



FPPC

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

October 15th, 2008

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

From: Bob Monley, General Manager, FPPC, Inc.
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Re: Quarterly Report for period from July 1st through September 30th, 2008

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 of 2008, all Limited Resource Farm projects are proceeding. FPPC is continuing its due diligence on the energy proposals and plans to update the Board in October.

In July, FPPC presented a paper at the Soil and Water Annual Conference and exhibited at Florida's Farm-to-Fuel Conference in Orlando.

OPERATIONS -----

- A. Board of Directors:** FPPC conducted a Board of Directors meeting in July to discuss the progress of the energy proposals. Further due diligence is needed in order to properly evaluate the proposals.
- B. Farm to Fuel Conference:** In July, FPPC representatives attended the State of Florida's Farm to Fuel Conference in Orlando, Florida. This year's conference focused much of the attention on renewable energy from agricultural, although animal agriculture was not a primary point of discussion. FPPC chose to exhibit at this year's conference in order to better educate the participants in the value of animal manure as a fuel source.
- C. Soil and Water Conservation Society Annual Conference:** FPPC was asked to participate in a conference hosted by Soil and Water Conservation Society (SWCS) in July. Bob Money and other FPPC representatives utilized their trip to Tucson, Arizona to lead discussions on lessons learned to NRCS staff and officials.
- D. A133 Audit:** FPPC closed out its 2007 A133 Audit and plans to report to the Board in October.
- E. Gasification Project:** Five Rivers Cattle Feeding Company updated FPPC on the recent events of the proposed gasification project and the pending changes in ownership. Five Rivers has refocused its interest towards a smaller gasification unit that is modular in design but still capable of continuous feeding. Tom McDonald indicated that they are also looking at other potential sites that would be easier to access from an airport than the originally proposed Grant County Feeders in Kansas. There is interest in moving forward with FPPC's help in a testing and monitoring capacity.
- F. Pelletization:** In a continued effort to benchmark pelletization, FPPC staff conducted a site visit to a local plant that pelletizes municipal waste. While visiting, FPPC discussed variances and system requirements with operating plant managers.
- G. Pelletization benchmarking:** In the continued efforts to better understand "best in class" processes and the appropriate application for pelletization on farm, the FPPC staff conducted a site visit in September to the local waste water recycling plant in Pinellas County. This facility recovers water and recycles municipal waste by converting this waste stream into dried solids by generating a value added fertilizer product. Synagro, who is one of the nation's top producers of pelleted fertilizer products, operates this \$ 10 M facility and shares profits from commercial fertilizer sales with the county government. While visiting, FPPC discussed requirements, unit processes and system capabilities with operating plant managers.

A. Progress at active pilot demonstration sites is briefly summarized below:

Swine and Dairy, Michigan (#6.06)-----
Phase 3 Developments & Investments, LLC
Geerlings Hillside Farm

Process Description:

- Treatment of mixed animal waste from both swine and dairy
- A series of waste treatment technologies (i.e. screw press and dissolved air flotation) have been integrated with an anaerobic digester to provide a complete system
- Ultimately producing electrical power may be incorporated at a later date
- Pelletization and transport of nutrients off site to organic fruit farms and other potential end users

Project Status:

During the first six months of 2008, pelleting trials were conducted using the initial die specified by California Pellet Mill (CPM) with no success. Phase 3 Development, after consulting with CPM, replaced the original die with a one inch die and constructed a fiber drying area to reduce moisture in the fibers to 35% or less, utilizing waste heat from the biogas generator.

In addition to the biofibers, the pelleting trials included blending in a byproduct of a chicken manure pelleting process. This material easily blended with the biofibers, coating the surface area evenly and making the fibers flow easier. The chicken manure also has a higher nutrient density, which would make the final pellets more valuable as a fertilizer.



The one inch thick die made a significant improvement in the operation of the pellet mill. A wider range of biofibers moisture could be processed, and the pellet mill ran successfully on a sustained basis. From the trials, it is estimated that approximately 500 lbs of pellets could be made an hour, or 12 ton/day if operated continuously.

