



FPPC

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

April 4, 2011

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RE: 1st Quarter Report for January 3, 2011 to March 31, 2011

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

The regional summit held in Annapolis, Maryland on March 23-25, was well attended and provided a forum to better understand variations of thermo-chemical processes and important attributes such as energy output, scalability, byproducts, market conditions and economic incentives.

On March 8, 2011, FPPC was notified that a request to amend two (2) cooperative agreements had been signed, thereby extending the term to September 30, 2012. Earlier, FPPC responded to a number of RFPs related to Phosphorous and Nitrogen reduction, from the National Fish and Wildlife Foundation, Chesapeake Stewardship Fund. The first was a proposal to provide technical assistance regarding nutrient management in the Chesapeake Bay watershed. The next proposal involved the use of Farm Pilot and its mobile platform to treat dairy waste in the Shenandoah Valley. Finally, another proposal was submitted to evaluate variations of thermo-chemical processes based on multi-site deployment.

OPERATIONS -----

1. Advisory Board Meeting:

- The Professional Advisory Board met on March 23, 2011, to consider recent developments on nutrient management projects and to review FPPC initiatives aimed at impaired watersheds and hot spots recommended earlier. John Thorne, from Crowe and Mooring, was introduced and welcomed to the Advisory Board. Kristen Hughes, from the Chesapeake Bay Foundation, provided an overview and current context for the environmental challenges facing the Chesapeake Bay watershed.

Efforts to pursue nutrient related funding and collaboration in the Chesapeake were described. In addition, the Advisory Board was advised that one developmental initiative has resulted in a filing of a provisional patent.

Advisory Board members were asked to discuss the merits of a consulting role for FPPC based on the perceived need for nutrient management and the technical assistance provider role identified by NFWF.

2. Outreach Activity

Key members of Farm Pilot's staff undertook site visits in key areas of the Chesapeake watershed to better assess developing interest, needs on farm and specific plans for incorporating variations of thermo-chemical processes and other technologies for managing nutrients in the Chesapeake Bay watershed. It was also an opportunity to promote and fine tune the program for the upcoming Technology Summit.

- In Dayton, Virginia we visited with poultry grower Oren Heatwole and Andre Dight from Biomass Heating Systems. Oren showed us his recent investment in a modern two house production facility just built. It was well equipped with controls and an attic to buffer air temperatures. Oren had been to Ireland and was impressed with the heating applications and manure-to-energy installations completed advanced by BHS. While there, we asked about his interest in the pyrolysis technology and Oren stated he continues to be an advocate but was concerned that the project was losing momentum.
- During our visit, we learned that Fibrowatt LLC was making a strong bid to build a centralized facility in Rockingham County, Virginia. Based on the interest level generated among various growers throughout the Shenandoah Valley who inquired about this, a follow up call was made to Mr. James Potter with an invitation to participate in the Annapolis Summit program.
- We scheduled a meeting in Lexington with Dr. Jactone Orejo from Virginia Tech to discuss the status of FPPC's effluent treatment wet waste. Dr. Orejo thought there was potential for applying this technology and developing a shared service for many of the small dairy farms who were financially unable to make significant capital investments. We committed to revisit the opportunities to demonstrate FPPC mobile technology to the Shenandoah Valley.
- In Richmond, we visited the Department of Agriculture, and were hosted by Stephen Versen from VDACS. We overviewed the technology status and pilot project activity being pursued in CBW with key members of Virginia's Economic Development, Renewable Energy Program, Department of Conservation and Resources, Soil and Water Districts and the Chesapeake Bay Foundation. We also visited with Kristen

Hughes from the Chesapeake Bay Foundation to gain her perspective on evolving plans and efforts for Nitrogen and Phosphorous reduction and the current legislative efforts to develop incentives in Virginia.

