnerships. Like limited partnerships and corporations, LLC's are created by statute.

The primary advantages of LLC's, which were of particular significance to the growers, are summarized below:

A. Members of LLC's enjoy the same protections from personal liability for business obligations as shareholders of a corporation or limited partners in a limited partnership. Unlike the limited partnership form, which requires at least one general partner be personally liable for all debts of the business, no such requirement exists for an LLC.

B. LLC's, S Corporations and partnerships all provide for the pass-through of income and loss to their owners. However, LLC's may be used in a wider range of circumstances than S Corporations. For example, S Corporations may have no more than 75 shareholders. With limited exceptions for certain trusts, shareholders in S Corporations must be individuals. Other types of investors, such as corporations and partnerships are not eligible to be S Corporation shareholders. This point was of interest to several potential members of Soy-Co, as their existing farms were organized as "C" Corporations or partnerships. In addition, S Corporations may issue only a single class of stock. LLC's, on the other hand, are not subject to any of these restrictions.

C. LLC members have the flexibility to allocate income or loss on a basis other than each member's percentage interest in the LLC. In contrast, for S Corporations all such allocations must be based strictly on each shareholder's stock ownership.

D. An LLC, like a partnership, is eligible to elect under Code Sec. 754 to adjust the tax bases of its assets after a change of ownership of a membership interest. In addition, as with a partnership, debt can be used to increase a member's basis in the member's interest.

In brief, the LLC appeared to offer the growers the greatest flexibility. This was extremely important as several of the largest potential investors in the processing facility were *non-growers*. This was a crucial factor in our organization's structure. Aside from the fact that non-grower investors may be motivated by different goals than growers (i.e., return on investment vs. increasing the demand and local price for raw soybeans, creating jobs in rural areas of the state, etc.) it diluted the value of an organization which tied "delivery rights" to ownership of the company, such as an NGC.

Finally, the only apparent disadvantage of the LLC type of entity involved the uncertainty resulting from a lack of legal precedent for disputes. As this is a relatively new form of organization there was little case law or precedent to follow. In contrast, Corporations, and partnerships have been in existence for numerous years. Accordingly, there is an abundance of precedence and case law to use as a reference point for disputes.

Several individuals implied one minor disadvantage associated with the LLC concerned the preparation and time required for the organization's governing documents. Typically, it requires consideration of more issues than is required in organizing a corporation. Although this may be true, none of the growers expressed concern that setting up the LLC was too arduous or cumbersome a process. In fact, the benefits available through this form of organization, namely, flexibility, limited liability of members, and pass through taxation to members, more than offset any perceived disadvantage.

## **2. New Generation Cooperative (NGC)**

New Generation Cooperative (NGC) is a term coined for the new, emerging organizations which have recently formed in North Dakota and Minnesota over the past several years. The focus of these entities appears to be based on value-added processing and forming a contract between members and the cooperative, which requires them to deliver a specified amount of product. The primary goals of these organizations are to allocate rights of delivery among potential members and raise funds for the construction of the processing plants. Typically, each share entitles a member to deliver one unit of farm product (such as a bushel of soybeans) to the cooperative. The price of each share is determined by taking the total amount of capital the cooperative wishes to raise and dividing it by the number of units of farm product that can be absorbed by the processing facility.

Although NGC's have been extremely successful in other states, the growers did not find them to be the preferred form of organization for Soy-Co. This was primarily due to the make-up of

the original investors of Soy-Co. Again, several of the investors who expressed an interest in the processing facility were *non* growers and, subsequently, had no intentions of supplying product to the facility. Therefore, as the LLC afforded more flexibility in this situation it was chosen as the most appropriate form of organization for our particular project.

Other alternative forms of organization, namely, "C" Corporations, general and limited partnerships were not given much consideration once the flexibility of the LLC was reviewed. However, the chart found under Exhibit B is useful for comparative purposes.