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:

To date, Virginia Tech has pyrolyzed approximately one ton of poultry litter and have collected several barrels of the bio-char. The bio-oil produced had a very high moisture content due to the feed being wet and some of the combustion gases produced water. Virginia Tech successfully re-circulated the synthesis gas and combusted it to fuel the reaction. A gas chromatograph was also installed to analyze some of the gases produced during pyrolysis.

During the third quarter, the NRCS conducted a one-day training about poultry litter pyrolysis where approximately thirty NRCS representative attended. There appears to be a lot of local support from farm owners as well as statewide and even global interest.



Transportable pyrolysis unit

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

Project Description:

Development and study of geotextile dewatering method using high pressure and rapid filling and metal salt/polymer flocculation. Comparative testing and evaluation is now being planned for three (3) separate swine sites in Iowa.

Project Status:

FPPC conducted a site visit in July to observe the first event of the project at the Langel Farm in Manning, Iowa. This farm is the smallest of the three projected farm sites. The geo-bag, measuring 22 ft. long x 26 ft. in circumference, was placed inside of a trailer in order to better transport the solids after dewatering. The system was designed to be controlled by computer input to properly mix the polymers and measure the flow of salts.



Geo-Bag inside trailer at Langel Farm



Puck Custom Enterprises and Iowa State University

FPPC visited the site again in September to observe the filling at the Greenflash II test site. Plans for dewatering at the Muhlbauer Farm are expected during the fourth quarter.

Dairy, Pennsylvania (#5.07) -----
Nutrient Control Systems
Mercer Vu Farms in Mercersburg, Pennsylvania

Process description:

- Upgrading and enhancing the existing nutrient management system, making waste treatment of manure user friendly and cost effective.
- Capability for fine sand removal, additional solids separation capability, conveyor, blower & controls, building expansion, windrow turner and curing pad sufficient to support a viable composting operation.

Project Status:

The technology provider is working to automate the system by attaching the Kemira system with the computer system of the solid separation equipment.

Dairy, Ohio (#4.07) -----
Crossroads RC&D / Wastewater Services, Inc.
Andreas Farm, Royer Farm

Process description:

- microbial enhancement
- flushed and dry scrape dairy sites

- dewatering and complete solid separation
- package plant to treat effluent
- able to achieve nutrient and water quality levels acceptable for discharge

Project Status:

During the third quarter, FPPC has communicated continuously with both the technology provider and the local NRCS to determine the best action forward for the project. Multiple solid separation technologies have been tested and discussed for both the Andreas and Royer Farms. In September, the technology provider proposed to install two different systems at the farm sites, a belt press at the Royer facility and a screw press at the Andreas Farm. Due to time and funding constraints, FPPC has determined that a change of scope is needed in order to proceed.

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 vacuum dewatering bed and polymer addition

Project Status:

All construction and air leak problems have been resolved; however the vacuum dewatering bed is currently inoperable. The bed tiles are currently clogged and unable to dewater the manure. FPPC is currently putting together a scope of work to evaluate the tiles and the concentrations of sand and/or polymer within the tile surfaces. The polymer evaluation along with the vacuum systems cleaning is expected to be completed by February 2009. The vacuum dewatering bed, along with the polymer system has a start up goal of March 2009.

Dairy, Texas (#4.16)-----
Reaction Energy Corp.
Fisher Dairy, Yantis, Texas

Process description:

- Limited Resource Farmer Technology
- Development of struvite formation on a limited resource farm.
- Initial testing will provide a performance milestone for continuing the project.

Project Status:

FPPC and NRCS representatives conducted a site visit in August to observe the project. The project's objective is to produce the mineral struvite from the effluent of the holding pond at Fisher Dairy. The project is a gravity fed system that introduces the effluent into two holding tanks where magnesium hydroxide and magnesium chloride are introduced. The material sets for one week and then drained.

The technology provider has crystals precipitating from the tanks, but is unsure whether it is the desired product. FPPC authorized the technology provider to conduct both x-ray diffraction (XRD) and energy dispersive x-ray fluorescence analysis (EDXRF) to identify the compounds.



