

Memo



To: Oswego Farm Bureau
From: Dominic Bassani
Date: 11/18/2009
Re: Bion Project Questions / Demonstration Facility

To begin, we would like to thank everyone for making themselves available on November 12th for the exchange of ideas regarding Bion's proposed NYS integrated livestock project. This note is intended to provide additional information that builds on that discussion.

The place to begin to garner an understanding of the topics discussed and the questions raised at our meeting is with an appreciation for the project's anticipated marketplace branding. An essential building block of long term economic value in Bion's Oswego County project requires creation and support of the consumers' perception for product value beyond the quality of the beef product itself. It is critical to the project's business proposition that the values of its beef products to the consumer encompass environmental attributes as well as food safety standard operating procedures (SOP's) including but not limited to traceability. Bion's technology platform must move well beyond just waste treatment for the business to be successful.

From its inception, Bion has focused on the development of a comprehensive environmental approach to livestock waste treatment. As a result, our technology holistically addresses both effluent and air based environmental impacts from livestock. Bion's business model anchored in that technology is based on making the adoption of environmentally sustainable, comprehensive waste treatment technology economically affordable. Doing so results in products the consumer wants and clearly values despite their being unavailable in the exiting marketplace. Market values for those products will not be based solely on tenderness or other traditional criteria of product quality; instead they will represent a new category of product developed through branding that conveys environmental sustainability and food safety while maintaining product quality comparable to existing beef product that the market values.

The consumer associates environmental product attributes with healthfulness; and in turn healthy equates to food safety. That is the opportunity for this project: to build a brand based upon raising cattle in the most environmentally sustainable facility in the world with standard operating procedures that embrace a commitment to the highest standards of food safety (i.e. traceability). Does a reduced carbon footprint make food safer? No, not necessarily, but it does demonstrate a management and approach to operations that is concerned with the environment; and that reinforces a dedication to food safety in the consumers' mind.

As a part of the project's traceability protocols, our quality control program will be extended up the supply chain to our suppliers. The effectiveness of such an integrated program will result in the safer and higher quality product valued by the consumer. In turn, developing and sustaining these product characteristics in both reality and perception will result in improved revenue and superior earnings. Beef products produced from this facility will be associated with food safety through focused branding to be reinforced in a number of ways. For example, as presently available with some brands in Japan, we are proposing to our participating partners the development of a website where each beef product's package barcode will allow the consumer to discover the history of that product (lineage, where the calf was born, raised, diet, date processed, etc). With the capability for traceability already in place, sharing this information with the consumer will be an inexpensive way to demonstrate a dedication to the delivery of a safe product.

In turn, traceability will enable Bion to reward the suppliers that provide compatible higher quality and value cattle feedstock and other inputs. The quality incentives created through this supply chain coordination will support the ability to establish a rejuvenated local industry to produce young stock and inputs for the project with regional producers expanding to participate and some small regional dairies choosing to convert to these activities as they determine for their own benefit.

In the end, the entire Bion platform is designed to deliver to the consumer the most environmentally sustainable and safe products possible while providing project participants with the most economically sustainable facility. Oswego County could become the "Agricultural Green County" where sustainable agriculture is not just carefully chosen words but a way of life. Over time, much of the balance of the livestock industry across the county will seek to introduce similar practices to generate a competitive brand to capture the enhanced economic values established by the Oswego integrated project.

In short, Bion's investment is not based on merely addressing operating issues but on solving them to such an extent that we are prepared to share that data with the consumer.

