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Agriculture Development and Diversification Project

Production and Marketing of Organic and GMO-Free Whey Products in Wisconsin

Final report

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Cedar Grove Cheese Inc.
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Summary

Cedar Grove Cheese conducted an analysis of opportunities to manufacture and sell specialty whey products. We identified markets for organic and GMO–free whey powders. Initial demand for the simplest formulation, sweet whey powder, appears sufficient to use available supplies. Additional demand appears substantial for whey protein concentrate, both as an ingredient and targeted to the health food and body building markets. Equipment costs are an impediment to production of these products. We investigated the possibilities for contract production and found them limited by technological and cost considerations. Wisconsin appears to lack an infrastructure for specialty drying. We estimated break even volumes under reasonable price and cost assumptions for several alternative solutions.

Cedar Grove Cheese's analysis of the whey market supports an earlier study (1) that identified the need for specialty production facilities in Wisconsin that can add value to the farmers' milk by getting full value from all of the components. Lacking those facilities, some inferior options exist for increasing value. Some whey can be sent to large facilities when they are available or, if properly prepared, can be shipped to distant plants. The first option requires cheese manufacturers to have multiple outlets for whey and can result in inconsistent supply to receiving plants. The second option is inefficient because liquid whey is 94% water that could be removed prior to shipping. Factories in closer proximity to specialty drying plants will have lower production costs and a competitive advantage in supplying specialty whey customers. During the course of the study, one major organic customer moved its cheese production from Wisconsin to a Minnesota plant with potential whey processing capabilities. Access to whey processing was one motivation for their move from the state. The move resulted in lost business to Wisconsin farmers and cheese businesses. Increasingly, the viability of Wisconsin dairy businesses will depend on the efficient extraction of all potential value from milk.

While the potential payoff from investment in specialty by-product processing is large, the magnitude of the investment and the large number of small products that would be supported make it difficult to organize. The Bush-era economy has not been conducive to starting such a venture. Perhaps an improved economy or a government initiative will create better conditions in the future. Meanwhile, the study identifies several second-best strategies.

As a result of this project, Cedar Grove Cheese has introduced organic sweet whey powder into the market. This is a product that was not previously produced in the United States. We also have added GMO- free sweet whey powder. These products have replaced imports or supported the growth of the domestic natural foods market. By increasing the value of cheese production by-products, Cedar Grove Cheese has been able to increase the price paid to farmers for milk. Cedar Grove has invested in equipment to make these new products available. Cedar Grove Cheese has also acquired

land and designed a building to house the equipment needed for the next phase of its value-added project. This stage will facilitate shipping the products to out of state processors. Pending financing, it will be completed in 2003. Further steps will require more money than Cedar Grove Cheese can raise at this time.

The report is organized as follows. 1. Description of whey processing technology with emphasis on simplest products. 2. Identification of some venders and rough cost estimates. 3. Identification of contract processing options. 4. Identification of markets for specialty whey products. 5. Steps taken and challenges encountered. 6. Future directions for Cedar Grove Cheese, the specialty cheese industry and the State of Wisconsin.

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Cheesmaking Byproduct Technology

After the curds have been turned into cheese, cheese factories are left with the whey. Whey solids are greater in volume than cheese solids. For many years, whey was disposed of by dumping or feeding to animals. Today, the components of whey are valuable and often determine the profitability of the cheese enterprise. Federal milk pricing assumes that plants are able to obtain value for their whey and set milk pricing accordingly. Cheese factories that do not receive at least the federal order value must offset the difference with other savings or go out of business. Plants with more expensive milk need to recover as much value as possible from all of the milk components to justify the higher cost.

Whey contains cream, which is typically removed and used for butter production or other processing. The remaining whey is about 94 percent water. The remaining 6 percent is 80 percent lactose, 10 percent protein and the remainder a mix of various non-protein nitrogen, ash, minerals and fat. Whey can be concentrated and used as an ingredient, dried or broken into components to increase its value. Additional processing adds both expense and value to the finished products.

