

**COLUMBUS COUNTY BOARD OF COMMISSIONERS
WORKSHOP - LANDFILL GAS TASK FORCE**

April 17, 2008

6:30 P.M.

The Honorable Columbus County Commissioners met on the above stated date and at the above stated time in the Dempsey B. Herring Courthouse Annex Building, located at 112 West Smith Street, Whiteville, North Carolina, for the purpose of holding a Workshop with the Columbus County Gas Task Force Committee. These minutes were recorded by Gail Edwards, Deputy Clerk to the Board, and typed by June B. Hall, Clerk to the Board.

COMMISSIONERS PRESENT:

James E. Prevatte **Chairman**
Bill Memory, **Vice Chairman**
Sammie Jacobs
Lynwood Norris
Ricky Bullard
Ronald Gore

APPOINTEES PRESENT:

William S. Clark, **County Manager**
Gail Edwards, **Deputy Clerk to Board**
Bobbie Faircloth, **Deputy Finance Officer**

APPOINTEES ABSENT:

June B. Hall, **Clerk to Board**
Steven W. Fowler, **County Attorney**

COMMISSIONER ABSENT:

Amon E. McKenzie

WORKSHOP CALLED to ORDER:

At 6:30 P.M., Chairman Prevatte called the April 17, 2008 Workshop to order.

INTRODUCTION of GUEST SPEAKERS:

Kipling Godwin, Project Manager, stated the Landfill Gas Task Force was introduced to this company through Monty Herring with Brunswick Electric Membership Corporation. I would like to introduce Dr. Maurizio F. Giabbai, President of Solv-It Technologies, LLC, from Marietta, Georgia, and Dr. Kimberly Jones, President of Alganomics, LLC, from Southport.

PRESENTATION by Dr. KIMBERLY JONES:

Dr. Kimberly Jones, President of Alganomics, LLC, stated the following:

1. This is a renewable fuel project;
2. You are thinking about putting the methane gas directly to the electrical grid;
3. What we are looking at is a couple of alternatives;
4. Form a company called Columbus Bio-Tek, LLC, with sustainable solutions via renewable resources;
5. Solutions for environmental and Energy Needs:
 - Beneficial use of renewable energy source and capture of "Green House Gas" (landfill methane gas)
 - Produce renewable energy products (ethanol fuel, bio-diesel)
 - Sequester carbon dioxide (algae process)
 - Treatment and utilization of animal waste (nutrients for algae process)
 - Production value-added bio-products (fertilizer, animal feed, nutraceuticals)
6. Provide benefits to all stakeholders (community, environment, company, for a win-win situation);
7. The company would be named Columbus Bio-Tek, LLC, and will be modeled from the operation in Robeson County which is presently being created;
8. Energy and biofuel business:
 - Landfill gas reclamation plant
 - County operated landfill gas reclamation plant
 - Energy source for industrial facilities (biofuel plant, algae facility)
 - Biofuel plant
 - Production of ethanol
 - Capacity of 5 million gallons per year
 - Use feedstock from local sources (corn, sorghum, grain, algae)
 - Off-take contracts with regional distributors and/or local end-users

- Production of specialty industrial chemicals (ethanol industrial grade, ethyl acetate, feedstock oil for biodiesel, etc.)
9. Ethanol and Algae Key Market and Business Factors:
 - Renewable energy market
 - Ethanol use is growing
 - Demand is expected to expand over several years
 - Secured letter of intent from regional buyers
 - Bio-diesel feedstock oils in great demand
 - Landfill gas use is growing
 - Energy source for industrial operations
 - Unique business model
 - Plant size allows for diversification
 - Local sustainable model
 10. Products:
 - Methane gas (energy source)
 - Ethanol
 - Fuel
 - Value added chemicals (industrial grade, solvents)
 - Distillers grains (DDG) (animal feed)
 - Bio-diesel, sugars, fertilizer
 - Carbon Credits/CO-2 Sequestration
 11. Benefits to Columbus County:
 - Generate new employment (15-17 people)
 - Added revenues to County
 - Royalties and increased tax base
 - Unique solution combining renewable energy with high demand biofuel and carbon dioxide sequestration
 - Support local farmers by steady demand for crop production and fertilizer/animal feed products
 12. We like to grow algae, better known as slime or pond scum;
 13. Algae is the fastest growing plant on earth, and reproduces very quickly;
 14. The original source of petroleum oil is compressed algae that was under the ocean;
 15. Algae has the ability to produce oils or lipids;
 16. Oils can be extracted from algae and produce biodiesel from that;
 17. We would be taking the carbon dioxide coming off of the fermentation from the ethanol plant, attaching an algae culturing facility to that, growing algae, and extracting oil from the algae; **and**
 18. Other byproducts would be algae paste which could be used to produce fertilizer.

