

**COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR DIVISION**

INTRA AGENCY MEMORANDUM

TO: File

FROM: Mary E. Major
Environmental Program Manager

SUBJECT: Meeting Minutes - Technical Advisory Committee Concerning Qualified Energy Generators using Biomass (Rev. Cg)

DATE: September 15, 2009

INTRODUCTION

A meeting of the technical advisory committee concerning qualified energy generators using biomass was held in the 2nd Floor Conference Room A, Department of Environmental Quality, 629 E. Main Street, Richmond, Virginia. A record of meeting attendees is attached.

Start: 10:10 a.m.

End: 1:15 p.m.

Subcommittee Members Present:

Mr. Tony Banks, Virginia Farm Bureau Federation
Ms. Donna L. Wirick, Intrinergy
Mr. Donald Bishop, Cumberland, VA
Mr. Randy Bush, Virginia Forest Products Association
Ms. Kathleen VanDerHyde, Chatham, VA
Ms. Rebekah Remick, Minor NSR Coordinator, DEQ
Mr. Jerome A. Brooks, Office of Air Compliance Coordination, DEQ
Ms. Sharon Foley, Air Permits Manager, DEQ
Ms. Patty Buonviri, Air Toxics Coordinator, DEQ
Ms. Mary E. Major, Office of Regulatory Affairs, DEQ

Subcommittee Members Absent:

Dr. Foster A Agblevor, Ph.D., Biological Systems Engineering, Virginia Tech
Mr. Oren Heatwole, Dayton, VA
Mr. Matt Faulconer, Rappahannock Electric Cooperative
Mr. Ken Moss, Piedmont BioProducts, LLC

Mr. H. Dean Price, Red Birch Energy, LLC

Mr. Ian Heatwole, Weyers Cave, VA

Mr. Paul R. Howe, Virginia Forestry Association

*(Note: Mr. Charlie Cushwa, Wildlife Consulting Services, requested to be removed from the TAC)

Public Attendees:

Mr. John English, English Boiler, Inc.

Mr. Al Weed, Public Policy Virginia

Ms. Diana Abbott

SUMMARY OF DISCUSSION

Discussion: Ms. Major began the meeting by explaining that several members had indicated that they were going to have material to present to the group but they did not come to the meeting; nor did they indicate that they would not be present. She then distributed an email received from Professor Agblevor with some emissions data from the pyrolysis project at Virginia Tech and indicated that no one from Tech would be present to review or explain the material. A question was raised about the limiting nature of the strawman (i.e. it only applied to sources of fuel and technologies that staff had emissions data for). It was explained again that the strawman was based solely on data that was available to staff and it was anticipated that the TAC would help provide the necessary and additional information that would be necessary in the development of a general permit(s) for the various technologies using biomass.

Item 1. Mr. Bishop provided an overview of the Bio-Energy Project in Cumberland County

Cumberland County is a small county with lots of chicken litter; farmers are restricted as to how much can be distributed on their fields.

Project involves an anaerobic digester using 40 tons/day of chicken litter.

One year of operation would result in about 1 ton of residual material that would need to be landfilled.

Mr. Bishop's presentation explained how the system would work and would provide renewable energy for the county. He also provided the group with information on products of anaerobic digestion, use of Biogas, potential revenue and the current status of the project.

Item 2.: Mrs. VanDerHyde provided an overview of the digester process at the VanDerHyde Dairy Farm in Chatham, Virginia.

Manure happens at dairy farms.

Digesters already in use on farms in other states: Wisconsin and Pennsylvania

Digester is designed to match the farm size: VanDerHyde farm is approx. 1200 cows, one of the largest in VA.

Farm utilizes a three lagoon system with less and less phosphorous in each subsequent lagoon.

Mrs. VanDerHyde also explained that the digester would generate about 1.4 million Btu

with 850 Btu used to operate the digester and questioned whether the size of the operation was exempt from permitting requirements as it only would generate 425 Kw.

Group discussed the difficulty of obtaining emissions data from many different types of technologies/fuels. Mr. English indicated that his company had data from many different fuels used in his company test boilers and indicated he would provide material at the next meeting. Mr. Weed expressed concern that the regulated community perceives that the permitting process is too cumbersome for new biomass industries to locate in Virginia. Group will address additional options to ease permitting burden until one or more general permits can be developed for different biomass industries reiterating that general permits cannot be developed without supporting emissions data.