In addition to cream, component products include sweet whey powder, whey protein concentrate, enriched protein fractions, individual proteins, lactose, reduced lactose whey, dairy minerals and demineralized whey. These products have uses ranging from animal feeds to processed food products to pharmaceuticals. The next section of the report explores the options in greater detail. Cheese plants with advanced whey processing facilities can obtain value for the whey that is greater than the value of the cheese.

The processing options we explored involve the simplest value added processing for whey from production of cheese without genetically manipulated organisms (GMO-free) or with certified organic ingredients. Because the ingredients are more costly for these specialty cheese products, it is important to try to extract greater value from the whey. However, because the available volume of specialty whey is limited, sophisticated processing options are not available.

The first challenge is to be able to keep by-products with the various characteristics segregated. This can be accomplished through scheduling or through duplication of storage facilities and processing equipment. At the beginning of the study, a major bottleneck was the whey separation equipment. Conventional cheese would have to follow GMO-free cheese which would have to follow organic. This scheduling would not always be convenient. If the vats were out of this order, even when we were able to schedule vats with organic cheese during different parts of the day from GMO-free or conventional cheese, the equipment needed to be washed between varieties. Our separator needed to be dismantled and washed by hand, which was laborious and time consuming.

Cedar Grove Cheese addressed this challenge by purchasing a self-cleaning separator. The separator can be cleaned without dismantling and thus is convenient for shifting among specialty products. The separator also provides improved cream separation in preparation for selling whey for drying where low levels of residual fats are permissible.

We explored markets for the specialty cream. Local butter manufacturers need large quantities of cream to have separate runs. Cedar Grove Cheese may be able to achieve those volumes by using the new separator to skim sweet cream from specialty milk and add it to our whey cream. We would like to make and market small containers of specialty butter. Packaging options for the plants that will do specialty production are limited to larger than optimal packages (1 pound or larger). The large packages carry a high price tag for specialty products. We priced butter equipment to determine whether we could make our own butter. Butter churns are reasonably priced (around $10,000 or

less). However, packaging equipment is expensive and we would have to hire a licensed buttermaker. Hand packaging will be explored further when the additional space is added to the factory. Many high quality and flavored butters are produced around the world. We concluded that opportunities exist for specialty butter manufacturing using technology that permits relatively small runs.

The bulk of our effort went into exploring processing options for the de-fatted whey. Most customers for higher value whey were seeking dried product. The dried whey can be stored and mixed into dried or moist sauces, soups, coatings or baked goods. Dried sweet whey contains all of the lactose, protein, ash and minerals of the cheese whey. It presents challenges for drying, such that not all drying plants are capable of drying sweet whey.

The lactose in dried sweet whey needs to be in a crystalline form in order to prevent it from absorbing water and becoming sticky. A variety of drying techniques are used to crystallize the lactose. Whey is generally concentrated in an evaporator to 50 percent moisture or less. It is then put into a crystallization tank where it is gradually cooled and agitated over a period of 10 to 24 hours. Sometimes the concentrated whey is seeded to improve formation of crystals. The whey is then put into a drier where the moisture is reduced, allowed to crystallize again and finally dried on a belt or fluidized bed. The evaporator, crystallization tanks and special driers are large, expensive and use a lot of energy. Used driers are occasionally available. We looked at a few. These tend to be bulkier and less energy efficient than newer models. We understand that new technologies are being developed that will be more efficient and use less space. Unlike the driers now in use, the new models may be scalable to smaller production runs.

Although sweet whey powder is the cheapest to produce and meets many customers' needs, whey protein concentrate has some advantages. Some customers need whey with lower levels of sugars and minerals. The technology for providing whey protein concentrate starts with membrane systems. Lactose is the largest particle in the whey. It can be separated using ultrafiltration. Typical levels of whey protein concentrate are 30%, 60% and 80%. The latter requires removal of minerals as well as lactose. Minerals can be removed with electodialysis, using electric charges to attract particles with cations and anions.

An advantage of drying whey protein concentrate is that it does not require the crystallization processes identified above. However, it does leave lactose as a by-product that must be processed and marketed. Markets for organic and GMO-free lactose do exist, but the pricing in these markets has not been determined. The cost of the membrane systems and the added costs of processing and marketing two or more products result in the cost of WPC and dried lactose being higher than the cost of dried sweet whey.