#### **IV. Financing Alternatives**

Once the growers had decided upon the LLC as the governing entity, they researched several alternative sources for financing their project. These included:

1. Conventional Bank Lending
2. Federal/State/Regional/Local Government Grant or Low Interest Programs
3. Member Financing Through the Sale of Units in the LLC

##### **Conventional Bank Lending**

The growers approached both local, independent banks as well as the larger regional banks in the state for financing. They quickly realized it would be difficult to obtain traditional bank financing as they were a "start-up" company with limited assets to use as collateral, and no historical performance. Even if they were able to convince a lender to provide financing for the company, it would have required a personal guarantee by the members of the LLC. This was a major stumbling block, as one of the most attractive options the LLC afforded its members was "limited liability." Therefore, if the members personally guaranteed the debt of Soy-Co, it would have been counterproductive to a major benefit available through the LLC. In addition, the interest rate would have been approximately prime plus 2% for any borrowings. Again, for a new company with limited cash flow, the interest rate differential plays a significant role with respect to profitability.

##### **Federal/State/Regional/Local Government Grant and Low Interest Loan Programs**

The growers researched a multitude of federal, state, regional and local government grant and low interest loan programs in an effort to find the best financing terms. Programs the growers considered, which are currently administered at the federal level, include those administered by the Rural and Economic Community Development Services (RECDs--and formerly known as FmHA or the Farmers Home Administration), the Rural Electrification Administration (REA) and the Small Business Administration (SBA).

The RECDs has several programs which we reviewed for their ability to assist with Soy-Co's requirements for capital. They offer a direct lending program as well as a guarantee program for Business and Industry. Their guarantee program is similar to a traditional bank loan which

carries an SBA guarantee. Although this program has several advantages, for our purposes, the lag time between application date and final approval was an area of concern. Others who have used this program suggested it takes between nine and eighteen months for an approval. In addition, it would have been difficult for Soy-Co to meet the conditions for acceptance, such as personal guarantees, collateral requirements and covenants. Typically, initial applications are filed with the State office in Stevens Point, then referred to Washington for final review and approval. Lending rates do not necessarily have a low interest rate component.

One program which the growers found of interest was the Intermediary Relending Program (IRP), which is administered at the local level and supervised by the RECDS. Usually, local or regional economic development organizations apply for funds from the RECDS at an interest rate of 1%, then re-lend them to final recipients, such as Soy-Co, at a fixed, below-market rate of interest for projects which create jobs and inject capital into the rural areas of the nation. Once re-paid, the funds are utilized to start a local revolving loan fund. Fortunately, for Soy-Co there were two local sources of IRP funds which could be accessed for their project. One IRP fund was operated by the Adams-Columbia Electric Cooperative in Friendship, Wisconsin, and a second was available through the North Central Regional Planning Commission in Wausau, Wisconsin. This program is an excellent development tool for projects such as Soy-Co's, as it is very flexible and funds may be utilized for a variety of purposes, such as construction, leasing, equipment, working capital and feasibility studies. In addition, a deferment of initial repayment may be requested. The flexibility and below market rate of interest were extremely attractive components of this program and made it the most attractive of those considered.

### **The Rural Electrification Administration**

The Rural Electrification Administration (REA) has several programs which offered very attractive features a new company such as Soy-Co found to be of value. The most attractive of these is their Zero Per Cent Interest Loan and Grant program. At present, this program is administered by the RECDS and is known as the Rural and Economic Development Loan and Grant Program (REDLG). The local electric cooperative plays a pivotal role in this program as a company must apply for financing directly through the cooperative. If the cooperative finds the proposed project to be of merit they next apply to the RECDS at the federal level for funding, then act as an intermediary in the process. If funds are approved by the RECDS the local cooperative lends the money it receives directly to the applicant. As the cooperative is the direct lender to the company, they complete the necessary due diligence as well as bear the risk of default. Fortunately for Soy-Co, and other new firms in this region of the state, the local Adams-Columbia Electric Cooperative was extremely aggressive in its participation in economic development projects and was willing to assume this role.

Although this program is extremely attractive, it is also extremely competitive and takes approximately six months to one year for approval, depending on the federal funding cycle and the availability of funds. Still, this is one of the best programs we reviewed; it provides funds to start-up companies and allows for a variety of needs such as construction/building, equipment, working capital and feasibility studies.

## **Small Business Administration**

The Small Business Administration (SBA) has several programs available for new companies, namely, 7(a), 504, and "Low Doc." The 7(a) and "Low Doc" programs are applied for through a conventional lender who is given a guarantee on repayment by the SBA in the case of a default. Theoretically, this guarantee allows the conventional lender to make a riskier loan they would not otherwise make based solely upon the merits of the project under consideration. Although the turn around time for both of these programs is faster than RECDs', they are not very flexible. Personal guarantees of individual members of the LLC were required and the interest rate offered is typically up to two points above the prime lending rate and is based upon the perceived risk of the project.

