



FPPC

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

January 17th, 2004

To: Mr. William Boyd - Leader, Animal Waste Utilization Team
East National Technical Support Center

From: Bob Monley, General Manager, FPPC Inc.

Copy: Carolyn Adams, NRCS – Acting Director, ENTSC
Richard Salem, Board Chairman & Executive Director – FPPC Inc.
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Tim Robinson, FPPC Field Coordinator
Jesse Wilson, NRCS - Florida

Re: FPPC Quarterly Update – Oct. 1, 2004 through Dec. 31, 2004

Executive Summary

This quarterly report is intended to update the NRCS and the FPPC Inc. Board on the status of the innovative technology projects. Four (4) 2002 projects are now complete and final reports are now being reviewed and distributed. One (1) 2002 project was discontinued early in favor of advancing a more comprehensive, multi-party approach. The remaining 2002 projects continue to make progress. A financial summary is available in Attachment I and a quick project status reference is available in Attachment II. The four (4) projects selected for the 2003 funding continue to move forward, as initial steps have been taken in the field at three farms. Negotiations for the remaining 2003 projects should be finalized within the next month but cold weather has delayed construction until Spring in Iowa and Utah. FPPC remains confident in the progress demonstrated to date on all projects selected and despite differences in economic viability believes each farm pilot demonstration will exceed the targeted levels for nutrient reduction of the waste stream.

OPERATIONS Report -----

This quarter's activity has been marked with numerous site visits, planning reviews and ongoing preparation during negotiations with technology vendors and farmers.

1. More recently, FPPC has encouraged all waste water technology vendors to think about the next generation systems. An RFP inviting next generation systems will be issued in the next quarter against funding available from the 2004 appropriation. Not surprisingly, several vendors have enthusiastically embraced this idea and would like to pursue their ideas and possible funding in the near future. A revised RFP has been generated and is out for review and comment. To date FPPC has met preliminarily with GRRO and Super Soils to specifically look at unsolicited proposals and talked with others who have expressed interest in the next round of RFPs. Press technology, another vendor located in Ohio, is showing a continued interest in the farm pilot project funding requirements.
2. Members of NC Ag Finance Authority, NRCS, FPPC and WRA participated in a one day planning session conducted in Raleigh during the month of December. The meeting was scheduled to review lessons learned on past projects and to consider the direction for future RFPs issued by FPPC Inc. This information was captured and included in the next 2004 RFP. This RFP, aimed at proposals for next generation systems, is out for internal review and comment.
3. Considerable effort has been expended to determine the final course of action at Watson Dairy. Based on the geo-technical information and a cost analysis of the alternatives proposed, a site specific remedy has been selected and funded. Several vendors will participate in the restart of the project, but the most recent efforts have been directed at solidifying agreements for a complete and comprehensive effort between the parties. To date we have half of the agreements signed which are needed to proceed.
4. In December, the FPPC Board met to review progress. Insurance coverage and the proposed actions at Watson Dairy were reviewed and acted upon. The symposium has been targeted for the first week of May, 2005.
5. The recent Congressional approval and President's signature of 2005 monies has now prompted a FPPC action for budget preparation, planning review and working agreements needed to obligate the \$ 5,500,000 funds for 2005 program. Agreement between NRCS and FPPC is expected by January 21st.

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Progress at individual sites and FPPC Pilot Projects is summarized below:

**RMG Strategies, Ltd and Microganics -----
Project demonstration on both swine and poultry farm facilities**

Process:

- The use of “Bio-Regen Animal” product contains “Carboxx” and Bacillus microbes which is a natural, supersaturated, highly soluble, high reactivity humic acid (HRHA)
- The ultra-pure formula provides an unprecedented capacity to capture and absorb a wide array of impurities found in soil or wastewater
- This process will provide a 75% nutrient reduction in the waste water column, concentrating nutrients in the sludge layer while decreasing odor

**Jerry Jacobs Ranch -----
Large layer hen facility in Carmine, Texas**

Initial Project Activity Completed:

The lagoons at this poultry site have been surveyed, and a base line has been established for the before and after comparison with microbes/reagents. No permitting is required and initial inoculation was begun on November 5, 2004. Site visits conducted last quarter revealed that this was a large well-managed facility making use of three (3) large interconnecting lagoons to capture effluent from the hen layer facility.

Problems Encountered:

The first application pump failed to introduce a sufficient dose. The initial 247,000 gallons of flush water was dosed ineffectively at 9 ppm and a new pump has been ordered to achieve the new recommendation concentration of 95 ppm. No other significant problems have been reported to date.

