



Farm Pilot Project Coordination, Inc.
"Technologies for Nutrient Management"

January 15, 2010

To: Mr. William Boyd - Leader, Manure Management Team
East National Technical Support Center - NRCS

From: Bob Monley, General Manager, FPPC, Inc.
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Preston Burnette, FPPC Mechanical Engineer
Christopher Tubbs, FPPC Site Project Manager

Re: Quarterly Report for period from October 1st through December 30th, 2009

This report is intended to update the NRCS and the FPPC Board of Directors on the status of the innovative technology pilot projects.

Executive Summary

During the fourth quarter, four projects were closed. Final reports for two (2) are posted on the webpage and the other two (2) are being reviewed. In addition, three (3) technology providers have requested no-cost time extensions to allow continued research effort at their project sites.

Close-out forms for the 04 agreement have been generated and proposed language for a new FPPC/NRCS 04 cooperative agreement have been submitted for review and approval.

OPERATIONS -----

1. **Board meeting:** Two Board meetings and one Advisory Board Meeting occurred during the fourth quarter. The purpose of these meetings were to discuss and review progress on meaningful initiatives. Discussion focused on

- **Dual use pellet**
- **Pre-treatment methods**
- **Gasification of poultry manure**
- **Gasification/thermal conversion of wet waste**
- **Nitrogen capture methods**
- **Effluent treatment methods**
- **Bio-char conversion**
- **Data base development**

2. **Outreach activities:**

- On October 29-30th, Dudley Voorhees participated in the Dairy Power New York Summit held just outside Syracuse in Liverpool, New York. The session was planned and organized by Dairy Management Inc with participant interactions heavily facilitated among a large cross section of technical providers, experts, researchers, regulators as well as from various stakeholders from the state.

The summit utilized a workshop style, brainstorming sessions and focused on developing ideas and opportunities to advance an ideal anaerobic digestion system. Twenty three opportunity areas were identified and were grouped by cost, substrates, by-products, electricity market, biogas market and support categories. The intent is to continue the efforts by promoting action plans and coordinated efforts among the working groups formed.

Dudley participated in the nutrient recovery discussions from waste stream of the digester. New York state has an additional challenge because it is the third largest milk producing state but its farm sizes are small – 110 cow average.

- FPPC was invited to visit China to help assess proposed waste treatment systems at large dairy CAFO sites under construction. The dairy industry is expanding rapidly and incorporating methane digester technology at new farm sites has been assigned a high priority. Funding for travel and related efforts was provided under a separate agreement with the Chinese firm.
- In December, FPPC staff conducted a site visit to Annapolis, Maryland to evaluate potential conference facilities in the area for a March conference. FPPC will host its first regional summit in the Chesapeake Bay area on March 24th-26th and will focus on nutrient solutions for the dairy and poultry industry as well as the changes in the regulatory environment. After negotiations, three sites were short listed and FPPC has now contracted with the Westin Annapolis Hotel to host this summit. Registration will open after the first of the year. While in the Chesapeake Bay area, FPPC traveled to Washington, DC to visit USDA representatives.

3. **Database Development:** FPPC has added a part time data analyst to work on the knowledge database, capturing lessons learned and to support the ongoing project effort.

Progress at active pilot demonstration sites is summarized below:

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Dairy, Florida (#5.09)-----
White Technologies Inc.
U.S. Environmental Products, Inc.
North Florida Holstein, Bell, Florida

Process Description:

- Installation and development of solids removal capability via vacuum dewatering bed augmented by polymer additions

Project Status:

This project has been completed. Results are being documented and analyzed and a final report is being prepared.

Polymer Study (#5.09a)-----
North Florida Holstein Dairy

Project Description:

- To better understand the important variables and significant process controls required for cost effective application of select coagulants and flocculants during solid separation of manure waste.

Project Status:

Testing at the North Florida Holstein site continues and will be completed over the next two months. Statistically significant data is being captured using manure with varying solids concentrations.

Pretreatment Methods and Evaluation (#5.12)-----

Project Description:

- **Find the (best in class) pretreatments methods from off the shelf offering**
- **Visit farms and evaluate cost effectiveness**

Project Status:

FPPC continues to gather data and information on sand laden manure. Chris Tubbs attended the November Sand Separation Conference hosted by McClanahan Corporation in Lancaster Pa and visited five (5) dairy sites where the process could be observed under different conditions.