Technology provider in front of primary lagoon



View of inside tanks where chemicals are put in a small basket (round orange ring) and diluted into the effluent batch.

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

Process description:

- Limited Resource Farmer Technology
- Pigs will be housed on green litter for a limited resource farm.
- 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.

Status:

All agreements have been signed and project is underway

Dairy, Virginia (#4.15)-----
Virginia Dairymen's Association
D&D Dairy, Dayton, Virginia

Process description:

- Limited Resource Farmer Technology
- Demonstrate and evaluate a high-efficiency screw press separator on a limited resource farm, to remove solids in conjunction with a struvite precipitation system to remove phosphorus from the liquid stream of the separated manure.

Project Status:

This project will be demonstrating a screw press to remove solids and a struvite precipitation system to remove phosphorus from the filtrate. FPPC and NRCS representatives visited this site at the beginning of the third quarter to observe the progress. Since the sight visit, the screw press has been installed and the project is underway.



Observation of the struvite reactor

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

Process description:

- Limited Resource Farmer Technology
- Process will evaluate solid separation, effluent treatment and polishing agents as currently designed for a limited resource farmer.

Status:

FPPC and NC A&T are in the final stages of contract negotiation. Project start up is anticipated during the fourth quarter.

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 N 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 plans to visit the project site during the fourth quarter to observe the installed sensors.

Dairy, Vermont (#5.02) -----
BioProcess Technologies
North Williston Cattle Co.

Process description:

- The existing system incorporates a solid separator, a digester, composting capability and effluent treatment.
- The proposed project will take the biological effluent treatment to a new level of effectiveness by upgrading pretreatment of fine suspended solids and optimizing organic treatment in the bio-filter towers
- A high performance belt press will be installed as the primary solid separator

Project Status:

The system is still being evaluated for effluent treatment of the manure. On farm treatment with lime continues to be an issue.

Dairy/Mixed Waste, California (#5.06) -----
Agricultural Waste Solutions, Inc.
Inland Empire Municipal Site, Chino

Process description:

This project utilizes a regional model and a centralized location at the Inland Empire Utilities Agency site in Chino, California. Key elements of the pilot demonstration include the AWS centrifuge and gasification unit. The one-year testing program will test dairy, swine, beef, poultry, horse, digested sludge, food waste and mixes of wastes for their produced energy

value. The demonstrations and tests will simulate a large range of farm waste systems, from high-volume flushes to dry-lot manure systems, in order to evaluate energy production, efficiency, costs, automation and maintainability. The improved centrifuge will remove moisture and is designed to uniformly condition the feed stock entering the gasifier.

The system consists of a skid-mounted centrifuge, a skid-mounted gasifier, an intermediate solids hopper, augers from the centrifuge to the hopper and from the hopper to the gasifier. The unique centrifuge removes 98% of the suspended solids with 70% moisture and is designed to uniformly condition the feedstock entering the gasifier. All equipment sits on a 25 by 35 foot concrete pad, with a gas compressor, expansion tank and storage tank located nearby. Utilities are plumbed to the pad, and the gasifier can run on either natural gas or its produced gas from the storage tank.

Project Status:

The project has been completed; a final report is anticipated by the end of the fourth quarter.

**Swine, Illinois (#4.09)-----
Envirowaste Technology, Inc.
Rensing Family Farms, Inc.**

Project Description:

- Low pressure/multiple filling of geo-textile bags to dewater solids from the first stage of a three-stage lagoon system. This farm houses a 2000-head finishing unit in Illinois.
- The effectiveness of this separation method will be compared to manure derived from the storage pit and manure pumped from storage pond

Project Status:

The final event has been completed and Envirowaste Technology is preparing the final report.

**Swine, North Carolina (#4.05) -----
Super Soil Systems
Goshen Ridge Farms in North Carolina**

Process description:

- This 2nd generation technology system deploys a “mobile” solid separation capability

Project Status:

FPPC and Super Soil continue to work together to review outstanding invoices associated with project initiation and closeout.

Attachment A

Final report status of sixteen 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 Microgenics (#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 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.