Preliminary Sampling and Testing:

Initial lab results of samples taken the month of November are not available at this time.

**Heritage Farm -----
Large swine farm Lamar, Colorado**

Initial Project Activity Completed:

There is no construction required at this site and FPPC has funded this project only to the extent that test data will be collected and analyzed.

Pete Hubbell from (WRA) conducted a site visit on December 1st. Ms. Lisa DeHaas, the Micro-ganics project manager, had become increasingly concerned that the desired chemical and biological reactions taking place in the lagoon would be negatively impacted by the lower winter temperatures. In addition, the freezing over of the lagoon will also make application difficult.

Problems Encountered:

Since cold weather is interfering with the cost effective dosing of microbes, this project has been delayed pending warmer temperatures.

Air Diffusion Systems -----

**Cavanaugh Farm No. 1
Swine farm in Wallace, NC**

“Advanced Microbial Treatment System (AMTS) at Cavanaugh Farm No. 1”

Process:

- Retrofits existing effluent treatment systems with suspended curtains to subdivide lagoon into discrete cells.
- Uses both aerobic and anaerobic processes.
- Forced air system and enhanced microbial activity utilizing aqua mats.
- A portion of the lagoon is covered to increase temperature, enhance biological activity and odor control.
- Treated water is reused for flush and spraying irrigated for crop production.
- Applicability for cleanup of abandoned lagoons.

Status of Operation and Maintenance:

System has been fully operational since September 2003 however at times the data revealed unexplained variability. ADS investigated the unexpected results and implemented a corrective action plan.

Problems Encountered:

On site investigation determined that spurious flow and stagnation from one cell to another within the lagoon was not performing as designed and needed to be augmented with a recirculation pump/timer to promote a more continuous flow. These modifications as well as changes in farmer practice have stabilized flow and should overcome achieve predictable nutrient reduction results by improving microbe activity.

Sampling and Testing:

New samples have been taken in January, and test data should be available in this quarter. This testing should confirm whether the fix is effective. Additional testing to meet the EST standards in the State of North Carolina is being considered, since this system may qualify as a candidate system for a state permit.

Global Resource Recovery Organization (GRRO) -----

Burt Farm & Livestock Co.
Swine farm in Marshalltown, IA
“Pork Nutrient Management Demonstration”

GRR01

Process:

- System uses a coarse static screen.
- Followed by an advanced induced cyclonic dissolved air flotation (IC-SEP).
- Cyclonic drying system (GRRO's Tempest).
- Value added products to include slow release fertilizer and/or gasification for energy use

Project Status:

This system was fully completed and tested, but due to operational efficiency of the existing system together with the complexity of the IC-Sep features, a decision was made to discontinue operations now, rather than spend the remaining O & M funds budgeted in the original project budget. Equipment has been disassembled for cleaning and unused equipment is being sold for salvage value. This project is expected to underrun budget by approximately \$ 110,000.00 when unused funds and the value of equipment salvage is realized. In the meantime, GRRO has captured lessons learned in a final report which is being reviewed.

In light of the next approved project GRRO II, together with the achievable results at the site, it became obvious that halting this project in favor of a more comprehensive approach was the most prudent course of action.

Other Problems Encountered:

In addition to the inefficient operating parameters required with the ICEP, the project experienced difficulty with delivering wet and variable consistency manure to the Tempest cyclone dryer. Significantly, the empirical testing of various manure mixes (dried manure with wet manure) proved to be a very practical/economical solution in handling the material feed problem.

GRRO II**Process:**

- System uses a highly efficient scraper system and capitalizes on low water consumption
- Pre-Separation Cyclone (liquid removal)
- Cyclonic drying system (GRRO's Tempest dryer).
- Value added products can include slow release fertilizer and/or gasification for the production of energy.

The GRRO II project was approved for funding in the latest RFP round. The use of the dry scraper system and the resulting conservation of water was key factor in the selection of this project. In addition this project promises to integrate more pieces of the overall process than other previous projects to date. For instance, United Suppliers is gearing up to develop/market a commercial grade fertilizer. The construction methods will also be specially designed and engineered to improve removal of manure from the underground pit. At this point a project plan has been submitted to FPPC and is being reviewed. The cost sharing on this project must also be developed and finalized in writing.