Cost Estimates and Space Requirements for Drying Sweet Whey

Cedar Grove Cheese contacted several vendors for information concerning equipment needs to concentrate and dry sweet whey. A thorough presentation was provided by GEA/ NIRO. Dave Mirko, of A&B Process Systems also provided considerable assistance. Additional Information was provided by Jon Hanson of CE Rogers Company, Steven Phillips of R. Mueller representing Filtration Engineering Co. Inc. and Joel Stencil of Membrane Process and Controls, Inc.

All of the vendors are to be commended for their assistance with this project. As described below, various hurdles have been encountered in implementing the plans and the vendors continued to suggest alternative solutions and identify used equipment in spite of undesirable delays. These suggestions broadened our understanding of the available options and subtle variations in the technologies.

Here we present a composite description of equipment requirements in the hope that it will provide guidance to other companies exploring these options. These price and space estimates will clearly vary depending on the plant, the application and the exact technological specifications chosen.

Evaporation of sweet whey will raise the concentration to between 35 and 55% solids from 6%. An integrated or separate pasteurization step is generally recommended. Cedar Grove Cheese based its design estimates on running 12500 pounds per hour of whey. A chiller and storage tanks are needed to hold the individual varieties of whey at low temperatures until they are ready to be separated. We would also need to upgrade utilities and steam boiler capacity to provide the needed energy.

There are several designs of evaporators. Most would work on whey except for rising film varieties in which the sweet whey would perhaps tend to stick or burn on the evaporator.. Used evaporators would be available for as little as $150,000. With installation, controls, CIP, pumps and piping and engineering the used equipment option would probably exceed $350,000. Used equipment will not be as energy efficient as new and requires more space. A new evaporator including the pasteurization and chilling units would run about $900,000. Space required for evaporation with new equipment would be at least a 25 ft. by 50 ft. room with about 25 foot ceiling height. One used evaporator we considered would require a 66 ft. ceiling height as well as additional floor space.

Utility requirements include approximately 4000 pounds per hour of steam at 125 psi, 20 kw of electricity at 460 amp, and cooling water at 500 gallons per minute. Evaporated whey could be shipped if it was cooled rapidly to suppress crystal formation and proper heat treatment was used to denature proteins. However, special truck and pump designs may be needed to fill and unload trucks if the whey is too concentrated. The higher the concentration of solids, the greater the challenge for shipping.

If we decide to further process the whey at Cedar Grove Cheese, the next step would be to put the evaporated whey in crystallizing tanks. We would need at least one tank for each type of specialty whey we would evaporate in each day. We would need to be able

to fill one tank while drying product from another one. Most likely three crystallizing tanks would be a minimum. Each would be about 7.5 feet in diameter and 14 feet high. Space required would be about 30 x 15 feet. With associated piping and controls, the cost would be approximately $200,000.

Following crystallization, concentrated whey would go into a dryer. To handle the whey indicated above, the drier needs to handle about 1700 pounds per hour of concentrated whey. It would use natural gas at a rate of about 25 cfm, steam at 500 pph, 70 kwh of electricity and additional chilled water and compressed air. The dryer would be followed by a powder bagging unit. The dimensions of the whole system are about 25ft. x 55 ft. with a 50 ft. ceiling. Cost of a new drier and bagging line of this size would be approximately $2,000,000. Cost of the building and utilities to house the entire system from whey to powder would be approximately $500,000. Most likely the cost of the entire facility would be around $3,500,000. This investment exceeded the comfort level of Cedar Grove Cheese, although, as explained below, the investment appears to be justifiable.

Contract Processing Options

As an alternative to the large investment, Cedar Grove Cheese investigated opportunities to outsource specialty whey processing. Because of the shipping costs and the need for the processing plant to deal with sweet whey, only a few possibilities exist. Until we are able to cool the product, the receiving plant must be within a distance that the whey will not spoil during transport. The plant must also be able to chill and store the whey on receipt. Because the whey is presumed to have special characteristics, the drying plant must be able to segregate the product until enough volume is received to make processing efficient. Even after chilling, the whey can only be stored for three or four days if quality is to be maintained.