Presently, three different screw presses, one rotary filter press and a belt press as well as a mascerator are being evaluated at M&B dairy without the influence of sand. This equipment was setup in December and will be evaluated in January. A literature search and a summary report is planned to close out Phase I efforts by the 1st Quarter of 2010.

Dairy, Florida (#4.12)-----
AWS, LLC and FPPC
Dual purpose pellets derived from dairy solids

Process description:

- FPPC will work with AWS, LLC to develop a mobile pellet plant leveraging the knowledge gained during the previous belt press demonstrations.
- Dual use pellet is for either fuel or fertilizer
- The system will consist of a belt press, pelletizer and fluidized bed dryer.

Project Status:

The process is being integrated at M&B dairy using select pretreatment methods, solids separation and pelletizing. The belt press will be introduced as the solids separation method. Initial test runs at M&B dairy revealed difficulty forming pellets from fibrous undigested dairy manure without pretreatment, contrary to the experience of others who have formed pellets more readily from digested manure. Tests are now targeted to incorporate pretreatment and smaller particle sizes with results before the end of 1st quarter.

Swine, Hawaii (#6.13) -----
University of Hawaii
Janong Natural Farms, Kurtistown, Hawaii

Process description:

- Pigs will be housed on green litter for a limited resource farm demonstration
- Liquids will be absorbed by green waste and composted material
- Project will utilize and identify the primary indigenous microorganisms
- Economic analysis of construction/design of a solar & naturally ventilated facility

Project Status:

This project is now complete and a final report is being drafted. On August 14th, the University of Hawaii conducted an open house with over 150 people in attendance. Public Broadcasting Station (PBS) has expressed interest in documenting this project with film for a segment on innovative agriculture.

Swine, North Carolina (#4.14) -----
North Carolina A&T
University Farm, Greensboro, North Carolina

Process description:

- Incorporates solid separation, effluent treatment and wetland conservation.
- Process is designed for a limited resource farm application.

Project Status:

The technology provider has requested a no-cost time extension to continue efforts on the existing project. An interim report has been requested by FPPC.

Poultry, Virginia (#4.06)-----
Virginia Polytechnic Institute and State University
Heatwole Poultry Farm

Process Description:

- Pyrolysis conversion of poultry litter to bio-fue oil I for on-site use
- Unit employs a fluidized bed and modern controls to system operation

Project Status:

The technology provider has requested a no-cost time extension to continue efforts on the existing project. An interim report has been requested by FPPC.

Poultry, Wisconsin (#5.04)-----
R&J Partnership
Creekwood Farms, near Madison
Weiss Poultry Farm in Kewaskum, Wisconsin

Process description:

- Utilizes chicken manure and mortality carcasses, along with a carbon source for conversion into a stable, (organic fertilizer derived from laying hen facility).
- A bio-filter acts as a scrubbing mechanism to take out noxious odors associated with composting process.
- A key element in the process is the ammonia capture and the re-introduction of Nitrogen into the final composting process.
- Leachate is collected in tanks and is re-used during the process. The net effect is that the process is optimized so that Nitrogen values remain elevated.

Project Status:

A follow up site visit was conducted by Dudley Voorhees and Chris Tubbs during the fourth quarter. The system is operating with three (3) containers utilizing manure and three (3) bin containers utilizing a manure and mortality mix. Operational and nutrient data is being gathered with computer assistance.

Swine, Iowa (#4.03)-----
Puck Custom Enterprises (PCE)
Muhlbauer Farm
Greenflash II Farm
Langle Farm

Project Description:

This project will develop technology, methods and investigate geotextile container bags as a means of collecting solids.

- Dewatering with high pressure, rapid fill methods.
- Metal salt and polymer flocculation is utilized.
- Testing and evaluation is planned for three (3) separate swine sites in Iowa.

Project Status:

The technology provider has requested a no-cost time extension to continue efforts on the existing project. An interim report has been requested by FPPC. Results were presented at the Summit and a video was made showing the process in operation.

