



# FPPC

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

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July 15, 2010

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

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

**Copy:** 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.  
Jule Doran, FPPC Chief Operating Officer  
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, Field Project Manager  
Preston Burnette, Research Engineer  
Christopher Tubbs, Technical Specialist  
Nidal Samad, FPPC Senior Research Engineer  
Don Malpass, FPPC Technical Specialist

Re: Quarterly Report for period from April 1<sup>st</sup> through June 30<sup>th</sup>, 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

During the second quarter, efforts continued to support project close out and the June termination date under the 2005 FPPC/NRCS Cooperative Agreement. Another agreement was partially executed to obligate and extend unspent funds remaining in the 2004 Cooperative Agreement.

To date, FPPC has expended substantial effort in hosting two regional summits - one focused on the nutrient issues in the Chesapeake Bay Watershed and more recently the Midwest Summit in Des Moines, Iowa. Final plans are now underway for the annual Technology Summit scheduled for August 25<sup>th</sup>-27<sup>th</sup> in St. Petersburg. This conference will be focused on building integrated solutions for effective nutrient management.

## OPERATIONS -----

### 1. Board Meeting:

- The FPPC Board of Directors met July 9<sup>th</sup> and reviewed progress on the dual-use pelleting project, the database development project and the status of the poultry project underway in South Carolina. The Board took action to approve expenditures on the following
  - Effluent project – the remaining funds for \$300K approved
  - Nitrogen and emissions capture – approved \$250K for initial phase subject to review and update at the next Board meeting
  - Second thermal project – approved \$276K gasifier for Delmarva pending CIG project approval
- Consideration for joining the National Institute for Animal Agriculture (NIAA) was discussed and approval was given to seek a membership with re-evaluation in one year.

### 2. Outreach Activity:

- In past the three months, FPPC participated on a multi-discipline steering committee to assess the technology and programs available for reducing nutrients into the Chesapeake Bay Watershed. Funds for this effort were provided by the Keith Campbell Foundation. In addition to listening and gaining the perspective of many in agriculture, this effort will result in recommendations for action going forward. A final report is currently being written.
- FPPC participated in a two day dialogue hosted by 25x25.org and conducted with the Ag leaders from various segments of the industry. In June, General Manager – Bob Monley made a presentation at the annual 25X25.org Technology Summit held in Arlington, Virginia. Presentation material is available at [www.25x25.org](http://www.25x25.org).
- The Midwest Regional Summit was conducted June 14-16, 2010 in Des Moines, Iowa. The conference was well attended and Governor Culver shared his thoughts at the conference. All presentations have been captured and were provided to participants.
- The Annual Technology Summit will be held August 25-27, at the Don Cesar Beach Resort in St. Petersburg, Florida. The upcoming Summit will focus on building integrated systems and will consider how solutions must take into account regional differences, effects of air emissions, incentives for reducing the carbon footprint and how systems can convert waste to energy. A panel of four (4) farm owners will share their perspective about innovative technology and what role it plays in providing a nutrient management solution for the farm. Speakers and program details are posted on FPPC's website at [www.fppcinc.org](http://www.fppcinc.org).
- FPPC has been invited to speak at the American Society of Agricultural and Biological Engineers (ASABE) annual symposium scheduled September 13-16, 2010 in Dallas, Texas.

### 3. Staffing / Personnel update:

- Board member, Lawrence Clark, has accepted an assignment on the EPA Farm, Ranch, and Rural Communities Committee (FRRCC) for its 2010-2012 term. The FRRCC is an independent committee that advises EPA on a wide range of environmental issues of importance to agriculture and rural communities.
- Lauren Park is leaving FPPC after 5 years to pursue career interests in the health industry. For the time being, Aimee Walker Thomas is assuming administrative duties for the organization.

**Progress at active pilot demonstration sites is summarized below:**

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**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:**

During the second quarter, FPPC moved the pelletizer to the farm site for testing. Even though extruded solids were formed at this moisture level, the extruded cylindrical shapes tended to crumble easily and the pellet geometry could not be sufficiently maintained without a binder. The addition of polymers from the preceding solid separation stage was the intended binder.

In further testing and evaluation of the solids separation with polymers, it was learned that the high variability of the dairy solids was affecting the proper dosing with polymers. The wide variability of dairy waste together with the higher moisture level has now raised concern that predictable and cost effective polymer dosing would be a viable process without high volume, pretreated batch loading.

When the same waste was further dried by another 25-30 points, pellets could be formed using a conventional CPM pelletizer. The manufacturers of the CPM - however claim they could not form pellets from the dairy solids at the originally high moisture levels – (i.e. 40-50%).

**Swine, North Carolina (#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:**

During the second quarter, the project changed focus from treating swine manure, which was being flushed directly from the finishing barns to an aged anaerobic swine lagoon, which captures and stores flushed manure from a 250 head; sow farrow-feeder operation. The lagoon maximum water holding capacity is approximately 282,000 cubic ft, it is being agitating and pumped into a geotube at flow rates ranging from 120-150gpm for up to 3 hours per day, for two days a week. Flow rate and volume are monitored using an inline magnetic flow meter. Coagulation and flocculation before entering the geotube was achieved by using ferric sulfate and hyperfloc CE854, respectively. Discharge from the geotube was emptied into the lagoon. Lagoon and geotube samples were taken at 30 minute intervals. Laboratory analyses are ongoing.