With that in mind I would like to review the main issues that were raised at the meeting:

- **Disease:** Our SOP's and controls must and will go beyond anything that presently exists in the industry today. This is not just an economic issue for us --it is a project fundamental. The fact that existing large-scale feed yards successfully manage their disease issues presently is not the standard we propose to set. Achieving the desired certification will require traceability protocols with greater testing and more controls than currently employed by the industry.
- **Site related issues (water / traffic / sufficient infrastructure / additional infrastructure requirements etc):** Each is a site specific challenge that needs to be examined and resolved based upon specific site conditions and operating requirements. Obviously these facilities cannot be located where the requirements for water, traffic and infrastructure either cannot meet project needs or cannot be upgraded to sustainably meet those requirements over the long-term.
- **Labor:** Bion will require a well trained full-time labor force that is capable of supporting all aspects of the operations with particular concern for the livestock facilities. Bion views the livestock operations akin to managing a nursing home: without a fully functioning support system --regardless of the weather-- the cattle on feed will not perform well and could even die. It is critical that these animals consistently receive care that assures both their well being and their comfort. Success will depend upon a skilled labor force that is both adequately

supported and individually dedicated to its job: to provide needed support services to the animals on feed regardless of weather conditions. Bion knows that a well trained and fairly compensated labor force is vital to create and support the labor commitment needed to assure success of the venture. This can only be accomplished with a labor force that views its employment opportunity as a quality, long-term career opportunity. Lastly, keep in mind that these jobs are non-transferrable. For all of these reasons the relationship between management and labor needs to be one of trust between the parties.

- Weather issues: The facilities will be designed to successfully operate across the broad spectrum of historic weather conditions experienced by Oswego County, especially the cold and anticipated snowfall. This is an issue that we readily acknowledge and which will be fully addressed within the site planning for the facilities. It should be understood that the capital budget requirement projected by our design consultants to address the issues of freezing, snow load, on-site storage and multiple daily manure collection is \$200 - \$300 per head of livestock or \$16 to \$24M over and above similar construction in a more moderate climate. That supplemental capital results in an annual cost for debt service of \$1.1 - \$1.7M incorporated into the operating budget (assuming a 20 year life cycle for the equipment).

In the end, facility improvements will be based upon site specific assessments and designed by architects and engineers who along with the contractors will be performance bonded to achieve specific operating efficiencies at specific operating parameters. Contrary to the apparent belief of some, these are not impossible operational requirements. For example, the Curtin Dairy near Utica did just fine during the unusually heavy snowfall a couple of years ago. I personally visited Jack during the storm with snow piled high on both sides of Rte 9; the barns and milking parlor were operating well. The bottom line is that these conditions can be provided for; it just takes money to pay for the required supplemental planning, construction and operations which can only be justified in support of the right operation (scale, integration, location) and market positioning.

- Odor and groundwater contamination: The environmental performance of Bion's comprehensive waste treatment process has been reviewed and successfully vetted by a number of independent scientific and regulatory entities. The most recent of these reviews was an assessment for St. Lawrence County of the potential for nuisance odors emanating from a Bion project livestock facility by a team of scientists at Clarkson University, led by Dr. Hopke, a world respected air emissions expert. The full report is available on Bion's Oswego project website: www.bionoswegoproject.com.

Using the modeling as developed and utilized by Dr. Hopke and his team, it is projected that the odor potential from a 14,000 head Bion beef cattle farm will have an equivalent nuisance odor potential no greater than that of a 400 head dairy **without including odor from the dairy's spreading of manure** (Bion will not be spreading manure). That independent community study concluded that the Bion project could be implemented without significant odor impacts. Bion has committed to performing supplementary detailed odor and air emissions assessments as specific sites are identified and to share the results of those reviews with the community.

The potential for groundwater contamination on the other hand is for the most part a function of the concentration of nutrients contained in the final discharge effluent from the facility. Note that after full treatment including both the Bion waste treatment process (nutrient reduction and pathogen kill) and polishing through a vertical-flow constructed

wetland (further nutrient removal), the nutrient content of the final effluent will be significantly below the requirement for fertilizer of most crops that would receive it in the form of irrigation.

- The issue of a demonstration project has been raised by Farm Bureau. Bion agrees that a demonstration project is appropriate and has from our original introduction of the project concept to the community recommended that it be a precondition of support for the project. Let us be very clear however that while there is agreement with the value of a demonstration project, it is important to fully understand precisely what should be and what could be demonstrated.