At this point, the proposed farm owner, the Burts, have opted not to go forward because of an excessive financial commitment at their newly purchased farm, however Mr. Bolvanz, President of GRRO, has said there are six other farm owners interested in this farm pilot demonstration and has narrowed the field to a final two(2).

Super Soils Systems, USA -----
Goshen Ridge Farms, LLC
Swine farm in Clinton, NC
“Solids Removal System to Reduce Environmental Impact of Swine Production”

Process:

- Solids separation system and the use of polymers to enhance dewatering.
- Anaerobic and aerobic activity to clean water
- Solids removed offsite for composting and marketing as value added product.
- Process is modular design and can be farm fixed or mounted as a mobile unit.
- Also has applicability for the cleanup of abandoned lagoons.

Status of Operation and Maintenance:

During this quarter the system has been operating and data has been collected except for 15 days when the system was shutdown for repairs during the holidays. Approximately 65,738 gallons of wastewater were processed during December and a total of 1500 cu ft of solids were removed and transported to the Super Soil Regional Processing Facility. Approximately 1,904 cu ft of FPPC compost was produced and removed from compost bins to curing piles in the past month.

Problems Encountered:

No problems encountered this quarter.

Sampling and Testing:

Funding of an additional monitoring scope to meet the North Carolina requirements for the “Environmentally Superior Technologies” (EST) designation is being considered. At this point, a final report is being prepared and will be shared with Mike Williams for consideration as an “EST” and permittable system in North Carolina. If additional testing is recommended, FPPC will consider extending the project scope at that time.

Applied Chemical Magnesias Corp. (ACM) -----
Bella Holstein Inc.
Large dairy in Platteville CO

Process:

- Easily-assembled recovery system that utilizes the reaction capabilities of inexpensive, milled brucitic marble to extract between 75% - 90% of most nutrients
- Uses a magnesium source to react with Nitrogen & Phosphorous to form a crystal precipitate.
- Uses mechanical cellulose separator, a series of reaction tanks (sized for the anticipated flow) with simple mechanical (paddle) agitation, and a hydro-cyclone separator and drying screen for the recovery of the precipitate.
- Precipitated crystals and liquid are sent to the drying screen; crystals are separated from the liquid then stored for various farmers to use as a slow release fertilizer. The remaining liquid flows to a lagoon for solids settling.

Percent Construction Completion: (> 80%)

Construction began on site with the installation of a cement pad and retaining wall. The portable office and reaction tanks were placed on this pad to provide stability for the lab and a level site for collecting solids from the solids separator. Four (4) 3000 gallon reaction tanks were purchased and set up on the site pad. Two tanks have physical agitation, with the remaining two each having a recirculation pump. All four (4) tanks were installed and fully operational in early December 2004. No major mechanical problems have occurred. Two bolts attaching the mixer shaft to the gear boxes are being replaced.

Status of Operation and Maintenance:

Lab scale test is continuing within the portable office. The ideal dosage of the Brucitic marble is still being investigated, along with monitoring other process conditions, i.e. pH, D.O., etc.

Problems Encountered:

The greatest concern affecting the process is the current weather conditions. The temperature has continuously fallen below freezing. Freezing of the reaction tanks is not a concern even though we have had problems with various hoses freezing and pumps failing during extremely cold nights. Adequate temperature control for the reaction tanks was not initially addressed and we hope to have this current problem corrected in the coming month. The freezing temperatures have also made working with the waste stream difficult on the employees.

Preliminary Sampling and Testing:

A third party lab facility at Colorado State University began the sampling process three times weekly. CSU monitors Total P, Ortho-P, and Ammonia at three locations. The initial results for the sampling in December should become available in the coming week.

**Utah State University -----
Hardy Dairy in Tremonton, Utah
Center for Profitable Uses of Agricultural Byproducts**

Process:

- The system consists of an induced blanket reactor (IBR), which is a type of anaerobic digester converting organic carbon in the manure to methane and carbon dioxide.
- The (IBR) is followed by an electro-coagulation unit to concentrate nutrients from the effluent of the IBR. The anaerobic digestion system allows the electro-coagulation process to perform more efficiently.
- Effluent from the electro-coagulation unit will be combined with sludge from the IBR producing a valuable liquid fertilizer and soil conditioner.
- Treated water from the system is nearly odorless and contains less than 25% of the nutrients in the original waste stream.
- Biogas will be produced from this system and utilized to offset the electrical usage.

Percent Construction Completion:

Construction will begin spring 2005.