Dr. Maurizio F. Giabhai, President of Solv-It Technologies, LLC, stated the following:

1. What we are trying to do is to give you some alternatives from the business point of view for you to evaluate and consider;
2. The ethanol plant in Robeson County will be located in St. Pauls, right next to where their landfill operation is located;
3. They are building this ethanol facility through a grant from Golden Leaf Foundation that we were able to help them out to secure in the amount of \$690,000 to help install the gas collection system, and deliver that gas to our facility through our pipe line where it will be burned in the boiler at the ethanol facility to provide the energy for the ethanol facility;
4. The energy cost for the ethanol plant represents about 20% of the total operating costs;
5. If we can reduce those costs, it would be a competitive advantage for this particular operation;
6. We have an agreement with Robeson County as follows - we have the gas rights for 15 years to use the gas for 15 years and in return, we are providing to them royalty fees based on the sales of the ethanol plant. In addition to that, we will provide new employment and all the other advantages that comes along with a new business;
7. The algae process would be in addition to the ethanol production facility, which would be a great addition because it can generate other fuels that can be sold and take care of other environmental issues; **and**
8. Eventually this facility could generate two (2) bio-fuels - ethanol and bio-diesel.

Vice Chairman Memory asked the following question: You say you can use the methane and you would extract the CO-2 out of it, and feed the algae cultures in which you would compress the

oil out of it to help make bio-diesel. Is that right?

Dr. Jones replied stating the following:

- The gas that would be coming off of the landfill is about 50/50 methane and carbon dioxide;
- We would not be capturing that carbon dioxide necessarily that is 50% coming directly out of the landfill;
- The methane gas is what is going to be used as an energy source for the boilers in the distillation process for the ethanol;
- When the feedstock comes in, or whatever the crop is, then it has to be fermented for the ethanol process;
- That fermentation uses bacteria, and that bacteria is similar to animals in that it puts off carbon dioxide, so that is the carbon dioxide that we are going to capture to put into the algae process, not what is produced from the landfill, but what is produced from the fermentation.

Vice Chairman Memory: how much algae would you have to grow to produce enough to squeeze oil out of to make bio-diesel? It is my understanding that you mix the bio-diesel with regular diesel, is that right?

Dr. Jones: replied stating not exactly, and stated the following:

- When you produce algae, algae can be from 30% to 70% oil;
- Conservatively speaking, one-third of the weight of the algae would be oil;
- That vegetable oil goes through a one-step process which produces it into bio-diesel;
- It would have to be determined if this would be transported to an existing bio-diesel facility or to build a bio-diesel processing plant on the site;
- From a production point of view, if you use soybeans as feedstock, they would produce 100 gallons per acre, per year, canella would produce 15 gallons per acre, per year, and palm oil would produce 600 gallons per acre, per year, which is not a very viable source;
- On the lower end of estimates, algae produces 15, 000 gallons per acre, per year;
- The way algae grows, it being the fastest growing plant in the world, and there is not a crop cycle involved, it is a continuous process, it allows you to maximize the footprint with the acreage you would need to grow it.

Chairman Prevatte: would you have to have a large pool to grow this algae?

Dr. Jones: stated the following:

- They're called photo bio-reactors which is a closed system;
- Most of it is clear tubing of some sort;
- What you are doing is, you are taking wave lengths of energy from sunlight and creating chemical energy out of it by the plant;
- The plant is converting the sunlight energy into chemical energy, you have to add the nutrients to it, and it has to have the carbon source, and that is where the carbon dioxide comes in; **and**
- The nutrients could be straight nutrients that you put in, or it could be nutrients from a wastewater facility, hog lagoon, etc.

After discussion was conducted relative to the transport of the off-site nutrients, Dr. Jones stated the gray water from the process, itself, could be used as a source of the nutrients.

Vice Chairman Memory: What kind of plant footprint are you looking at?

Dr. Giabbai: stated the following:

- Based on the plant in Robeson County, which the ethanol plant is a 5 million gallon a year facility, it will be a nine (9) acre plant;
- On the algae side, which would be an additional requirement, it would take approximately 20 acres.

Vice Chairman Memory: How many years of methane gas are at the landfill?

Dr. Giabbai: we do not know that at this time, but if the operation is installed and when the methane gas is exhausted, with another boiler, we could use wood chips, or other local products. 20,000 Tons of carbon dioxide will produce approximately 1.2 million gallons of bio-diesel. We could sell the bio-diesel for \$1.80 to \$2.50 per gallon.

Kipling Godwin: stated the following:

1. This could generate 15-17 jobs in Columbus County;
2. Could possibly be funded from the Golden Leaf Foundation;
3. Would use farm products from the local farmers;
4. Enerdyne could be a part of the process;
5. This is one of the alternatives to look at; **and**
6. We could apply for several grants and combine them.

Dr. Giabbai: an alternative method would be the use of this process to produce electricity.

SUMMATION of DISCUSSION:

1. This company needs to start the feasibility study as soon as possible;
2. The time frame for this company, if selected, would be approximately 5 months;
3. The capital cost of the ethanol plant will be \$7 million;
4. Grants need to be applied for in the near future;
5. This proposal could be used as a comparison to the other 2 proposals;
6. After feasibility study is done, an Agreement needs to be drawn up for use as a comparison for the final decision;
7. We are losing methane gas during the time this decision is being made; **and**
8. This would benefit the local farmers.

ADJOURNMENT:

At 8:00 P.M., Vice Chairman Memory made a motion to adjourn, seconded by Commissioner Gore. The motion unanimously carried.

APPROVED:

**GAIL EDWARDS, Deputy Clerk
to Board**

JAMES E. PREVATTE, Chairman