What Should be Demonstrated: In addressing the question of what should be demonstrated, it needs to be noted that there is actually very little in Bion's entire project plan that has not already been fully demonstrated through years of industry implementation. Certainly the scale of the livestock operation is well understood by the industry despite it being outside the scope of experience of upstate New York. A modest Internet search confirms. For example, Nebraska has a dozen finishing operations over 32,000 head with one in Broken Bow at 95,000 and one in Sidney with 165,000 head. In Kansas, a feedlot directory lists 16 feedyards with over 30,000 head with at least three operations well over 100,000. In Colorado, there are at least four feedyards with capacities in excess of 90,000 head. The above referenced information was readily available and all secured from state Internet sites such as: www.kansasfeedyards.com/directory.htm.

Certainly the ability to successfully manage a livestock facility of the size proposed by Bion needs no further demonstration. And there is great experience at many successful, large scale cattle operations challenged with both cold and snow approximating conditions in Oswego County. Bion will secure project partners with experience designing and managing facilities with these characteristics to assure a successful operation. As an additional example, the Fair Oaks Dairy owned and operated by consultants to Bion in Indiana successfully manages a herd of 32,000 milk cows with a feed requirement and manure load equivalent to over 100,000 cattle on feed.

Beyond the consideration of scale, all other components of the integrated set of proposed activities have already demonstrated their viability through years of traditional industry utilization with one important exception, Bion's biological waste treatment process. As we pointed out during our meeting, it is important to understand that the Bion waste treatment system is modular and part of a technology platform. The balance of the technology platform is a composite of equipment and processes that have been commonly and successfully used throughout the waste treatment industry.

There are a number of ethanol facilities producing wet distiller grains for consumption by nearby cattle; biomass has been used successfully throughout many industries (including ethanol production) as a source of energy for process steam; various biomass fuels including processed and unprocessed livestock manure have been successfully used as fuel in numerous biomass to energy applications; slaughter and further process facilities have been successfully integrated to achieve efficiencies of operation; waste treatment processes have used a number of solids separating devices tuned to the characteristics of the effluent stream; wetlands engineers have successfully designed, permitted, built and operated vertical flow constructed wetlands in climates as cold or colder than Oswego County; the list goes on and on.

However, Bion has identified and recommended its patented biological waste treatment process as appropriate for further demonstration because it does not have a robust history of industrial application as proposed. The Bion Kreider Farms installation in Lancaster, PA will be an implementation of Bion's waste treatment process operating on a herd of 1,200 dairy cows. Performance of the installation will be independently monitored to provide additional scientifically based environmental assessments for livestock waste being treated by a Bion waste treatment system. For this reason, Bion has recommended that the community look to the Kreider Farm installation for additional confirmation that the waste treatment process, and therefore the environmental impacts from Bion's project will be as represented or better.

What Could be Demonstrated: Economics play a critical role in driving all aspects of a project design and operation, including the characteristics and circumstances of a demonstration project. Bion's waste treatment technology is designed to be economically efficient above 2,500 - 3,000 dairy cows (or 8,000 to 10,000 beef cattle). This waste load efficiently utilizes the capacity of equipment utilized for the various unit processes across the waste treatment function. An installation below that size will experience a significant deterioration in efficiencies from lack of scale. A demonstration project below that size will experience further reductions in efficiency in isolation from the proposed set of integrated activities for the project. Such a facility therefore will require substantial supplemental revenues or other external financial support to implement.

The Bion facility at the Kreider Dairy will receive sufficient supplemental cash flows to justify its implementation through the monetization of nutrient credits in the Chesapeake Bay watershed. At the same time it should be noted that the initial herd of 1,200 dairy cows being treated by Bion at the Kreider Dairy is the waste load equivalent of approximately 4,000 head of beef cattle on feed. From the perspective of legitimately demonstrating waste treatment capability, the effective equivalent of close to 4,000 beef cattle should be more than adequate.

Based on an understanding of both what really needs to be demonstrated and what can be economically implemented, Bion looks to its independently evaluated installation at the Kreider Dairy Farm as the appropriate choice of a demonstration facility for the Oswego County integrated project.