



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

October 15, 2009

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

From: Bob Monley, General Manager, FPPC, Inc.
Lauren Seigel, FPPC Program Manager

Copy: Carolyn Adams, NRCS – Director ENTSC
Jeff Porter, NRCS – Manure Management Team, ENTSC
Bruce Newton, NRCS - Director WNTSC
Ron Williams, NRCS - Director CNTSC
Richard Salem, Executive Director & Board Chairman, FPPC Inc.
Dr. Robert Carnahan, FPPC Board Director
Robert Zaytoun, FPPC Board Director
Hilliard Eure, FPPC Board Director
Lawrence Clark, FPPC Board Director
Frank Bordeaux, Executive Director – N.C. Agricultural Finance Authority
Peter Hubbell, Principal - Water Resource Associates
Frank Lancaster, N.C. Agricultural Finance Authority
Dudley Voorhees, FPPC Field Coordinator
Preston Burnette, FPPC Mechanical Engineer
Christopher Tubbs, FPPC Site Project Manager

Re: Quarterly Report for period from July 1st through September 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 third quarter, efforts were made to finalize pilot project funded with monies from the NRCS/FPPC 2004 cooperative agreement. Three (3) technology providers have requested no-cost time extensions to allow continued research effort at their project sites.

The Professional Advisory Board met just before the Technology Summit at the end of August. As part of this year's Summit, a polymer workshop was conducted allowing participants to gain hands-on experience.

OPERATIONS -----

1. **Professional Advisory Board:** The Professional Advisory Board (PAB) met in August to consider ways in which FPPC can grow as an organization, extend its interest in nutrient management and find additional funding sources..
2. **Technology Summit:** FPPC successfully completed its fifth annual technology summit in August at the Don CeSar Resort in St. Petersburg, Florida. The summit focused on sustainability and waste resource utilization at the farm level. Networking discussions were encouraged between engineers, technology experts, researchers and various government participants who were anxious to discuss solutions to the animal waste problems on farms. Those who participated were afforded the opportunity to participate in a polymer workshop at the FPPC facilities off-site.
3. **Continued Outreach:**
 - FPPC exhibited at the Farm-to-Fuel Conference on July 29-31st in Orlando where the focus was on renewable energy including the development of bio-fuels derived from biomass.
 - Following that conference, FPPC staff attended the first convention for Florida small farms in Kissimmee, Florida. Many of the small farm owners have an interest in composting and organic farming.
 - FPPC in conjunction with NRCS participated at the Livestock and Poultry Environmental Learning Center's webcast event.
 - In September, FPPC staff participated in the World Dairy Expo in Madison, Wisconsin. FPPC was exposed to a the Anaerobic Digester course put on by Iowa State and made contact with many technology and equipment vendors serving the dairy industry.
 - During that week FPPC was able to host of a delegation from China and escort them to a dairy farm in Greenleaf, WI where animal waste was being combusted and converted to electric power.
4. **Database Development:** FPPC has begun outlining and summarizing the knowledge it captures from various field project demonstrations. The project will extract data and other useful information over the years of operating technical projects on the farm. Once complete, this database will house information such as lab results, farm statistics and lessons learned.

Progress at active pilot demonstration sites is summarized below:

=====

Dairy, Florida (#5.09 & #5.09a)-----
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 5.09a provides for on-site effort to optimize polymer addition and to debug current dewatering bed process

Project Status:

The project continues to have all the major components observed and tested, to be in proper mechanical status. The final component, the computer and control box, is scheduled to be tested the first week of October. The organized full operation of the system intends to be underway the first week of October with data gathering of separated nutrients, economics, etc. for a 4-5 week period. The final report projected by year end.

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

Project Description:

To better understand the important process variables, appropriate controls in the cost effective application of coagulants and flocculants as applied for optimum solids capture.

Project Status:

At the 2009 Technology Summit, FPPC staff took the opportunity to share lessons learned from the polymer study and conducted a workshop. Approximately 15 participants had hands-on experience in FPPC's lab.

Testing at the North Florida Holstein site continues, although difficulty with the mechanics of the vacuum dewatering bed delays the project. Testing is anticipated to be complete by fourth quarter.

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 of pretreatment methods**

Project Status:

FPPC continues to complete the due diligence phase of this project by researching the most optimal solid separation equipment to test on the farm site. A Phase 2 proposal will be submitted for review by the Board during the fourth quarter.

