



# FPPC

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

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October 29, 2010

**TO:** Mr. William Boyd - Leader, Manure Management Team, ENTSC - NRCS

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**RE:** 3<sup>rd</sup> Quarter Report for July 1, 2010 to September 30, 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**

The annual Technology Summit conducted in St. Petersburg in August was well attended. This conference focused on building integrated solutions for effective nutrient management. All presentations made by speakers are available online at the website. Additional Regional Summits are being budgeted and planned for 2011.

The Professional Advisory Board met the day before to review trends in nutrient management activity in light of regulatory requirements and anticipated policymaking while considering possible paths for future Farm Pilot activity.

During the third quarter, four projects were completed with final reports posted on the FPPC website. A new cooperative agreement has been executed authorizing efforts with remaining funds from the 2004 cooperative agreement.

## OPERATIONS -----

### 1. Advisory Board Meeting:

- The Professional Advisory Board met to consider changes on the forefront and to consider meaningful actions that would advance nutrient management efforts. The Board advised that FPPC should concentrate its efforts in the hot spots or impaired watersheds like the Chesapeake, and Florida headwaters where changes in TMDL are most likely to drive change and be precedent setting.

### 2. Outreach Activity:

- FPPC continues to actively participate with the steering committee of AG leaders assessing technology and programs for reducing nutrients in the Chesapeake Bay Watershed. Recommendations have been presented by Ernie Shea, Natural Resource Solutions, recently at the Chesapeake 2025 Goal Line conference in Hunt Valley. A FPPC presentation was also made at the same conference.
- FPPC is supporting the Recommended Energy and Nutrient Solutions for Maryland Farming which will be considered by members of Governor O'Malley's staff. Maryland's governor is launching a major new initiative to support farmers while working to protect clean water.
- A FPPC presentation was made at the ASABE International Symposium on Air Quality and Manure Management conducted in Dallas on September 14<sup>th</sup>
- An article featuring activity and development at FPPC was published in September issue of the *"Manure Manager"* magazine
- FPPC was invited to share progress on nutrient management technologies by participating in an Ag Issues Forum in EPA's monthly regional teleconference. In the previous week FPPC traveled to DC to brief Larry Elworth, Chief Agricultural Counselor, EPA as well as Pearlie Reed, Assistant Secretary of Administration, USDA/NRCS.

### 3. Staffing / Personnel update:

- Aimee Walker Thomas has accepted a full time position with FPPC as Program Manager assuming duties for outreach as well as administrative and support functions required by the program.

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



**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:**

Upon further investigation it was learned that the polymer system did not perform as expected and this phenomena invited more detailed evaluation. In the meantime, the polymer addition was not available for forming pellets and therefore not acting as a proper binder for pellet formation. Our investigation revealed that variability of the waste stream was a significant factor and the root cause influencing polymer performance.

FPPC concluded that variability of dairy solids could significantly change from day to day and may not be constant across different farms highlighting the need for more robust homogenization prior to the separation processes augmented with chemical additions. Essentially the inability to capture a high percentage of solids with the belt press using polymers was attributed to high variability of the waste stream.

The pelletizer did not produce pellets that would be able to maintain its geometry without crumbling in a dryer system. Hence the effective use of a binder with wet waste is essential. This same dairy waste was dried and subjected to pelletizing using a CPM machine. Pellets from the same dairy waste were successfully formed without a binder but at low moisture levels requiring the expending of significant energy and motor horsepower to form.

The original scope of work was modified to encompass testing the belt press as a solid separator without the use of polymers. Testing efforts were initiated at North Florida Holstein Dairy with sand laden manure and solids ranging up to 15%.

With experience, FPPC learned that the belt press was capable of separating solids from the sand laden manure and still capture over 40% of the solids. This capture is consistent with other devices operating absent of sand and should offer a competitive advantage over other technologies in the industry. A 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:**

During the third quarter, swine waste from an aged anaerobic lagoon was agitated, mixed and pumped between 120-150 gpm for 3 hours a day into a 10 ft dia X 30 ft length woven polypropylene geotextile bag. A 4 inch magneto flow meter was utilized to determine flow rate and volume. Coagulation and flocculation was achieved by using .04 to .05 gal/min of ferric sulfate and 0.5 to .7 gal/min hyperfloc of cationic acrylamide copolymer.