Alternatively, the SBA 504 program is a good source of long term fixed rate financing and applications for this region of Wisconsin were only available from the Wisconsin Business Development Corporation located in Madison. The same requirements of the previous programs, i.e., personal guarantees, made this program unattractive to Soy-Co members.

## **State of Wisconsin**

The State of Wisconsin has numerous economic development programs, the majority of which are administered by the Department of Development. For our particular project, the Department's Rural Economic Development Program (RED) and the Community Development Block Grant Program (CDBG) appeared to be the most attractive.

The RED program is a grant/low interest rate loan program which assists with soft costs, on a matching basis, for economic development projects which will likely result in capital expenditures and create new jobs. Examples of eligible soft costs include expenses such as feasibility studies, architectural or accounting fees. Potential applicants contact the Department directly to receive an application. A combination of grants and low interest rate loans are available. This appeared to be an excellent program and one which Soy-Co anticipates filing an application with in the future.

The CDBG program also provides funds for projects which create jobs and involve capital expenditures. A company first applies for funds from the local municipality, who then completes a grant application for the project to the Department of Development. If funded, the dollars requested become a grant to the municipality which then re-lends them to the company for uses such as building construction, equipment purchases or working capital. Oftentimes, when the funds are repaid from the company to the municipality, the municipality is able to retain a portion of the funds to seed its own local revolving loan fund. This is an excellent program, which offers advantages to both the company and the municipality, and currently offers a 4% fixed rate of interest.

As many municipalities in Wisconsin have utilized this program before, they may already have

large amounts of funds available in their revolving loan funds to lend to companies such as Soy-Co. Unfortunately for Soy-Co, Adams County did not have a capitalized, local revolving loan fund.

### Member Financing Through the Sale of Units in the LLC

Upon review of the many programs available for financing a new company, the members of Soy-Co decided to raise the required capital internally. Primary reasons for this decision included flexibility, cost, and ease of completion. Internal financing offered the members the greatest degree of control while removing the sometimes onerous and expensive process of completing applications for funding. As an example, completing applications for the CDBG and REA programs may cost \$3,000 to \$6,000 per application and take up to one month to complete. Additionally, final approval for these programs may take anywhere from four weeks to six months. In comparison, all that is required for internal financing is a small amount of recordkeeping.

Also, there were no covenants, restrictions or detailed documentation to comply with if internal financing was utilized rather than the governmental or traditional financing. Further, and most importantly for Soy-Co, internal financing removed the need for members to personally guarantee debt. As previously mentioned, had the members offered personal guarantees to secure debt, it would have been counterproductive to one of the major advantages the LLC offered, namely, *limited liability*. Alternatively, all that was required to complete internal financing was an addendum to the LLCc's Operating Agreement. Thus, the ease and timing of completion for this transaction, when coupled with the above, made it the most desirable way of raising capital for this project.

### CONCLUSION

The members of Soy-Co found the preceding information invaluable in determining the feasibility of a soybean manufacturing facility in Central Wisconsin. Based on the research to date, the growers formed Soy-Co in December of 1997, raised all capital internally, and initiated operations in March of 1997. To date, they have created five new jobs for rural residents and purchased 66,000 bushels of soybeans from local growers at market prices. At conservative estimates, this has allowed them to return \$16,500 additional dollars to the local economy in their first year of operation.

Soy-Co would like to thank the Wisconsin Department of Agriculture, Consumer Trade and Protection for supporting their efforts to date. Without their generous assistance this project would not have been possible, nor, would the resultant benefits been available to the local economy.