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.
- The system will consist of a belt press, pelletizer, and fluidized bed dryer.

Project Status:

FPPC continues to work with AWS to determine the best path forward for the dual use pellet project. Multiple methods for pelletization are being researched as well as the quickest solution to obtain dry solids for testing.

The AWS pelletizer was tested at M&B Dairy near Gainesville, FL to see if the pelletizer would pass the dairy solids through the machine. This test was also used to evaluate what the protocol would be for further testing of the pelletizer. The AWS pelletizer passed dairy solids through the unit, but pellets did not keep their shape. It was determined that the solids needed to be macerated and a binding agent would probably be needed. Before further testing of the pelletizer, we are waiting for the AWS belt press to be finished along with their pre-treatment system (polymer system). It is expected that the belt press with the pre-treatment system will be ready for testing at M&B dairy in October. A macerator (JWC muffin monster) has been received by FPPC and will be used in the testing along with the belt press and pelletizer.

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

Process description:

- Pigs will be housed on green litter for limited resource farm applications
- Liquids will be absorbed by green waste material
- Project will identify the primary indigenous microorganisms
- Economic analysis of construction and design of a solar and naturally ventilated facility in Hawaii.

Project Status:

During the fourth quarter the University of Hawaii plans to conduct its open house with over 150 people in attendance. A Public Broadcasting Station (PBS) production will begin filming for a segment on innovative agriculture during the fourth quarter.



Photos courtesy of Carolyn Wong, NRCS Resource Conservationist, Waimea Field Office



Photo courtesy of Carolyn Wong, NRCS Resource Conservationist, Waimea Field Office

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

Process description:

- Process will incorporate solid separation, effluent treatment and wetland conservation.
- Designed for a limited resource farm.

Project Status:

FPPC staff as well as NRCS representatives visited the site in July to film a virtual tour. Progress continues to be made at the site.

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

Process Description:

- Pyrolysis conversion of poultry litter to bio-fuel for on-site use
- Unit employs a fluidized bed and modern controls to operate the system

Project Status:

FPPC conducted a site visit during the third quarter to film a virtual tour of the pilot project. The pyrolysis unit currently produces oil twice a week.



Pyrolysis machine



Farm owner Oren Heatwole and VA Tech student Derek Grysko

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:

FPPC conducted a site visit during the third quarter while project was in start up mode. A follow up site visit is planned for the fourth quarter to observe 3 filled containers as well as the filling of two additional while staff is on site.

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

Project Description:

This project will develop technology and investigate geotextile container bags as a means of collecting, dewatering with high pressure and rapid filling methods with metal salt/polymer flocculation. Comparative testing and evaluation is planned for three (3) separate swine sites in Iowa.

Project Status:

The technology vendor conducted its second GFII dewatering event using the 300 series bags successfully. The flow was strong and was maintained without the bags plugging as they had previously. Laboratory results are still under review.

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

Project purpose:

Expand the list of candidate treatment methodologies following solid separation

Project Status:

FPPC worked during the third quarter to develop and finalize a plan of work for the effluent project. Discussions between potential providers and FPPC have been initialized

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

Project purpose:

Nutrients can typically contribute to air emissions through methane formation and the decomposition of organic matter and alternately with the fate of Nitrogen. Some waste treatment methods transform Nitrogen into an inert form (N₂) which is an acceptable environmentally but fails to realize the value of Nitrogen.

Project Status:

Efforts are still underway to research methods and processes to capture the Nitrogen for use rather than experience Nitrogen losses to the atmosphere. A literature search has begun and the potent impact of NO_x compared to methane and CO₂ has been noted. During this year's summit in August, presentations were conducted to discuss these options.

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

Project purpose:

To utilize the poultry manure to offset energy needs on farm in the form of hot water for heating and for electricity for ventilation and cooling of the barns.

Project status:

This project is fully scoped and is waiting for review for final approval which is anticipated during the fourth quarter. FPPC staff has been in discussions with gasification companies and anticipating a field visit during the fourth quarter.

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:

During the third quarter, FPPC conducted an energy audit North Florida Holstein, however it did not account for the entire farm or for fuel used on the farm for moving and hauling the manure and sand around. FPPC staff has visited with two gasifier companies and has spoken to another to find information about gasification of dairy manure. FPPC also started looking at testing North Carolina State University's torrefaction machine with dairy manure and chicken manure.

Attachment A

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

=====

- 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.