Samples of the discharge from the geotextile tube were taken in 30 minute intervals. Total phosphorous was reduced by 88% while total solids were reduced by 84%. Nitrogen however indicated only a 20% reduction.

At times it was observed that separation was not occurring – leading to the conclusion that solids separation is not efficient or reliable with aged (>20 years) swine waste water from anaerobic lagoons because of partial degradation occurring in the lagoon system. Others however have reported efficient solids capture can be achieved in young anaerobic lagoons storing swine waste.

**Poultry, Virginia (#6.4.06)** -----  
**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 of poultry litter with variation of process parameters. Two tons of biochar were generated for organic farm field trials by the Appalachian Sustainable Deveelopment Group. Since the use of biochars is new, learning how to use them correctly is critical. From the limited literature available, biochar may take 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 may limit annual applications. Thus far, our work is showing that biochar derived from poultry litter is able to increase water holding capacity and cation exchange capacity of the soils. Some improvement in the yield has ben observed on two of the farms, however, carbon sequestration in the soil has not

been documented yet. Continued studies in the soil during the second year will be needed to determine the effect of the biochar on the soils.

The Manure Energy Research Corporation (MERC) has been formed to further develop the pyrolysis technology for commercialization. CIG funding has been awarded from NRCS to build a pre-commercialization pyrolysis unit in the Shenandoah Valley of Virginia.

An educational video for the pyrolysis of poultry litter will be made to educate growers and policy makers and made available for use by Virginia Tech Extension agents and professors. Presentations on the pyrolysis technology were made at the 2010 Chesapeake Bay Agricultural Networking Forum, St Michaels, MD on October 27, 2010 and at the Chesapeake Goal Line 2025 conference in Hunt Valley, MD, on October 5, 2010.

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

#### **Project purpose:**

The objectives of this project include:

- Identify the benefits of land application of Bio-char 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 Bio-char as an activated or non-activated sorption media and evaluation of its utility in swine and poultry house

#### **Project Status:**

Two Bio-char materials derived from poultry litter have been prepared by NC State University using their torrefaction unit. Approximately 20 tons of biochar (half exposed at 550°F and the balance heated at 300°F) have been delivered to FPPC for evaluation. The parameters for biochar production were selected after a visit to UGA.

An agronomist for the NC Farm Center visited FPPC to explain the test protocol for the plot sites. Soil and plant leaf sampling and analysis of irrigation, yield analysis, the application of the crops will be evaluated for the 24 plots dedicated in this study. Soil sampling will consist of 20 randomly collected samples per plot, mixed together and one composite sample will be delivered to the lab for nutrient analysis..

NC&T has been engaged to characterize the adsorption characteristics of the biochar samples.

**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:**

A second site visit was conducted with all participating parties, reviewing project status. The air permit has been issued. The gasifier is installed on concrete slab within new building. A loading hopper and augers have been purchased and the organic rankine cycle (ORC system) has been reviewed and will be purchased. The Lynches River Co-op will be the electric company purchasing the electricity generated.

The gasifier is scheduled to be in operation in November and producing electricity (ORC) in January of 2011.

**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 for the nearby vegetable crop.

**Project status:**

A potential poultry farm site has been proposed on the Eastern Shore of the Chesapeake Bay Watershed. FPPC has placed another gasifier on order and plans to conduct further due diligence at the proposed broiler site the first week of November.

An invitation to gain collaborative CIG funding was not successful.

**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 incremental solid separation steps. 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 a liquid waste stream.

**Project Status:**

A self sufficient system has been constructed on two mobile trailer platforms. It is currently in testing operation at M&B Dairy in Lecanto, FL. Data is being gathered at

time of writing to determine degree of solids and nutrients removal from effluent. The mobile system is scheduled to be in operation at DPS Dairy in Branford, FL for further data gathering in November.

**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:**

Nidal Samad and Jeff Porter conducted a site visit in August to observe the geotech loading at the higher fill rates. A final report is being drafted.

**Attachment A**

**Final report status of twenty (20) 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 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 Partnershi[ (#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.