FARMERS LLC  
PRODUCTION ASSUMPTIONS

	5 DAYS YEAR 1 <u>1 EXTRUDER 1 EXTRACTOR</u>	7 DAYS YEAR 2 <u>1 EXTRUDER 1 EXTRACTOR</u>	5 DAYS YEAR 3 <u>2 EXTRUDERS 3 EXTRACTORS</u>
Bushels of Beans per Ton	38.8	38.8	38.8
Pounds per Bushel	60	60	60
Total pounds of bean per ton	2,328	2,328	2,328
Yield Loss	69.8	69.8	69.8
Processing Pounds	2,258.2	2,258.2	2,258.2
Pounds of Oil Removed	256	256	256
Net Pounds of Meal	2,002.2	2,002.2	2,002.2
<b>Annual Production Capacity:</b>			
Soybeans in bushels	132,840.0	185,976.0	408,360.0
Soybean cost per bushel	\$7.00	\$7.00	\$7.00
Total Raw Material Cost	929,880	1,301,832	2,858,520
Bean Meal Output (Tons)	3,426.7	4,797.4	10,523.9
Sales Price per ton	315.0	315.0	315.0
Bean Meal Revenue	1,079,411	1,511,175	3,315,029
Soy Oil By Product (Tons)	438.4	613.7	1,429.3
Price per Ton	480	480	480
Soybean Oil Revenue	210,419	294,586	686,045

Soybean LLC

PROJECTED INCOME STATEMENT FOR THE NEXT THREE YEARS

	1997 FORECAST	
	Amount	% Sales
Soybean meal revenue	1,079,411	83.69%
Soybean oil revenue	210,419	16.31%
Total Sales	1,289,830	100.00%

	1998 FORECAST	
	Amount	% Sales
Soybean meal revenue	1,511,175	83.69%
Soybean oil revenue	294,586	16.31%
Total Sales	1,805,761	100.00%

	1999 FORECAST	
	Amount	% Sales
Soybean meal revenue	3,315,029	82.85%
Soybean oil revenue	686,045	17.15%
Total Sales	4,001,074	100.00%

	1997 FORECAST	
	Amount	% Sales
Cost of Sales		
Raw material cost	929,880	72.09%
Depreciation expense	10,000	0.78%
Repairs and maintenance	3,000	0.23%
Utilities	37,995	2.95%
Direct labor	49,920	3.87%
Payroll taxes	4,493	0.35%
Labor benefits	10,800	0.84%
Total Cost of Sales	1,046,088	81.10%

	1998 FORECAST	
	Amount	% Sales
Cost of Sales		
Raw material cost	1,301,832	72.09%
Depreciation expense	10,000	0.55%
Repairs and maintenance	4,200	0.23%
Utilities	53,193	2.95%
Direct labor	69,888	3.87%
Payroll taxes	6,290	0.35%
Labor benefits	10,800	0.60%
Total Cost of Sales	1,456,203	80.64%

	1999 FORECAST	
	Amount	% Sales
Cost of Sales		
Raw material cost	2,858,520	71.44%
Depreciation expense	23,610	0.59%
Repairs and maintenance	8,400	0.21%
Utilities	91,091	2.28%
Direct labor	49,920	1.25%
Payroll taxes	4,493	0.11%
Labor benefits	10,800	0.27%
Total Cost of Sales	3,046,834	76.15%

Gross Margin	243,742	18.90%
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Gross Margin	349,558	19.36%
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Gross Margin	954,240	23.85%
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General and Administrative Expenses

Lease expense	15,600	1.21%
Depreciation - Building	0	0.00%
Liability insurance	12,000	0.93%
Property insurance	12,000	0.93%
Management Fees	31,200	2.42%
Advertising	3,600	0.28%
Lab Fees	1,200	0.09%
Legal expense	1,200	0.09%
Office and accounting	2,100	0.16%
Licenses and permits	1,200	0.09%
Telephone	2,400	0.19%
Postage expense	1,000	0.08%
Travel	1,000	0.08%
Meals and entertainment	1,000	0.08%
Total General/Administrative Expenses	85,500	6.63%

General and Administrative Expenses	16,068	0.89%
Lease expense	0	0.00%
Depreciation - Building	12,360	0.68%
Liability insurance	12,360	0.68%
Property insurance	32,136	1.78%
Management Fees	3,708	0.21%
Advertising	1,236	0.07%
Lab Fees	1,236	0.07%
Legal expense	2,163	0.12%
Office and accounting	1,236	0.07%
Licenses and permits	2,472	0.14%
Telephone	1,030	0.06%
Postage expense	1,030	0.06%
Travel	1,030	0.06%
Meals and entertainment	1,030	0.06%
Total General/Administrative Expenses	88,065	4.88%

