FPPC

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

January 4th, 2011

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RE: 4th Quarter Report for October 1, 2010 to December 31, 2010

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

At the end of August, 2011, a proposal to provide administrative and contract assistance was submitted to NRCS in Vermont. The request for proposal focused on managing funds earmarked for Phosphorous and Nitrogen reduction affecting Lake Champlain. Despite the execution of an earlier nutrient management project in Vermont, FPPC learned that its proposal was unsuccessful but was awarded to an entity within the state who provided meaningful cost share. Another proposal to gasify poultry litter on the Eastern Shore of Virginia was finalized and submitted to NRCS in response to a CIG solicitation.

With the growing interest in gasification of poultry litter and energy production in the Chesapeake Bay watershed, FPPC began planning a regional Technology Summit, focused on the family of thermo-chemical processes. Various stakeholders in the Chesapeake Bay were consulted to help plan the program and to consider speakers who should be invited.

OPERATIONS ----------

Board Meeting: At this quarter's meeting, status of various projects was discussed. The Board encouraged FPPC staff to:

- Target impaired watersheds consistent with the satellite strategy recommended by the Professional Advisory Board;
- Narrow its technology pursuit to the most mature applications and
- Concentrate on system solutions having the highest probability of generating an economic payoff.
- In the short run, this reduces the activity focus along two (2) primary pathways. The first involves treatment of wet waste by extraction of solids for nutrient recovery and water re-use. The second is to pursue dryer waste (i.e. poultry litter) using gasification and energy recovery. Nutrient recovery in the ash byproduct should also be pursued.

As the first two systems level solutions have been deployed on farm, initial performance problems have been reported by FPPC personnel in the field.

i. In the effluent treatment of wet waste system, the potential of incremental solids capture in multiple steps is being investigated. Despite having characterized the particle size distribution of the dairy waste solids, one piece of equipment, the multibank filtration from FiltureSure Inc. was performing in a disappointing way because of frequent backwash demand in two of the five modules. A reformulation of the filter media is now being planned and the particles size distribution of the dairy waste is being revalidated.

ii. In the litter-to-energy project and with initial startup of the BGP gasifier, it was discovered that the auger shafts located inside the gasification chamber have become distorted (bowed - banana shaped) beyond use. This issue has been referred to Harsh International, the gasifier manufacturer, and David Brookes, the designer, for a recommended solution. In the current design the rotating augers play an important system function (i.e. material handling role) for continuous operation by transferring the feedstock into the chamber while simultaneously moving ash out of the chamber.

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:

All data and observations are being reviewed. A proposal to modify the belt press and continue further testing is being prepared.

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:

Project has been completed. Data and observations are being collected for a final report.

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:

Project is being affected by a desire to upgrade and commercialize this technology. A review of opportunities to gain additional funding and to redirect this project is required.

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 biochar material delivered to NCA&T for sorption studies has been characterized using lab evaluation techniques. The preliminary data indicates that biochar activated with either steam or phosphoric acid performed better than non-activated biochar when low ammonia concentration levels were introduced. These findings need to be repeated and validated. The sorption curves and kinetic studies will be conducted for both activated and non-activated biochar. For reference, a commercial activated charcoal, Calgon's monosorb, has been selected for evaluation.

FPPC field personnel, Dudley Voorhees and Preston Burnette, made a site visit to the NC Farm Center to record progress using biochar and test plots. In addition, Dr. Keri Cantrell from USDA-ARS in Florence, SC, has been contacted to assist in evaluating test plot data. Test plot planting was completed in November in accordance with the agreed upon protocol.

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 needs of the barns.

Project status:

Progress at the site focused on assembling the manure loading hopper and auger to feed the gasifier. A temporary method was installed to remove the ash, allowing continued operational testing of the gasifier. See picture below.

During operational testing of the gasifier, a distortion problem of the gasifier augers was detected. The bowing of the augers resulted during a thermal cycle and are sufficiently distorted to require replacement. BGP has been advised and replacement parts will be ready to install in January.

Figure 2 –gasifier feed system being installed

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:

A CIG proposal, requesting grant funding for an Eastern Shore gasification project, was submitted by FPPC and NRCS RC&D in December 2010. This request establishes a gasifier project at the Dave Lovell Farm and provides funding support to complement the gasifier installed by FPPC.

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:

Several commercially available methods for data retrieval have been explored. Wikipedia and Google as well as other unique search engines were evaluated for searching information posted on the FPPC website. In addition, maintaining security on the website and the internal server was considered.

While various search engines are being evaluated, significant project and process attributes are being characterized for each project.

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 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:
The multi-step effluent system was self powered and was deployed on two (2) mobile platforms at M&B dairy for operational testing. Farm Pilot personnel conducted the operational testing at the dairy.

The system treated dairy waste collected and mixed in the farm's concrete storage pit. The waste was first pumped to a screw press with its effluent routed to the next step, a fiber filter. A third treatment step, a multi-stage back washable FilterSure unit was deployed but experienced some startup problems initially. While troubleshooting occurred on the FilterSure equipment optimization of the front end processes (screw press and fiber filter) allowed work to continue. These delays resulted in a more thorough characterization of the FilterSure requirements particularly since extended and frequent back wash cycles were being observed in the field.

FPPC and FilterSure worked together to understand the importance of the filter media in the FilterSure unit and a decision was ultimately made to replace the media in four of the five stages while the particle size distribution for the waste stream was reverifed.

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:

Based on previous site visit to witness the higher fill rates along with the use of metal salts and polymers, project activity is being discontinued. A final report is being drafted.

Attachment A

Final report status of thirty-three (33) 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: Project report is being drafted.

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.