- On the Eastern Shore of Virginia we met with grower Dave Lovell and Jane Lassiter and Edwin Long from, NRCS Accomac RC&D. We reviewed the status of proposed gasification efforts on the farm. In addition, we touched base with Dr. Reiter , from Virginia Tech about the proposed ash development efforts.
- On the following day we met with Tony Tranquil from Wayne Combustion and Dr. James McNaughton, from AH Pharma and Dr, Jeanine Harter and Dr. Jennifer Timmons from UMES to discuss the feasibility of integrating energy derived from combusted litter in a heated floor configuration.
- Later in the day, we met with a variety of poultry growers throughout Maryland and Delaware and ag consultants to discuss the litter to energy at their farm and the merit of using a system being advanced by Wayne combustion.

Progress at active pilot demonstration sites is summarized below.

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Dairy, Florida (#4.12 and project #6.03)-----

**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:

Final report is being drafted.

Swine, North Carolina (#6.4.14) -----

**North Carolina A&T
University Farm, Greensboro, North Carolina**

Process description:

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

Project Status:

Final report is being drafted with recommendations for future methods to pursue.

Poultry, Virginia (#6.4.06)-----

**Virginia Polytechnic Institute and State University
Heatwole Poultry Farm**

Process Description:

- Pyrolysis conversion of poultry litter to biofuel oil and biochar
- Unit employs a fluidized bed and modern controls for managing the system operation

Project Status:

Have contacted Virginia Tech, MERC and the Poultry site personnel regarding staffing changes and their roles going forward. A meeting with all principals will be needed to review progress and to assess new direction given available funding.

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

Project purpose:

The objectives of this project include:

- Identify the benefits of land application of biochar and its effect on crops and soil health (carbon sequestration, water retention, etc.);
- The application of Nitrapyrin to help stabilize Nitrogen when poultry litter is applied and its ability to slow migration; and
- The characterization of ammonia adsorption using biochar as an activated or non-activated sorption media and evaluation of its utility in swine and poultry house

Project Status:

The sorption studies of biochar were presented in the Technology Summit at the end of March. A third method of activation was requested and approved extending the laboratory studies by two months.

At the NC Farm Center, sampling of the test plots has begun. Soil samples and plant tissue samples were collected during the months of February and March. Initial data requires analysis.



Figure 1 – representative test plot

Thermal Energy from Dry Waste (#6.12)----- **Marc Marsh Farms, South Carolina**

Project purpose:

To harness the energy value of poultry litter utilizing gasification and poultry litter as a fuel. Electricity will be produced to offset ventilation/cooling costs for the farm.

Project status:

Progress continues with assembly of the ash auger and installation of electrical items. Mechanical adjustments to the load hopper were required. The structural support frame for the heat exchanger has been designed and will be mounted in April.

New problems were observed with the gasifier augers, which were just replaced. A section of the welded flites has loosened and come off during operation. These augers will be removed, inspected and modified. Restart will occur after the heat exchanger is mounted in April.

A recovery plan was discussed with BGP and Harsh International during visits - the week of the Summit.

**Thermal Energy and Ash By-Product (#6.09) -----
Old Mills Farm, Virginia**

Project purpose: Phase I -To derive energy and nutrient benefits by gasifying poultry litter and converting the sterile Phosphorous rich ash into a manageable by-product that can be utilized as a pathogen free fertilizer for the nearby tomato and vegetable crop. The intent is to reduce the typical poultry litter land application in Delmarva by converting the gasified phosphorous rich ash to a viable pathogen free fertilizer.

Project status:

Manufacture of the gasifier continues but the project is on hold until the funding outcome of the CIG grant request is known. The gasification system will result in electrical energy generated at the poultry farm site on the Delmarva Peninsula.

Database Development (6.14) -----

Project purpose:

To develop user friendly capability for retrieval of significant project information, data and lessons learned from the growing FPPC knowledge base.

Project status:

A mini-Google search engine was installed for FPPC documents posted on the webpage. This capability provides simple search strategies and Boolean logic. In addition, the search capability can be easily expanded to the internet available documents.