General and Administrative Expenses	0	0.00%
Lease expense	3,125	0.08%
Depreciation - Building	24,360	0.61%
Liability insurance	24,720	0.62%
Property insurance	33,100	0.83%
Management Fees	3,819	0.10%
Advertising	1,273	0.03%
Lab Fees	1,273	0.03%
Legal expense	2,228	0.06%
Office and accounting	1,273	0.03%
Licenses and permits	2,546	0.06%
Telephone	1,061	0.03%
Postage expense	1,061	0.03%
Travel	1,061	0.03%
Meals and entertainment	1,061	0.03%
Total General/Administrative Expenses	100,900	2.52%

Net Operating Income	158,242	12.27%
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Net Operating Income	261,493	14.48%
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Net Operating Income	853,340	21.33%
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Other (Income) and Expenses	
Interest income	0
Interest expense - Credit Line	0
Total Other (Income) Expense	0

Other (Income) and Expenses	0
Interest income	0
Interest expense - Credit Line	0
Total Other (Income) Expense	0

Other (Income) and Expenses	0
Interest income	0
Interest expense - Credit Line	0
Total Other (Income) Expense	0

SOYBEAN LLC  
PROJECTED

BALANCE SHEET  
December 31, 1997

ASSETS

Current Assets

Checking account	125,000.00	
Inventory	79,490.00	
Accounts receivable	130,000.00	
Total Current Assets		<u>334,490.00</u>

Property and Equipment

Equipment	150,000.00	
Accumulated depreciation	(10,000.00)	
Total Property and Equipment (Net)		<u>140,000.00</u>

Other Assets

Organizational Costs	2,000.00	
Less: Accumulated amortization	(400.00)	
Total Other Assets		<u>1,600.00</u>

TOTAL ASSETS

476,090.00

LIABILITIES AND OWNER'S EQUITY

Current Liabilities

Accounts Payable	<u>88,000.00</u>	
Total Current Liabilities		<u>88,000.00</u>

Total Liabilities 88,000.00

Owner's Equity

Owners Capital	229,848.00	
Net Income	158,242.00	
Total Owner's Equity		<u>388,090.00</u>

TOTAL LIABILITIES AND OWNERS' EQUITY

476,090.00

SOYBEAN LLC  
PROJECTED

BALANCE SHEET  
December 31, 1998

ASSETS

<u>Current Assets</u>		
Checking account	321,893.00	
Inventory	114,490.00	
Accounts receivable	<u>170,000.00</u>	
Total Current Assets		606,383.00
<u>Property and Equipment</u>		
Equipment	150,000.00	
Accumulated depreciation	<u>(20,000.00)</u>	
Total Property and Equipment (Net)		130,000.00
<u>Other Assets</u>		
Organizational Costs	2,000.00	
Less: Accumulated amortization	<u>(800.00)</u>	
Total Other Assets		<u>1,200.00</u>
TOTAL ASSETS		<u><u>737,583.00</u></u>

LIABILITIES AND OWNER'S EQUITY

<u>Current Liabilities</u>		
Accounts Payable	<u>88,000.00</u>	
Total Current Liabilities		<u>88,000.00</u>
Total Liabilities		88,000.00
<u>Owner's Equity</u>		
Owners Capital	388,090.00	
Net Income	<u>261,493.00</u>	
Total Owner's Equity		<u>649,583.00</u>
TOTAL LIABILITIES AND OWNERS' EQUITY		<u><u>737,583.00</u></u>

SOYBEAN LLC  
PROJECTED

BALANCE SHEET  
December 31, 1999

ASSETS

Current Assets

Checking account	35,000.00	
Inventory	204,490.00	
Accounts receivable	<u>320,000.00</u>	
Total Current Assets		559,490.00

Property and Equipment

Equipment	479,150.00	
Accumulated depreciation	<u>(36,944.00)</u>	
Total Property and Equipment (Net)		442,206.00

Other Assets

Organizational Costs	2,000.00	
Less: Accumulated amortization	<u>(1,200.00)</u>	
Total Other Assets		<u>800.00</u>

TOTAL ASSETS 1,002,496.00

LIABILITIES AND OWNER'S EQUITY

Current Liabilities

Accounts Payable	<u>108,000.00</u>	
Total Current Liabilities		<u>108,000.00</u>

Total Liabilities 108,000.00

Owner's Equity

Owners Capital	41,156.00	
Net Income	<u>853,340.00</u>	
Total Owner's Equity		<u>894,496.00</u>