Problems Encountered:

The original objection concerning the size of the dairy has been overcome with a more prototypic selection of the Hardy Dairy. The plan of work and working agreements are being fine tuned and a confirming visit to consider data gathering at an additional anaerobic digester is being trip being planned for February.

**Chemical Lime -----
Aprile Dairy in Riverview, FL**

"Nutrient Removal from Dairy Farm Wastewater Using Lime"

Process:

- Use of chemical lime to reduce nitrogen and phosphorous loading in dairy wastewater.
- Screening and sand removal.
- Dewatered effluent treated with lime to precipitate P and N.
- Ammonia captured as ammonium nitrate.
- PH reduced by utilization of CO2 gasses vented from flash composter.
- Treated water recycled as flush water.

Percent Construction Completion:

Construction and fabrication is 100% complete but debugging continues.

Problems Encountered:

This system has been operated intermittently due to the unending startup and debugging issues. A management review in late October with senior managers of Chemical Lime and FPPC yielded a better understanding of problems to date and the expectations going forward. Since that meeting, slow but steady progress has been made but a weakness in system design has prevented testing of the chemical lime waste treatment.

While testing the system this quarter a blockage was experienced in the exit pipe. After further investigation it was found that a solids plug had developed above the piston within the throat of the T-Rex separator. The exterior cover was removed on the side of the piston exposing the solids plug. The system was run without the exterior cover in order to observe the piston movement. The piston was not retracting far enough for solids to drop in front of the piston then be forced through the exit pipe. Dr. Roger Nordstat contacted Royal Jones with the piston problem and who made a site visit in December. Royal found water had accumulated in the hydraulic fluid reservoir which was causing a degraded piston movement. The hydraulic fluid has been replaced and system properly bled.

Attempts to run the system with the new hydraulic fluid occurred on January 12th, 2005 and all were present to observe the piston performance. Even though, the system operated most of the day and many hydraulic adjustments were required before the piston retracted properly.

Problem solving continues as the punch list shrinks and issues get focused:

1. Inadequate effluent volume passing through the T-Rex screen separator. The dimension of the screen separator is being investigated.
2. The intermittent operation of the alum pump is being investigated.

AJT/Agrimond -----

Watson Dairy in Trenton, FL

"Florida Dairy Nutrient Management Demonstration Pilot Project for Watson Dairy"

Process:

- Sand/grit removal.
- Solids separation.
- Primary anaerobic treatment and secondary aerobic treatment with enhanced aeration.
- Suspended solids precipitation using polymers.
- Anoxic treatment for denitrification prior to land application.

Percent Construction Completion:

Construction was 100% complete according to the original Plan of Work but the construction of a geo-technically acceptable wastewater basin is now being scheduled.

Problems Encountered:

During system startup, the wastewater level in secondary treatment pond could not be stabilized. Subsequent investigation via removal of a portion of the in-ground basin concrete revealed a network of underground chimneys and a significant sinkhole. Geotechnical experts were retained by FPPC to assess the situation and recommend alternatives for project completion.

Remediation of the existing wastewater basin has been eliminated as an option because of excessive cost and unacceptable risk. However, an adjacent location has been evaluated by geo-tech experts and is suitable for construction. Costs for a site-specific solution have been reviewed and the installation of an above ground Slurrystore storage tank is being planned at the adjacent site location. Written agreements, reflecting the scope changes, are being signed with all parties before restart of the project, expected in January.

Renewable Oil Inc., Alabama Operations -----

Mills Poultry Farm in Russellville, AL

"Demonstrating Bio-oil Technology for Poultry Litter Nutrient Management"

Process:

- Mobile processing plant to burn poultry litter.
- Poultry litter would be removed and burned from houses.
- Process produces nutrient rich ash and vapor that is converted to bio-oil.
- Bio-oil and ash would both be marketable products.
- Bio-oil is a low-grade fuel for furnaces or heaters to warm poultry houses.

Percent Construction Completion:

Construction of the system equipment is 100% complete except planned modifications, which are now approximately 90% complete.

Status of Operation and Maintenance:

Formal review and approval was granted in early October by the Alabama Department of Environmental Management (ADEM) to allow Renewable Oil Inc to make modifications to the plant.

The focus on these equipment modifications has delayed system run time this quarter. Preparations are being made to run the system more frequently in January 2005.

Problems Encountered:

Approved modifications to the plant were performed in a local fabrication shop. By October, some modifications had been completed including construction of a new heat exchanger, removal of the engine/generator set, and mounting of the char burner in its place.

By November, the following additional modifications had been completed - see Figures 1,2,3,and 4.