A relatively small plant, Impro, in Iowa was contacted. They had an interest in the production of specialty whey but lacked the chilling, holding and crystallization equipment necessary to produce a good product. Other drying facilities, such as Pabst Farms, indicated they did not have capacity to take on the business. Most large cooperatives, for instance DFA, and proprietary cheese plants, for instance Mullins, did not have the capacity to segregate the product or were not interested in obtaining organic certification.

We were finally able to get some product dried by Land O' Lakes. We have also found another company who is interested in buying the liquid organic whey. Both of the processing plants are in Minnesota. We also understand that a Foremost Farms plant is doing some specialty drying.

The challenges with these operations are substantial. First, shipping raw whey is expensive. Second, unloading time for the whey is long if the whey has to be fed through a chiller. Third, the driers at these plants are only available for specialty production after they are cleaned. Most large processors run continuously for a couple weeks at a time.

Thus, although whey production at most cheese factories is continuous, access to specialty drying is not. Therefore, in order to get all the whey treated as a specialty, a cheese factory would have to coordinate between several large whey processors. This is probably not practical.

Another problem is that the large equipment is not efficient at startup. Several thousand pounds of powder can be lost in coating the clean equipment. Over the course of a two week run, this product loss may be insignificant. Much of the powder can be blown out of the drier and packing equipment at the end of the period. However, this is not available as a specialty product if conventional product has been dried in the meantime. As a practical matter, a minimum of 250,000 to 500,000 pounds of raw whey, collected over a period of 3 to 6 days seems to be the minimum custom drying run. This would yield 10,000 to 25,000 pounds of dry whey powder.

In the case of Cedar Grove Cheese product, we are able to have GMO-free whey run after the organic product since the organic whey is also GMO-free. Although the yield on the organic product is low, some of that ends up in a lower value, but still premium, product. If a plant had several specialties where one was not a subset of the other, then the product loss and the minimum practical run size would be an even bigger issue.

Finally, Cedar Grove Cheese found that the plants most interested in doing specialty processing were those that had a use for the byproduct. By processing the specialty whey, they are able to satisfy their own customers. We have found it more difficult to arrange for processing where we get the product back for our own customers. As a result, the processor captures much of the value of the specialty product and we still have a hard time getting whey for our cheese customers who would also like specialty whey.

Cedar Grove Cheese can make several investments that will help make contract processing more viable. We are making plans to add chilling capacity and storage capacity at our factory. The chiller will make it possible to store whey longer until we have a full truck load of any specialty and then to ship the whey to plants that are farther from Plain. Cost of the chiller system, controls and storage tanks will run around $200,000.

Shipping can be made more efficient by increasing the concentration of the whey. A reverse osmosis membrane system can be used to increase the solids to about 20%. This can eliminate two of every three shipment. Depending on the mileage shipped, the savings can be substantial. Assuming a cost of $1.00 per mile, 150,000 pounds per day and a 200 mile trip, the shipping savings would be $400.00 per day. In the course of a year the savings could exceed $120,000.

In addition to the venders mentioned earlier, we received information on RO systems from Filtration Engineering Co., Custom Fabrication and Repair and from Membrane System Specialists. Installed cost for the system would be about $350,000. Membrane replacement costs are about $24,000 per year and operating costs for 100 horsepower of pumps and CIP plus labor are likely to run $50,000. Thus the payoff is not very fast for

this size system unless the shipping distance is long. Moreover, the system will produce 10,000 gallons of water a day. If the membranes are in good condition, this water is clean. Otherwise, it may require polishing or treatment.

An evaporator can raise the concentration to a higher level and also be used for full concentration for drying. A used evaporator costs about the same as the new membrane system, but the membrane system takes considerably less space. One argument for buying the RO even if planning to dry in the future is that the RO system may be convertible to an ultrafiltration system in order to supply WPC.

In summary, outsourcing the drying function is possible as a short run solution. It requires costly shipping or substantial investments. Some outsourcing options have scheduling problems. The most practical arrangements are with companies that want to serve their own customers, resulting in loss of much of the value and control of the whey sales by the cheese plants. These relationships may develop over time into more efficient and mutually satisfactory arrangements.