DOCUMENT DISTRIBUTION

The following documents were distributed to the committee prior to or at the meeting:

1. E-Mail from Professor Agblevor to Mary Major
2. Bio-Energy Presentation; Digester in Cumberland County

TEMPLATES\GEN-PERMIT\GP08
REG\GEN-DEV\Cg-GP08-2

Attachments

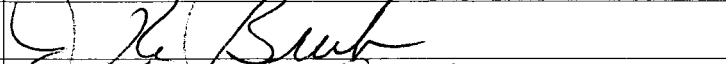
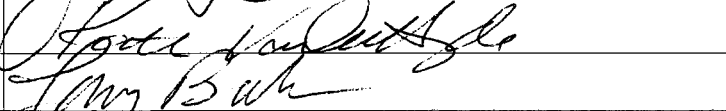
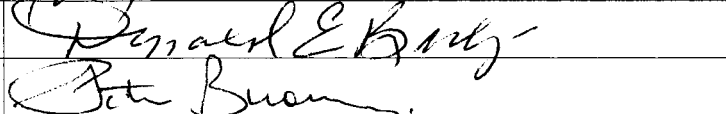
**COMMONWEALTH OF VIRGINIA
STATE AIR POLLUTION CONTROL BOARD**

**TECHNICAL ADVISORY COMMITTEE MEETING
ATTENDANCE RECORD**

September 15, 2009

SUBJECT: Biomass General Permit for Qualified Energy Generator (Revision CG)

LOCATION: 2nd Floor Conference Room, Department of Environmental Quality, 629 East Main Street, Richmond, Virginia

PRINTED NAME	SIGNATURE
J. R. Bush	
Kathleen VanDortHede TONY BANKS	
Donald Bishop PATRICIA BUONINI	
John ENGLISH	ENGLISH Boiler, Inc.
Ed Wood	Public Policy VIRGINIA,
Sharon Foley	Sharon B. Foley
Becky Remick	Becky Remick
DIANA ABHOTT	Diana Abbott
Donna Wirick	Donna L. Wirick
Jerome Brooks	Jerome O. Brooks

RE: Biomass TAC; 2nd meeting

Major, Mary

From: Agblevor, Foster [fagblevo@exchange.vt.edu]
Sent: Tuesday, September 01, 2009 2:11 PM
To: Major, Mary
Subject: RE: Biomass TAC; 2nd meeting
Attachments: ACG. Emission analysis.2009.docx

Thanks Mary,

The last week of September will work for and also the first week of October will be fine for me to attend a meeting. Please see attached some data. I will check with one of my graduate students if he could attend to explain the data. The data are the emissions recorded when the pyrolysis gases were not flared. In case of flaring, the VOC will be burnt. HCl, H₂S, Naphthalene, phenol, formaldehyde, and particulate concentrations were extremely low. These were all below the EPA values. The only real emission of concern will be ammonia (NH₃).

Compound	Emission rate (lb/h)
Hydrochloric acid gas (HCl)	0.004
Hydrogen sulfide gas (H ₂ S)	0.00
Phenol	2.53E-02
Formaldehyde	4.34E-05
Naphthalene	5.06E-03
Particulates	0.02
Ammonia	1.86

Regards
 Foster

 Foster A Agblevor
 Associate professor
 Biological Systems Engineering
 Virginia Tech
 213 Seitz Hall
 Blacksburg, VA 24061
 email: fagblevo@vt.edu
 Phone: 540-231-2578
 Fax: 540-231-3199

From: Major, Mary [mailto:Mary.Major@deq.virginia.gov]
Sent: Monday, August 31, 2009 9:02 PM
To: Agblevor, Foster
Subject: RE: Biomass TAC; 2nd meeting

Dear Professor Agblevor,

That would be very helpful...is there someone else that could explain the information and is there a time toward the end of September/early October that you will be available to attend a meeting? (This way I will have a better idea when to schedule the next meeting so that you can attend.)

-----Original Message-----

From: Agblevor, Foster [mailto:fagblevo@exchange.vt.edu]
Sent: Thu 8/27/2009 5:55 PM

9/15/2009

To: Major, Mary; Banks, Tony ; Bishop, Donald ; Brooks, Jerome; Buonviri, Patricia; Bush, Randy ; Cushwa, Charlie ; Faulconer, Matt ; Foley, Sharon; Heatwole, Ian; Heatwole, Owen ; Howe, Paul R. ; McLeod, Doris; Moss, Ken ; Price, H. Dean ; Remick, Rebekah; Vanderhyde, Kathleen ; Wirick, Donna L.
Cc: Berndt, Cindy
Subject: RE: Biomass TAC; 2nd meeting

Thanks Mary,

I have some emission data on pyrolysis of poultry litter that I could share. Unfortunately, I will be on travel that week, but I could send you the information for discussion.

Foster

From: Major, Mary [Mary.Major@deq.virginia.gov]

Sent: Thursday, August 27, 2009 3:18 PM

To: Agblevor, Foster; Banks, Tony ; Bishop, Donald ; Brooks, Jerome; Buonviri, Patricia; Bush, Randy ; Cushwa, Charlie ; Faulconer, Matt ; Foley, Sharon; Heatwole, Ian; Heatwole, Owen ; Howe, Paul R. ; McLeod, Doris; Moss, Ken ; Price, H. Dean ; Remick, Rebekah; Vanderhyde, Kathleen ; Wirick, Donna L.

Cc: Berndt, Cindy

Subject: Biomass TAC; 2nd meeting

The next meeting of the biomass TAC will be September 15th at 10:00 a.m. in the 7th floor conference room at the central office of the DEQ. In my email of August 13, I asked folks to contact me regarding any information pertinent to the development of the general permit, i.e. activities and or emissions data associated with the work they are engaged in or are researching so that it could be present to the group. Thus far, no one has contacted me.