Phase I - Emissions and Nitrogen Capture (#6.08)-----

Project purpose:

Nutrients can typically contribute to air emissions through methane formation and the decomposition of organic matter. Ammonia is particularly a problem followed by NOx. Some waste treatment methods transform Nitrogen into an inert form (N₂) which is an acceptable environmentally but the value of Nitrogen is not realized as a by-product.

Project Status:

A literature search is underway to find methods and processes to capture Nitrogen, rather than accept the losses of Nitrogen being released to the atmosphere. One technology provider has proposed a method of extracting most of the Nitrogen from the digested effluent of an Anaerobic Digester. Other means of scrubbing ammonia and alternate methods of treating poultry litter are being investigated.

Thermal energy from dry waste (#6.12)-----

Project purpose:

To utilize nutrients in the manure and to utilize the poultry litter to offset on-farm energy needs (hot water for heating and for electricity for ventilation and cooling of the barns).

Project status:

This project is fully scoped and will be initiated in January during a kick-off meeting at the Marc Marsh farm in South Carolina. A test of the chicken litter (30 barrels) from the farm was combusted using a continuous feed gasifier. Changes to the feed hopper were discussed during the visit. During the visit manufacturing capability for the gasifier was explored.

Phase I - Thermal energy from dairy or swine manure (#6.09)-----

Project purpose: To utilize the wet manure to offset energy needs on farm in the form of energy most needed by the farm.

Project status:

FPPC staff has visited with two gasifier companies and has spoken to another to document thermal conversion benefits. FPPC conducted testing at North Carolina State University's and determined it was feasible to use torrefaction for dairy and chicken litter bio-char. By January, FPPC will be able to evaluate collaboration with those who have torrefaction equipment available and those who are partially funded for land application studies.

Phase I - Effluent Treatment Methods (#6.07)-----

Project purpose:

Expand the list of effluent treatment methodologies following solid separation

Project Status:

FPPC is presently conducting a literature search. Candidate methods, which deserve further evaluation and testing, will be described in a plan of work.

Attachment A

Final report status of twenty completed pilot demonstration projects is listed below:

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- A. Swine, North Carolina -----
Super Soil Systems, USA (#3.09)
Goshen Ridge Farms, LLC - in Clinton, NC
"Solids Removal System to Reduce Environmental Impact of Swine Production"
Report Status: The final report has been reviewed, issued and posted on the FPPC website.

- B. Swine, North Carolina -----
Air Diffusion Systems (#3.02)
Cavanaugh Farm No. 1 - swine farm in Wallace, NC
"Advanced Microbial Treatment System (AMTS) at Cavanaugh Farm No. 1"
Report Status: The final report has been reviewed, issued and posted on the FPPC website

- C. Swine, Iowa -----
Global Resource Recovery Organization (GRRO) (#3.05)
Burt Farm & Livestock Co. - swine farm in Marshalltown, IA
"Pork Nutrient Management Demonstration"
Report Status: The final report has been reviewed, issued and is posted on the FPPC website.

- D. Dairy, Florida -----
Royal Consulting Services, Inc. (#3.08)
Posey Dairy in Lake Placid, FL
"Florida Dairy Nutrient Management Demonstration"
Report Status: The final report has been reviewed, issued and is posted on the FPPC website.

- E. Poultry, North Carolina -----
McGill Environmental Systems (#3.06)
Farms in Sampson County, NC
"Nutrient Management Technology for Animal Feeding Operations"
Report Status: The final report has been reviewed, issued and is posted on the FPPC website.

- F. Poultry, North Carolina -----
Cape Fear Resource Conservation (#3.03)
Central Processing Facility in Duplin County
"Demonstration Optimum Fertilizer of Ash from the BEST Solution for Swine and Poultry Manure Management"
Report Status: The final report has been reviewed, issued and posted on the FPPC website.

- G. Poultry, North Carolina -----
Mountain Organic Materials (MOM) (#3.10)
Randy Johnson and David Parsons Farms, Wilkesboro, NC
"Demonstration of Poultry Manure and Mortality Forced Aeration Composting Bin Systems"
Report Status: The final report has been reviewed, issued and posted on the FPPC website.