The Market for Specialty Whey

Cedar Grove Cheese contacted a large number of potential customers for organic and natural whey powder. We listed the product with the Organic Trade Association, the Dairy Export Council and the Wisconsin Milk Marketing Board. We also included it in news stories and advertising in Cheese Market News and posted it on our web site. We received many inquiries from individuals and some from major potential customers. We also identified and contacted potential customers in the organic and specialty food manufacturing markets and importers of whey powder.

A single snack food manufacturer is capable of utilizing all of the natural whey that we can provide if we can schedule the drying effectively. Buyers in both the snack coatings and pasta products markets are also able to use all of the organic whey powder that we could produce. We found interest in purchasing whey powder from candy, baby food, flavorings, snacks and health foods companies. Companies outside the United States, including several from Canada and the East Asia, expressed interest in buying product.

The market for organic whey powder has been served by European companies. We received pricing information from a couple sources indicating that it would cost us about $1.60 per pound to get European organic whey powder to our factory. At least one of the companies that are currently importing whey powder for sale in this country is interested in a domestic source. Under the new National Organic Standards, formulators of organic products must use organic ingredients if those ingredients are available. Thus, in those formulations, organic imports rather than domestic conventional whey set the market price. To some extent organic whey powder is a substitute for organic non-fat dry milk. Organic non-fat dry milk has been selling at over $2.20 per pound. Except in those instances where non-fat has superior properties for a particular application, whey powder is an economical alternative. Our experience is that the current market will move all of the organic product we could provide at $1.30 to $1.35 per pound. The New Zealand

dairy industry is engaged in a crash effort to produce organic dairy products. Given the low production costs in New Zealand, dry organic dairy products will probably soon be available in much of the world at prices below the current market equilibrium price. Nonetheless, the rapid growth in organic product demand appears likely to absorb a lot of supply at high prices for a considerable period.

GMO-free whey fills a market niche that falls between organic and conventional. The NOP permits companies to define "natural" products as something short of organic. Some major companies are filling the niche with products that do not contain ingredients made from genetic engineering, and using a minimum of preservatives and additives. The market for GMO-free whey is less limited than the organic market. It requires sourcing milk from the still abundant farms that do not use recombinant bovine growth hormone, and using rennet, cultures, and salts that meet customer's other requirements. If manufacturers of GMO-free whey perceive its price to be too close to that of organic, most will switch to the organic alternative. Therefore, the market price appears likely to settle between half and three quarters of the organic offering.

As indicated above, extensive investigation of these markets over the past two years indicates that logistics rather than demand are setting the limits. Options for other specialty products also are possible. New Zealand researchers have been exploring the relationships between milk from cows with certain types of proteins and impacts on heart disease, diabetes and other immune system problems. American producers have been examining the beneficial qualities of products made from milk from grass-fed herds. High kosher whey products are virtually non-existent. An earlier analysis concluded that a potential market exists for goat's milk whey. These markets are currently smaller than those that Cedar Grove Cheese investigated for this analysis and thus involve even larger logistical problems.

Economic Estimates

Based on the information on costs and prices detailed above, Cedar Grove Cheese estimated profitability of investing in whey processing resources under many sets of assumptions. Illustrative cases are included here so that readers can attempt similar analyses of relevant opportunities.

First, assume a daily volume of 90,000 pounds of organic and 60,000 pounds of GMO free whey. On the conventional market at the current time, the price net of hauling is about 2.5 cents per pound of solids. At 6% solids, the whey would yield $225 per day. Assuming 300 days of production per year, this would net $77,500.

If all of the whey could be dried at other facilities and those facilities purchased the whey for $1.00/cwt for organic and .50/cwt for conventional whey, the net revenues would increase to $1200 per day or $360,000 per year. Of course, as indicated earlier, the logistics of contract processing are such that it will not be easy to ship all of the whey to be made into specialties. By investing in tanks, chillers and self-cleaning pasteurizers the amount of whey that can go into specialty items could be increased. An expenditure of

$350,000 would result in interest expenses at 6 percent of $21,000 per year. Costs for operating the new equipment on the specialty whey are estimated at 15 cents per hundred pounds. If these investments enable half of the whey to go to specialty uses, then the net revenue would be about $125,350, or an increase of $47,750.