TOTAL LIABILITIES AND OWNERS' EQUITY 1,002,496.00

EXHIBIT A  
SOYBEAN OIL END PRODUCTS

## Soy Oil Products

- Glycerol , Fatty Acids, Sterols
- Refined Soy Oil
  - Edible Uses
    - Coffee Creamers
    - Filled Milks
    - Margerine
    - Salad Dressings
    - Shortenings
    - Cooking Oils
    - Mayonnaise/Sandwich Spreads
    - Pharmaceuticals
    - Salad Oils
  - Industrial Uses
    - Anti-Corrosion Agents
    - Core Oils
    - Dust Control Agents
    - Fungicides
    - Oiled Fabrics
    - Plasticizers
    - Vinyl Plastics
    - Anti-Static Agents
    - Diesel Fuel
    - Electrical Insulation
    - Printing Inks
    - Pesticides
    - Protective Coatings
    - Wallboard
    - Caulking Compounds
    - Disinfectants
    - Epoxys, Paints
    - Linoleum Backing
    - Putty
    - Soap/Shampoo/Detergents
    - Waterproof Cement
- Soybean Lecithin
  - Edible Uses
    - Emulsifying Agents
    - Candy/Chocolate Coating
    - Nutritional Uses
    - Bakery Products
    - Pharmaceuticals
    - Dietary, Medical
  - Technical Uses
    - Anti-Foaming Agents
    - Yeast
    - Paint
    - Dispersing Agents
    - Rubber
    - Shortening
    - Calf Milk Replacers
    - Alcohol
    - Anti-Spattering Agents
    - Inks
    - Insecticides
    - Stabalizing Agent
    - Wetting Agents
    - Cosmetics

Table 1: From the American Soybean Association world wide web pages at [http://www.oilseeds.org/asa/uses\\_soy.html](http://www.oilseeds.org/asa/uses_soy.html) and <http://www.ag.uiuc.edu/~asa/soystat/uses.html>

EXHIBIT B  
COMPARISON OF FIVE BUSINESS  
STRUCTURE ALTERNATIVES FOR CLOSELY HELD VENTURES

**Comparison of Five Business Structure Alternatives for Closely-Held Joint Ventures**

	Partnership	Limited Liability Company	S Corporation	C Corporation	Cooperative Corporation
<b>Ownership Issues</b>	<i>The number of owners, their respective and relative contributions, and their personal and collective business goals will determine the significance of ownership and start-up issues described below.</i>				
<b>Term for owner Limitations</b>	Partner (general & limited) (+ / -) New owners must be unanimously approved.	Member (+ / -) Limited to 35 owners. May not own a subsidiary. Corporations and non-resident aliens may not own stock.	Shareholder (+) Few, if any, limitations.	Shareholder (+) Few, if any, limitations.	Member (+ / -) Generally limited to current "users" of the business' goods or services. Ownership often limited to active farmers. <sup>1</sup>
<b>Family farm orientation</b>		(+ / -) No inherent orientation to favor farmer ownership over non-farmer ownership, although rules could be so instituted.			(+) Often an inherent orientation toward farm family ownership.
<b>Limited liability</b>	(-) No	(+) Yes	(+) Yes	(+) Yes	(+) Yes
<b>Getting Started</b>	<i>Starting a multi-family joint venture will always entail complications. It is very important to get competent outside assistance.</i>				
<b>Legal and administration costs</b>	(+) Lowest legal and administrative costs. <sup>2</sup>	(+) Relatively easy and low cost.	(+ / -) More complicated and costly than partnership and LLC. The greater the number of owners, the more the legal and administrative costs can be spread out.		
<b>Familiarity</b>	(+) The partnership is very common.	(-) The LLC is still a relatively new option. Legal and financial consultation may be limited and costly.	(+ / -) The S corporation may be less familiar to farmers and their advocates than C corporations and cooperatives.	(+) Very familiar.	(+ / -) While the cooperative model is especially common in U.S. agricultural cooperative farm ownership is quite uncommon.
<b>Capitalization</b>	(-) Unlimited liability may discourage investment.	(+) Limited liability, and the ability to contribute and withdraw appreciable assets without capital gains taxes are distinct advantages.	(+) Limited liability, but (-) capital gains tax penalties may discourage contributions of appreciable assets such as land.		(-) In addition, restrictions on membership and dividends may limit investment. <sup>3</sup>

<sup>1</sup> Retired farmers (former members) may still participate as shareholders in votes that may affect equity capital that has not yet been revolved back to them. They would have one vote as a shareholder.