Internal security for the server is being maintained by the firewall. FPPC continues to test this recently installed search capability.

Effluent Treatment Methods (#6.07) -----
Multiple Dairy Sites, Florida

Project purpose:

Develop a graded approach for treating liquid waste utilizing a cost effective system composed of incremental solid separation steps. Multiple pieces of equipment will be linked and connected into an optimum system and will rely primarily on low cost mechanical solids separation methods. The contribution from each piece of equipment will be determined based on the amount of solids and nutrients removed from the liquid waste stream.

Project Status:

Operational testing of the FilterSure unit was renewed after the filter media was replaced. The particle size distribution of the waste stream was retested and found to closely duplicate the original characterization. Nonetheless, the demand for excessive back washing of the FilterSure continued. (Excessive demand for backwashing means that the amount of clean water required for backwashing far exceeds the amount of filtered effluent.) This operational performance with dairy waste together with the low backwash demand observed in the US Gypsum application strongly suggests that the FilterSure unit deployed in a dairy application was impacted by too high of a solids loading rate.

Knowing that the fiber filter was delivering effluent with small enough particles (<150 microns) a backup strategy was launched to effectively target the smaller particles. A chemical separation method using metal salts was pursued to displace the poor performance of the FilterSure unit.

Swine, Iowa (#6.4.03) -----
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:

This project is complete and awaiting receipt and review of a final report.

Attachment A

Final report status of thirty-four (34) 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 Microganics (#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 has been reviewed, issued and posted on the FPPC website.
- 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, reviewed and posted on the FPPC website.

- W. Dairy/Mixed Waste, California-----**
Agricultural Waste Solutions, Inc. (#5.06)
Inland Empire Municipal Site, Chino
Report Status: A final report has been issued, reviewed and posted on the FPPC website.
- X. Swine, North Carolina-----**
Super Soil Systems USA (#4.05)
Goshen Ridge Farms in North Carolina
Report Status: A final report has been issued and is currently under review.
- Y. Dairy, Ohio-----**
Crossroads RC&D / Wastewater Services, Inc. (#4.07)
Andreas Farm, Royer Farm
Report Status: A final report has been issued, reviewed, and posted on the FPPC website.
- Z. Dairy, Virginia-----**
Virginia Dairymen's Association (#4.15)
D&D Dairy, Dayton, Virginia
Report Status: A final report has been issued, reviewed, and posted on the FPPC website.
- AA. Dairy, Pennsylvania-----**
Nutrient Control Systems, Integrity (#5.07)
Mercer Vu Farms in Mercersburg, Pennsylvania
Report Status: The final report has been reviewed, issued and is posted on the FPPC website.
- AB. Dairy, Texas -----**
Reaction Energy Corp. (#4.16)
Fisher Dairy, Yantis, Texas
Report Status: A final report has been issued, reviewed, and posted on the FPPC website.
- AC. Dairy, Florida -----**
Pretreatment Methods and Evaluation (#5.12)
Report Status: A final report has been drafted and is being reviewed.
- AD. Swine, Hawaii -----**
Limited Resource Farm – University of Hawaii (#6.13)
Janong Natural Farms, Kurtistown, Hawaii
Report Status: Final report is being reviewed for posting on FPPC website.
- AE. Poultry, Wisconsin -----**
R&J Partnership (#5.04)
Creekwood Farms, Lake Mills, WI
Report Status: Project report is being drafted.

AF. Dairy, Florida -----
White Technologies Inc – US Environmental Products Inc. (#5.09)
North Florida Holstein, Bell, FL
Report Status: Project report being drafted

AG. Dairy, Florida -----
FPPC Polymer Study (#5.09a)
North Florida Holstein, Bell, FL
Project Status: Project report is being written.

AH. Swine, Iowa -----
Puck Custom Enterprises (#6.4.03)
Project Status: Awaiting report and review