More whey could be shipped to more distant processors and the shipping costs could be reduced with a membrane reverse osmosis system to reduce the moisture. The cost of that system indicated above would be about $350,000 above the costs indicated in the last example. That would result in another $21,000 per year interest, $24,000 for replacement membranes and at least $25,000 in additional energy, labor and CIP expenses. The concentration could eliminate two of three shipping costs which should enable the buyers to pay an additional $200 per day for the half of the whey going to specialties. This would generate $60,000 per year in added revenue. However, unless the volume of whey going to specialties increased, that does not cover the added $70,000 of costs. If all of the whey were to go to specialties, the added revenue relative to shipping only half without concentrating it would be $300,000 and the added costs would be $95,000 resulting in an increase in net return of $205,000. Thus, it is apparent that the success of the RO investment is heavily dependent on the ability of the receiving plants to utilize most, if not all, of the available specialty whey. If smaller volumes are available, the success of the project is questionable.

We won't consider the option of shipping evaporated whey. The costs are too high to improve on the RO option if the whey is only concentrated to 35 percent or less solids. At higher concentrations, the problems of shipping the heavily concentrated product, including loading and unloading and avoiding crystallization on the truck are too great. Another caveat to the analysis is that it assumes stable interest rates at 6 percent. Because most banks will not provide long term fixed financing for commercial loans, the risk of rising interest rates is greater with larger initial investments. As the principal is reduced, the returns will increase. We look at the 6 percent as a likely minimum return on investment.

Finally, we consider the returns from evaporating and drying the product and selling the dried specialty whey. For these purposes we assume a cost of $3,500,000. We assume operating expenses of $.35 per pound of solids which equals $3150 per day for 300 days a year, or $945,000 per year. In addition, return on investment at 6% would be $210,000.

Looking at the revenues if we sold all of the dried whey at $.80 per pound for GMO-free and $1.30 for organic, we would get $9,900 per day for the whey. This would equate to $2,970,000 per year. Subtracting the expenses, the investment would net $2,035,000 per year.

Assuming the price of whey dropped to $1.00 for organic and $.50 for GMO-free whey, gross revenue would fall to $7,200 per day or $2,160,000 per year. This would still leave a net annual increase in revenue over the first scenario of about $1,000,000. A similar result would occur if operating expenses were $.30/lb higher than estimated. At half the volume of whey, the investment becomes somewhat less favorable. Revenues of

$1,500,000 with expenses of $680,000 would only leave $820,000. That return would make the payoff on the investment about 4.5 years, which is longer than many investors will consider.

Progress to Date

Cedar Grove Cheese, with the assistance of this grant, has been able to obtain detailed estimates of the various options for processing sweet specialty whey, including contract processing, concentration - using RO or evaporation - with contract drying, or construction of new drying facilities. Poor financial results following September 11, 2001 delayed installation of facilities and equipment at Cedar Grove Cheese. We explored opportunities to form a joint venture or operating agreement with other organic cheese producers and marketers including Horizon Organic and Organic Valley. These overtures have not been accepted. In fact, the companies appear to have taken the information and decided to pursue their own options. A number of small cheese manufacturers that together account for the bulk of organic cheese production are continuing to discuss opportunities to work together.

Cedar Grove Cheese has been laying the groundwork for specialty whey production by investing in facilities that will be needed. We purchased a new separator that enables us to provide high quality whey and to isolate whey from different sources. We purchased land for construction of a new facility and have engaged an architecture firm to produce blueprints of the space needed for each step of the process. We have met with equipment manufacturers to select technical parameters of equipment. The first installations will be additional tanks and chilling equipment to facilitate shipping. We expect to move forward with the initial phase of construction this year.

Cedar Grove Cheese has managed to sell a significant quantity of GMO-free whey to a processor that is using it to provide powder to its own customers. These sales have been made at an enhanced price relative to commodity whey, but far below the value or the whey once it is dried. Cedar Grove Cheese has also had organic whey dried and sold the powder. The volume of organic dried whey has been limited, but by repurchasing and selling the powder, Cedar Grove Cheese has been able to capture more of the value.