- 1) A new char Recovery Screening System had been Fabricated and installed.
- 1) A Char cooler for the excess char has been completed
- 2) The char burner with an ash-recovery system was installed
- 3) New ducting between char burner and heat exchanger installed
- 4) New ducting between reactor and dryer installed
- 5) New ducting between dryer and emissions control cyclone installed
- 6) Access ports to facilitate clean out installed
- 7) Piping modifications made to accommodate new char cooler
- 8) Heat exchanger and screen system were insulated
- 9) Changes made to control system to accommodate heat exchanger
- 10) Computer software modified to improved performance.

Observations during test runs of the plant indicated system warm-up times dropped significantly from 3 hours to just about an hour.

A few problems occurred when the system was brought online after the modifications. The screen material did not hold up and had to be replaced. Also the condenser system became blocked due to a tar buildup. Preventative maintenance will need to be performed for tar buildup before every major run. Problems also occurred when softwood shavings were used however a previous test with poultry litter does exhibit this problem. Several tons of poultry litter was moved into storage in anticipation of future processing.

As discussed in previous progress reports, ROI had been making a two-phase BioOil with poultry litter with the heavier fraction containing heating values on the order of 12,000 Btu/lb. Research reported by Ensyn, an ROI fast pyrolysis technology competitor, has confirmed similar results. ROI is designing a modification to the plant to try to better handle the two-phase BioOil generated by the plant. ROI has determined that a centrifugal separator would allow separation of the two fractions and a cost effective centrifugal separator that may work has been located.

Preliminary Sampling and Testing:

Pending a process run in the beginning of January.

Photos showing progress of ROI's mechanical modifications to system



Figure 1. To the upper left is the new char screen assembly with the new heat exchanger beneath it. To the right is the char burner and associated hot air ducting installed in place of engine/generator set.

Figure 2. Engine/generator set before removal and replacement



Figure 3. New char screen assembly with new heat



Figure 4. Old char screen assembly with old heat exchanger

Completed 2002 Projects =====

Royal Consulting Services, Inc. -----
Posey Dairy in Lake Placid, FL
"Florida Dairy Nutrient Management Demonstration"

Process:

- A Pond Enhanced Treatment & Recycle Operation (PETRO) process utilizing a series of lagoons, both aerobic and anaerobic, with a final polishing sand bed filter
- Includes enhanced aeration and fermentation processes.
- Polymeric ion exchange system provides for complete phosphorous removal.

Status of Operation and Maintenance:
Complete.

Problems Encountered:
None

Preliminary Sampling and Testing:

A final report is being reviewed and final comments are being collected. Since the 503 page report is rather large and reproduction costs are not warranted, the following internet location is being utilized during the review of the "draft" final report:

ftp://rcs_shared:brian@royalconsulting.com/fppc/

McGill Environmental Systems -----
Delway, NC (Central Processing Facility)
Poultry Litter Collected from Farms in Sampson County, NC
"Nutrient Management Technology for Animal Feeding Operations"

Process:

- Centralized static pile (a forced aeration composting facility for the handling of poultry litter from area farms)
- Test different formulas utilizing carbon sources such as cotton waste, hog waste
- Compost will be developed as a marketable compost/mulch product.
- The potential for utilization of compost as a substitute for methyl bromide will be analyzed.

Status of Operation and Maintenance:
Complete

Problems Encountered:
None.

Preliminary Sampling and Testing:

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A final report is being reviewed and comments finalized. Comments and questions from FPPC will be forwarded to the supplier. The "draft" final report is available online:

<http://www.leprechauncompost.com/mcgillcompost/RESEARCH/FINAL%20revised%20010405%20FPPC-3-2002.pdf>

Cape Fear Resource Conservation -----
Rose Hill, NC - Central Processing Facility
Poultry Litter Collected from Duplin County, NC

"Demonstration Optimum Fertilizer of Ash from the BEST Solution for Swine and Poultry Manure Management"

Process:

- BEST technology provides for gasification of poultry and swine litter.
- Gasification process byproduct is nutrient rich ash.
- ACT process will turn ash into portable, usable fertilizer.
- Test marketing product with multiple users.

Status of Operation and Maintenance:

Completed.

Problems Encountered:

Issues related to elevated/variable silica levels collected in the turkey litter samples prevented nutrients from being available in a commercial form that comply with fertilizer labeling.

Preliminary Sampling and Testing:

The final report has been distributed.

