Department of Agriculture, Trade and Consumer Protection
Division of Agricultural Development
Agricultural Development & Diversification Program (ADD)
Grant Project Final Report

Contract Number: 22070

Grant Project Title: Advanced Solids Separation Technology (SST) for Manure Management

Amount of Funding Awarded: $48,000

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Please use the following questions as a guide for writing your grant project final report. In your final report, please answer each question as it relates to your grant project.

1) What was the original intent of the grant?
   - What did you want to accomplish with the grant?
   - How was it expected to benefit Wisconsin Agriculture?
   - What makes this project work important or significant?

2) What steps did you take to reach your goal?
   - What worked?
   - What challenges did you face?
   - What would you do differently?

3) What were you able to accomplish?
   - What are the results from this project?
   - Include any analysis of data collected or materials developed through project work.

4) What conclusions can you make based on project work the analysis of collected data?

5) What do you plan to do in the future as a result of this project?

6) What information or additional resources are needed to commercially develop this enterprise?

7) How should the agricultural industry use the results from your grant project?

Final Report

Advanced Solids Separation Technology (SST) for Manure Management

September 16, 2008

1. The purpose of this project was to verify and validate the advanced Solids Separation Technology (SST) being developed by ENCAP, LLC. When SST is applied correctly and the chemical agent was utilized at the proper dosage, solids were easily and instantly separated using traditional mechanical means, with the overall solids capture rate being substantially higher than from conventional separation. This project also focused on determining the market potential for the chemical agent in Wisconsin, with a primary emphasis on the overall economics of the solids separation with and without the agent. A secondary emphasis was on the market opportunities available for the recovered manure solids, which increases the benefits obtained through the use of the agent. This secondary emphasis was consistent with ENCAP's current use of byproducts (paper mill sludge) for the value-added manufacturing of products in the turf, landscape, agricultural and erosion control markets under the Advanced Soil Technology (AST™) brand.

   The benefits of this project to agriculture could include the ability to better manage nutrients from dairy manure, the opportunity generate a revenue stream from the separated solids, and the ability to expand farms if manure management becomes a less significant operational issue, particular because of the increased phosphorus capture and reduced phosphorus loading associated with SST.

   Based on the results of this project, the amount of chemical agent required for separation was significantly less than what has been historically reported in the literature, thereby improving the overall economics of SST. This, coupled with ENCAP's marketing expertise and ability to incorporate these materials into value-added products, could make this a very attractive manure management option for the farming community in Wisconsin.

2. Initially, it was anticipated that several large field demonstrations would be completed as part of this project. However, a smaller laboratory scale separation system was constructed, which allowed for the completion of a significant number of tests in a more cost effective manner. The relationship between ENCAP and FEECO was also critical in the overall implementation and completion of this project.

   The biggest challenge associated with this project was the fact that we kept learning new things on a daily or weekly basis. Although this was very exciting, the excitement had to be controlled so the research could be completed in a systematic fashion. The other major challenge was the fact that the resources that could be devoted to the project were fairly limited, as ENCAP and FEECO do not have extensive research and development budgets. This will also be an issue going forward, as additional funding will be required for farm-scale testing and further development and protection of the intellectual property derived from this project.

I don't believe there would be many things that we would do differently, with the exception of trying to get a sample port installed after the FAN separator at Green Valley Dairy in a more timely manner, as the mechanism used in the laboratory to simulate the FAN separator during the early part of the project was time consuming and not entirely representative.

3. The results of this project are very promising, as based on nearly $20,000 worth of laboratory analysis for solids and nutrients, it was determined that SST works on a very consistent basis for a range of manures and is capable of removing 80-90% of solids and phosphorus from dairy manure.

4. The extensive data collected during the project indicates that SST can effectively remove solids and phosphorus from manure at polymer dosage rates far below those typically found in the literature. Based on the demonstrations that were completed in the laboratory, it appears as though there will be interested from the farming community in this technology.

5. This efforts initiated as part of this project will continue with a number of future activities, including the following:

    1. Farm- scale demonstration
    2. Filing of patent for intellectual property
    3. Potential integration with Brown County Waste Transformation Initiative
    4. Development of ENCAP products that incorporate solids recovered from SST

6. Although the SST process has demonstrated efficacy in a laboratory setting using a range of manures, larger scale batch or continuous testing must be completed to verify the process capabilities. This effort could cost between $50,000 and $250,000, which is a substantial investment for a small company such as ENCAP/FEECO. In addition, the intellectual property developed during the course of this grant must also be protected through patent applications, which are also costly and time consuming.

7. Pending the successful full-scale development of SST, the agricultural industry in Wisconsin should have the opportunity to better manage nutrients, thereby reducing manure management as a limiting factor to the growth of the dairy industry in Wisconsin. In additional, the manure solids separated through SST can be used for value-added products that are consistent with existing ENCAP products.