Cedar Grove Cheese has been able to obtain agreements from new whey customers who within the next couple months will be able to use all of the whey as specialty products if we can work out the logistics of storing and shipping to the respective plants. Shipping all of the non-organic GMO-free whey is the most challenging remaining part of the puzzle because of scheduling limitations at the receiving plant. Installation of the chiller and additional tanks will help that process. All of the plants that we have succeeded in reaching processing agreements with are outside Wisconsin.

One complication in the sale of the specialty products is that the receiving plants would like to have guaranteed, sometimes exclusive, access to the specialty whey. We would like to be sure we can sell all the product, but because the market is developing rapidly and we are receiving a low portion of the total value for the raw whey, we don’t want to

get locked into a position that prevents us from exploring more lucrative options. This issue will have to be determined through negotiations, perhaps using the value that competing manufacturers receive as a benchmark. Unfortunately, we must recognize that at the current time, with no processing capacity and other companies entering the organic cheese field, we are in a relatively weak bargaining position. One possibility is that we can negotiate to be a preferred buyer of the whey so that we can recoup some of the added value of the finished product.

Cedar Grove Cheese has been very open in sharing its vision of the specialty whey market with others. We have discussed the opportunities with other cheese manufacturers, whey processors, importers, and customers. We have made our interest clear in advertising, at trade show booths, and in news articles. This approach has sacrificed the strategic advantage that we had at the beginning of the project, including creation of competition from companies we had approached as potential collaborators. While we would probably follow this approach in the future, and it is most appropriate for a project receiving public funding, we are not sure we would recommend it as a business model. Some types of non-competition agreements, non-disclosure agreements and subterfuge would probably have resulted in greater profitability to our firm if not to the industry as a whole.

Future Directions

Cedar Grove Cheese plans to continue developing specialty markets for the by-products of its specialty cheese manufacturing. We will continue to improve our capacity to provide value-added whey and cream. Markets for kosher, GMO-free and organic whey appear to be big enough to justify expenditures in processing equipment. Other developing specialty markets including whey from grazed cows, whey high in particular proteins or whey from non-bovine ruminants, do not appear to be sufficiently well developed to be processed in the large whey plants that dominate today.

Some regulatory issues continue to cloud specialty cheese and whey production. The USDA appears to have requirements for pasteurization of whey prior to shipping that are different from requirements of the FDA and the WDATCP. For companies that want to have USDA accreditation without destroying the quality of the whey, USDA should get in line with the other agencies.

The issue of defining organic was clarified by the enactment last year of the National Organic Standards. The same can not be said for products marketed as natural. Furthermore, the ability to market products as GMO-free continues to be in doubt. Wisconsin continues to enforce burdensome regulations for certification that cows are not treated with bovine growth hormone. No similar program exists with respect to any other genetically modified products. Some products have been represented by their manufacturers as not containing genetically modified products although their production process employs GMOs. Some suggest that the right to market products as free of genetically modified organisms is dependent on demonstrating the efficacy of the characteristics. In the case of rBGH, Wisconsin requires the caveat that no significant

difference has been shown between milk from treated and untreated cows. For many consumers of non-GMO products however, the fact of genetic manipulation is more important than whether or not the gene tampering has been demonstrated to have changed the product in a significant manner. Further clarification of the regulations and issues will assist in the production and marketing of products for these consumers. Unnecessary governmental burdens should be removed in order for farmers to obtain value for their specialty production.

This research indicates that Wisconsin has a shortage of capacity to handle the by-products of specialty cheese manufacturing. Large specialty production is possible, but sometimes requires shipping out of state. This has already led to loss of some Wisconsin cheesemaking and organic milk sales. If other states develop the capacity to support their specialty dairy industries with flexible processing facilities that can handle whey and cream, then their specialty manufacturers will have a great disadvantage over Wisconsin processors.

The study suggests that it would be very challenging for a small specialty cheese manufacturer to make the investment needed to process specialty whey or cream. However, it also indicates that such an investment is desirable and potentially very profitable. The State of Wisconsin could consider a strategic initiative to support such a venture for the benefit of the specialty cheese industry and the farmers who supply it. Flexible technology should be employed that makes possible segregating product and producing the highest value products in run sizes as small as 100,000 pounds of raw whey. No current whey processing facility except for very small pilot plants is geared for that type of production.