- H. Poultry, Alabama-----
Renewable Oil, Inc. (ROI) (#3.07)
Mills Poultry Farm in Russellville, AL
"Demonstrating BioOil Technology for Poultry Litter Nutrient Management"
Report Status: The final report has been reviewed, issued and posted on the FPPC website.

- I. Poultry, Texas -----
RMG Strategies, Ltd and Microorganics (#3.11)
Jacobs Ranch in Carmine, TX
Report Status: The final report has been reviewed, issued and posted on the FPPC website.
- J. Dairy, Florida -----
AJT/Agrimond (#3.01)
Watson Dairy in Trenton, FL
Report Status: The final report has been reviewed, issued and posted on the FPPC website.
- K. Dairy, Wisconsin -----
Skill Associates – Phase I & II(#5.08)
Weise Farms in Greenleaf, WI
Report Status: The final report is currently under review.
- L. Dairy, Florida-----
Royal Consulting, Inc. (#4.01)
Butler Oaks in Lorida, Florida
Report Status: The final report has been reviewed, issued and posted on the FPPC website.
- M. Dairy, Florida -----
QED Occtech (#4.02)
Branford–DPS Dairy in High Springs, Florida
Report Status: The final report is currently under review to be re-posted on the FPPC website.
- N. Dairy, Florida-----
Chemical Lime Co. (#3.04)
Aprile Dairy in Riverview, Florida
Report Status: The final report has been reviewed, issued and posted on the FPPC website.
- O. Swine, Iowa-----
Global Resource Recovery Organization, Inc. (#3.13)
Mobile Deployment System, Eldora, Iowa
Report Status: The final report has been reviewed, issued and posted on the FPPC website.
- P. Dairy, Colorado -----
Applied Chemical Magnesias Corp. (ACM) (#3.12)
Bella Holsteins, Inc. in Platteville, Colorado
Report Status: The final report has been issued, reviewed, and posted on the FPPC website.
- Q. Dairy, Utah-----
Utah State University (#5.4.04)
Blaine Wade Dairy near Ogden, Utah
Report Status: A final report has been issued, reviewed, and will be posted on the FPPC website.
- R. Dairy, Vermont-----
AWS, LLC (#6.02)
North Williston Cattle Company (Whitcomb Farm)
Report Status: A final report has been issued, reviewed, and posted on the FPPC website.
- S. Dairy, New York-----
AWS, LLC (#5.05)

Noblehurst Farms

Report Status: A final report has been issued, reviewed, and posted on the FPPC website.

- T. Dairy, Vermont -----**
BioProcess Technologies (#5.02)
North Williston Cattle Co.
Report Status: A final report has been issued, reviewed, and is posted on the FPPC website
- U. Swine, Illinois-----**
Envirowaste Technology, Inc. (#4.09)
Rensing Family Farms, Inc.
Report Status: A final report has been issued, reviewed, and posted on the FPPC website.
- V. Swine and Dairy, Michigan-----**
Phase 3 Developments & Investments, LLC (#6.06)
Geerlings Hillside Farm
Report Status: A final report has been issued and is under review to be posted on the website.
- W. Dairy/Mixed Waste, California-----**
Agricultural Waste Solutions, Inc. (#5.06)
Inland Empire Municipal Site, Chino
Report Status: The project is completed and the final report is being written.
- X. Swine, North Carolina-----**
Super Soil Systems USA (#4.05)
Goshen Ridge Farms in North Carolina
Report Status: Project closed, report under review.
- Y. Dairy, Ohio-----**
Crossroads RC&D / Wastewater Services, Inc. (#4.07)
Andreas Farm, Royer Farm
Report Status: A final report was drafted and is currently under review.
- Z. Dairy, Virginia-----**
Virginia Dairymen's Association(#4.15)
D&D Dairy, Dayton, Virginia
Report Status: Project complete and final report is being drafted for review.
- AA. Dairy, Pennsylvania-----**
Nutrient Control Systems, Integrity (#5.07)
Mercer Vu Farms in Mercersburg, Pennsylvania
Report Status: Project complete and final report is being drafted.
- BB. Dairy, Texas -----**
Reaction Energy Corp. (#4.16)
Fisher Dairy, Yantis, Texas
Report Status: Project complete and final report is in review.