<sup>2</sup> The partnership business form can be "deceptively simple". Separate books must be kept for accounting and tax income, and partners must keep track of their individual basis or the IRS may rule that partners started with no basis and hence all asset appreciation could be counted as gain. These "income tax traps" can be avoided with proper counsel, but the point is partnerships are not always as simple as they may appear on the surface.

<sup>3</sup> While preferred stock is allowed, there is an 8% limit on dividends paid to capital in cooperatives. If each co-op member makes capital contributions in proportion to their patronage or "use" of the business, rewards to capital investment may be commensurate to rewards paid according to use (patronage refunds), so this need not be an issue. However, when investment by any one member greatly exceeds his or her use of the business (relative to other owners), another business form that rewards investment may be more appropriate. At the same time, a "base capital plan" may address investment discrepancies among members, tending toward equitable equity investment over time. Also, special loans from "co-op banks" may be available for cooperative ventures.

	Partnership	Limited Liability Company	S Corporation	C Corporation	Cooperative Corporation
<b>Decision-Making and Management</b>	<i>Decision-making authority is allocated and structured differently among the business forms. Some involve a more formal process, some distribute power more equally than others, some require anonymity while others require simple majority approval. Which of these alternatives is more advantageous will depend on the situation.</i>				
Distribution of voting power	(+ / -) Usually, one vote per partner.	(+ / -) Usually in proportion to investment, although each owner enjoys veto power in consensus-based decisions.	(+ / -) One vote per share of stock. While only one class of stock is permitted, differences in voting rights are permissible.	(+ / -) One vote per share of stock.	(+ / -) One vote per member. <sup>4</sup>
Decision-making body	(+ / -) The partners as a whole. Less formal, more flexible. No board of directors.	(+ / -) Usually in proportion to investment, although each owner enjoys veto power in consensus-based decisions.	(+ / -) Board of Directors, elected by a majority vote of the owners. More formal than partnership or LLC.		
Majority rule or consensus	(+ / -) Unanimous consent.	(+ / -) Majority of ownership interest rules, except for major decisions that specifically require consensus approval.	(+ / -) Majority of ownership interests elects the board of directors, and majority rules on the board.	(+ / -) Majority of members elect board of directors, and majority rules on the board. <sup>5</sup>	
Management	(+ / -) Owners may manage collectively or appoint and/or hire a manager. <sup>6</sup>	(+ / -) Owners may manage collectively or appoint and/or hire a manager. <sup>6</sup>	(+ / -) Usually, the Board of Directors hire a manager, and management is centralized. In a tightly held corporation or small cooperative, however, owners may effectively manage collectively and/or divvy out management responsibilities.		
<b>Flexibility in Distributions</b>	<i>When the business employs one or more of its owners, a business form (or forms) and associated tax strategy should be instituted that equitably rewards labor and capital, while minimizing the tax burden. It should be noted that all of the business forms have such options as paying rent as distributions to owners that rent land to the entity.</i>				
Distributions to employee-owners	(+) Distributions can be directed to labor or capital, in proportions that may vary from owner to owner and from year to year (within reason), in order to minimize tax burden and most appropriately reward owners.	(+) Distributions can be directed to labor or capital, in proportions that may vary from owner to owner and from year to year (within reason), in order to minimize tax burden and most appropriately reward owners.	(-) The temptation to minimize salaries (and associated taxes) of employee-owners and distribute earnings instead to owners as pass-through income is limited by the IRS. (-) Also no deductions for fringe benefits.	(-) Advantages to maximizing salaries to employee-owners in order to minimize taxable income (taxed at both shareholder and entity level) is offset by increased FICA taxes. (+) Deductions for fringe benefits available.	(+ / -) Cooperative law favors reward to "use" (patronage) over reward to capital. If use is measured in terms of labor, distributions would tend to go to employees as either salaries or "patronage refunds".
Distributions to investors	(-) Lacks deductions for fringe benefits paid to employee-owners (see tax issues below.)	(-) Lacks deductions for fringe benefits paid to employee-owners (see tax issues below.)	(-) Single class of stock limits special allocations to more substantial investors.	(+) Multiple classes of stock makes special allocations to substantial investors possible.	(+ / -) 8% limit on dividends may perhaps be off-set with a base capital plan that rewards early satisfaction of equity requirements with greater patronage refunds.