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

**Process Description:**

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

**Project Status:**

Work continues on the pyrolysis process parameters using poultry litter feed stock.

Approximately two tons of bio-char were generated for organic farm field trials for the Appalachian Sustainable Development Group. Biochar production and application to soils has a huge potential to sequester carbon, increase soil quality and sustainability of farming systems. However, the use of biochar is new, and techniques for their use are still being developed. There are major differences between biochar because of the origin of the raw material and the conversion technology. Limited literature available indicates that biochar takes more than a year to stabilize in the soils. The poultry litter biochar has high pH, and high nutrient content which is very beneficial for the generally acidic and nutrient deficient soils in Virginia, but high salt content limits annual applications. Virginia Tech's work indicates that biochar derived from poultry litter was able to increase water holding capacity and cation exchange capacity of the soils.

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

**Project purpose:**

Nutrients from manure can become airborne and affect air quality during the decomposition of organic matter. In addition, ammonia and NOx are also typical emission issues associated when the Nitrogen conversion process occur. Nitrification – DeNitrification, a known process, can transform Nitrogen into an inert form (N<sub>2</sub>), which is acceptable environmentally, but converting and capturing Nitrogen in this way adds cost and does not result in a marketable by-product. The goal of this project is to explore the capture of Nitrogen in different methodologies and to provide a value added product for the farmer while improving environmental acceptance.

FPPC is focused on a) beneficial effects of biochar and Nitropyrin, a Nitrogen stabilizer, when utilized for land applications and b) the adsorption qualities of biochar that could be capture ammonia emissions emanating from swine and poultry houses.

**Project Status:**

FPPC conducted a due diligence visit to the University of Georgia to review processes for poultry litter fractionation and to become familiar with early work underway on bio-char. FPPC was impressed with the number of bio-char variables that need to be evaluated. One clear finding was that the poultry litter feedstock is very important as potentially high levels of arsenic in the litter can jeopardize crop yields from bio-char application rather than improve them. FPPC has also been working with NC State University to create 15 tons of bio-char from poultry litter. This will be utilized in plot studies and further testing.

The scope of work to determine bio-char adsorption properties has been defined. Initial test strips using Nitropyrin and poultry litter were generated during spring planting at the University of Maryland. More detailed work is being planned for land use and specific farms will be targeted for an appropriate test site.

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

### **Marc Marsh Farms, South Carolina**

#### **Project purpose:**

To unlock the energy value in poultry litter by utilizing gasification and poultry litter feedstock to offset on-farm energy needs (hot water for heating and electricity for ventilation/cooling of the barns).

#### **Project status:**

A BGP gasifier has been manufactured with anticipated arrival at the Marc Marsh farm by mid-July. The application for an air permit was submitted by July to the State of SC for review.

Negotiations with two electric utilities resulted in Lynches River Co-op indicating interest in the generated electricity. FPPC is working with the State of South Carolina and their available grant funds to purchase several pieces of equipment – specifically the organic rankine cycle (ORC system), a heat exchanger, and material handling equipment.

A site visit was conducted with all participating parties reviewing project status and next steps including the gasifier placement, building construction, permitting, electric utilities, and miscellaneous equipment purchase.

## **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 displace typical poultry litter application in the Chesapeake Bay Watershed and to provide a different application for the nutrients and in so doing replace chemical fertilizers for the vegetable crop.

#### **Project status:**

After meeting with a potential dairy site owner in Florida, FPPC determined that it was not economically feasible to go forward with an energy project on that site. Another farm site was proposed in the Chesapeake Bay watershed and FPPC has become a funding collaborator for this site. We are waiting to hear if CIG funding will be approved.

## **Effluent Treatment Methods (#6.07)** -----

### **Multiple dairy sites, Florida**

#### **Project purpose:**

Develop a graded approach to treat liquid waste to a cost effective breakpoint after the solid separation step. Multiple pieces of equipment will be system configured for mechanical solids capture. The contribution from each piece of equipment will be deployed to determine where and how the solids and nutrients can best be incrementally removed from liquid waste stream.

#### **Project Status:**

During the second quarter FPPC conducted testing to determine the particle size distribution of the solids in order to correctly purchase a multi-stage filter unit. While a 30 gpm Filtersure unit was being built, FPPC constructed a smaller version of a mobile deployed effluent technology unit to do some

initial testing. Based on the preliminary pre-test data, it was determined that a larger press and a fiber filter would be required to optimize system flow.

**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:**

The project has been scheduled for completion during July. The technology provider will be conducting the event at the Muhlbauer Farm in an effort to increase flow rates as high as possible – near 1000 gpm. This will require modification to the dewatering unit enabling recycling effluent into the polymer mixing circuit for higher flow rates without using more fresh water. A final report will be drafted after testing.

**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 in work.

**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:**

This project is in close out stage and a final report is in work.

**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 polymer addition and vacuum dewatering bed

**Project Status:**

The performance of the vacuum dewatering bed has been evaluated and findings indicate it is adversely affected by the combination of high solids dairy waste and the wide variability of solids (6-23%) which do not allow effective polymer dosing. The project results are being documented for a final report. This finding is further supported by successful municipal applications using dewatering beds with low solids (1-3%) and preceded by large volume anaerobic digesters.

**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 site has been completed. Data and final observations have been captured for the final report.

**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 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 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 has been submitted for review.
- 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 revision.
- 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:** Project complete and final report is being drafted.
- 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