Mountain Organic Materials (MOM) -----
Randy Johnson and David Parsons Farms
Wilkesboro, NC

"Demonstration of Poultry Manure and Mortality Forced Aeration Composting Bin Systems"

Process:

- Portable on-farm forced aeration composting system.
- Handles both poultry litter and mortalities.
- Developed marketable compost products.

Status of Operation and Maintenance

Complete

Problems Encountered:

None

Sampling and Testing:

Complete. The final report has been distributed

**FARM PILOT MACRO BUDGET
SUMMARY
JANUARY 2002 – DECEMBER
2004**

Congressional Appropriation- 2002	\$4,500,000.00
Congressional Appropriation- 2003	\$2,700,000.00
Congressional Appropriation -2004	\$4,700,000.00
Total Appropriations	<u>\$11,900,000.00</u>

	Budget	Actual Outlays	Remaining Budget
2002 Working Agreement			
Project Related Costs-2002	\$1,075,000.00	\$834,724.58	\$240,275.42
General and Administrative Costs-2002	\$317,000.00	\$305,046.78	\$11,953.22
Project Contingency	\$0.00	\$0.00	---- 0 ----
Agrimond	\$737,964.00	\$508,167.93	\$229,796.07
Air Diffusion System	\$298,510.00	\$284,897.21	\$13,612.79
Cape Fear RC & D	\$250,400.00	\$250,400.00	---- 0 ----
Chemical Lime	\$432,300.00	\$377,680.21	\$54,619.79
Global Resource Recovery - I	\$485,765.00	\$406,167.20	\$79,597.80
McGill Environmental	\$342,000.00	\$307,800.00	\$34,200.00
Renewable Oil Inc	\$447,114.00	\$408,920.54	\$38,193.46
Royal Consulting	\$493,832.00	\$475,562.05	\$18,269.95
Super Soil Systems	\$370,115.00	\$345,811.00	\$24,304.00
Mountain Organic Materials	\$60,000.00	\$60,000.00	---- 0 ----
Total Expenditures-2002	<u>\$5,310,000.00</u>	<u>\$4,565,177.50</u>	<u>\$744,822.50</u>
2003 Working Agreement			
Project Related Costs-2003	\$500,000.00	\$312,109.90	\$187,890.10
General and Administrative Costs-2003	\$142,000.00	\$83,340.96	\$58,659.04
Microganics	\$273,162.00	\$87,338.00	\$185,824.00
ACM, LLC.	\$264,260.00	\$157,332.00	\$106,928.00
Utah State University	\$431,000.00	\$0.00	\$431,000.00
Global Resource Recovery - II	\$231,578.00	\$0.00	\$231,578.00
Project Contingency	\$13,000.00	\$0.00	\$13,000.00
Compendium/Symposium	\$35,000.00	\$0.00	\$35,000.00
Total Expenditures-2003	<u>\$1,890,000.00</u>	<u>\$640,120.86</u>	<u>\$1,249,879.14</u>
2004 Working Agreement			
Project Related Costs	\$940,000.00	\$11,241.56	\$928,758.44
General And Administrative Projects	\$470,000.00	\$425.58	\$469,574.42
	<u>\$3,290,000.00</u>	<u>\$0.00</u>	<u>\$3,290,000.00</u>
Total Expenditures – 2004	<u>\$4,700,000.00</u>	<u>\$11,667.14</u>	<u>\$4,688,332.86</u>
TOTAL	<u>\$11,900,000.00</u>	<u>\$5,216,965.50</u>	<u>\$6,683,034.50</u>

Attachment II – Farm Pilot Project Flashcard Status

2002 Projects	Cost	Schedule	Goal - Nutrient Reduction	Final Report
Aprile Farm, Chemical Lime				
Burt Farm, GRRO				Complete
Cape Fear RC&D				Complete
Cavanaugh Farm, ADS				
Goshen Farm, Super Soils Systems				
Johnson& Parsons' Farm, MOM				Complete
McGill Environmental Systems				Complete
Renewable Oil Inc. Mills Farm				
Royal Consulting Posey Dairy				Complete
Watson Dairy, Agrimond				
2003 Projects				
RMG Strat. & Microganics Jacob Brothers Ranch Heritage Farms				
Global Resource Recovery Organization (GRRO II)				Being negotiated
Applied Chemical Magnesias Corp. (ACM), Bella Holstein Inc.				
Utah State University Hardy Dairy				Being negotiated

Key: **Green** - On target; **Yellow** – goal recoverable; **Red** - off target