<sup>4</sup> Non-patron stockholders (e.g., retired farmers who were formally active members) may take part in stockholder votes if equity capital has not yet been revolved back to them. They receive one vote.

<sup>5</sup> Two-thirds approval may be required in major votes presented to entire membership.

<sup>6</sup> For an LLC to qualify for partnership (pass-through) tax status, it may possess no more than two of the following "corporate characteristics": (a) continuity of life, (b) centralized management, (c) limited liability, and (d) free transferability of interests. Since limited liability is almost always present, if the LLC opts for centralized management, no other corporate characteristics may be present without forfeiting pass-through tax benefits.

	Partnership	Limited Liability Company	S Corporation	C Corporation	Cooperative Corporation
<b>Taxation</b>	<i>Closely-held joint ventures often involve complex contributions of capital, working and non-working owners, and many other complications. Minimizing the tax burden under these complex circumstances can lead to elaborate and cumbersome models involving numerous business forms.</i>				
"Pass through" income taxation	(+) Yes		(+/-) Built-in gains and passive net income are taxed at entity level. Otherwise, yes.	(+/-) No. Income is taxed at the corporate and shareholder levels.	(+) Yes, to the extent that the cooperative issues patronage refunds.
Deductions for fringe benefits	These "pass-through" business forms are not considered separate employers from their owners, and the entity cannot therefore deduct fringe benefits paid to employee-owners.			(+) Entity level can deduct fringe benefits, and employees may exclude benefits received when determining their gross income.	
Conversion cost (rank along the tax spectrum)	(+) 1st (lowest cost.) Converting from partnership to higher level structures entails no associated capital gains.	(+) 2nd.	(-) 3rd. Preferable to the LLC if converting from a C corporation.	(-) 4th (highest cost). Converting from a C corporation or cooperative "downward" may entail substantial capital gains taxes.	
Basis adjustment when distributing ownership interests	(+) Enjoys favorable adjustments in the basis in its assets when ownership interests are sold.			(-) No adjustment in the basis of assets when there is a transfer of ownership.	
Capital gains taxes on distribution of appreciated assets <sup>9</sup>	(+) Appreciated assets can be distributed back to original contributors without recognizing gains.		(-) Gains penalties may be somewhat less severe than C corporations and cooperatives.	(-) Taxable gains may be recognized at both the individual and entity levels.	
<b>Adjusting to Change:</b>	<i>Flexibility to partition and transfer ownership interest, marketability of those interests, and tax penalties and disincentives for disassociation all affect owners ability to adapt their personal business strategies and to plan estates. In general, a balance must be struck between the maintaining flexibility of individual owners while ensuring stability of the joint venture for remaining owners. The best fit, again, will depend on the particular situation.</i>				
Withdrawal and transfer of ownership interest	(+ / -) Owners may withdraw their assets at will— often without recognizing gain— but transfers of ownership interest may require unanimous approval of remaining owners.		(+ / -) Majority of interests may prohibit withdrawal of minority interests' assets. This may promote the stability of the joint venture. It would also be a significant disadvantage for an individual wanting out, and it's one reason there's often a limited market for minority shares in a closely-held corporation.		

<sup>7</sup> Converting from a higher to a lower business form may result in taxable gains if current market value of the assets involved exceed their basis. For instance, appreciated land under corporate ownership will trigger a tax penalty if reincorporated to capitalize a new LLC. That penalty could outweigh any benefits that could be gained from switching business forms. One advantage of an S corporation is that built-in gains can be carried over a number of years, after which the entity could be converted to an LLC, if appropriate.

<sup>8</sup> Converting from a C corporation to an LLC requires liquidation of the C corporation and significant gains may be recognized. Shifting to S corporation status avoids liquidation of the original C corporation, thereby postponing the recognition of gain until the S corporation is liquidated.

<sup>9</sup> Example: An entity owns land with a \$100,000 basis and a fair market value of \$500,000. If the entity is a partnership or LLC and the entity dissolves by distributing the land to its partners (members), the gain is not recognized. The partners (members) simply have the land with the \$100,000 basis so the gain is still waiting to be recognized. If the entity is a corporation, both the corporation and the shareholders recognize the gain when the land is distributed to the shareholders and the shareholders then have \$500,000 basis in the land. An S corporation may enjoy an advantage over C corporations and cooperatives, but clearly the partnership and LLC are better.