If the group is interested we could opt to do more than one general permit to address the various types of biomass/technologies. Therefore, if there is a specific area that you have an interest in, i.e. a particular fuel use or technology like pyrolysis, now is the time to bring that information to the group.

Please let me know if you will be presenting any information to the group and an estimate of how much time you will need by September 8th. I will be in contact with those wishing to present information after the 8th to arrange any audio/visual equipment for your presentations.

Mary E. Major

Environmental Program Manager

Virginia Department of Environmental Quality

P.O. Box 1105

Richmond, Virginia 23218

Phone: 804-698-4423

Fax: 804-698-4510

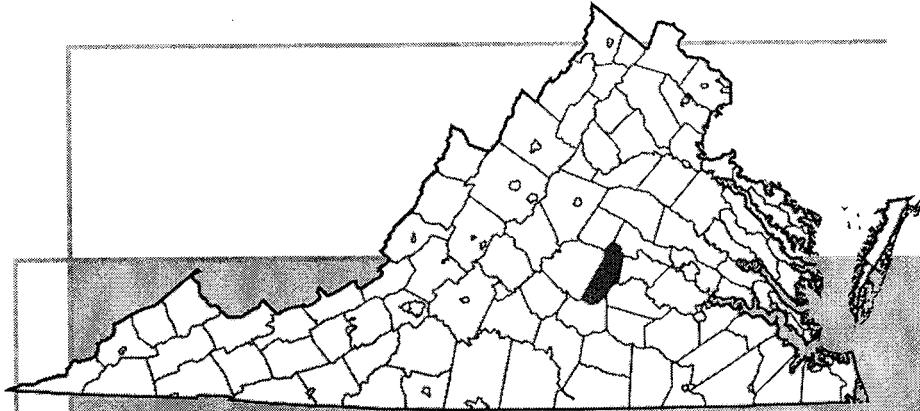
TABLE 10
SUMMARY OF GASEOUS EMISSIONS
VIRGINIA TECH CHICKEN LITTER PYROLYSIS
PROCESS OUTLET - CONDITION 2

DATE	06/05/09	06/05/09	AVERAGE
TIME OF GAS SAMPLE	14:30	16:00	
START TIME OF FLOW RATE	14:30	15:10	
END TIME OF FLOW RATE	14:48	15:15	
<hr/>			
PROCESS BURNER STATUS	OFF	OFF	
GAS PARAMETERS			
Gas Temperature (°F)	131	112	122
Oxygen (%)	15.90	15.40	15.65
Carbon Dioxide (%)	3.00	3.60	3.30
Moisture (%) ¹	9.69	9.69	9.69
GAS FLOWRATE			
Velocity (ft/sec)	6.19	15.58	10.89
Actual Volume (acfm)	130	326	228
Standard Volume (dscfm)	99	258	179
NOx EMISSIONS (as NO2)			
Concentration (ppmdv)	15.5	22.9	19.2
Concentration @ 7%O2 (ppmdv)	43.09	57.87	50.48
Mass Rate (lb/hr)	0.02	0.03	0.02
SO2 EMISSIONS			
Concentration (ppmdv)	19	25	22
Concentration @ 7%O2 (ppmdv)	52.82	63.18	58.00
Mass Rate (lb/hr)	0.02	0.06	0.04
CO EMISSIONS			
Concentration (ppmdv) [‡]	1,428	1,400	1,414
Concentration @ 7%O2 (ppmdv) [‡]	3969.84	3538.18	3754.01
Mass Rate (lb/hr) [‡]	0.62	1.58	1.10
VOC EMISSIONS (as Propane)			
Concentration (ppmdv)	5,300	5,300	5,300
Concentration @ 7%O2 (ppmdv)	14,734.00	13,394.55	14064.27
Mass Rate (lb/hr)	3.60	9.39	6.50

Notes

¹ Moisture percentage was taken from EPA Method 5 sampling results.

Bio-Energy in Cumberland County



DEQ Air Permit TAC – 09/15/09

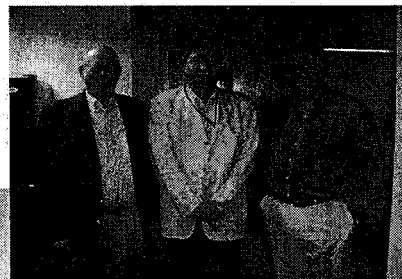
Local Concern- Farming is less profitable

- End use regulation
- Soil- Phosphorus
- Crop profitability
- Poultry competition - limited
- Increasing tax burden- 61% revenue from Agriculture, over 80% from poultry in Cumberland County
- Increasing restrictions on land use
- Increase in farm regulations- more to come

How can we locally utilize Poultry Waste?

- Application on land- fertilizer, limits and concerns on transport
- Burning- Air Quality issues (21% better for the environment to burn methane than to escape into the atmosphere)
- Anaerobic Digestion- A promising option
- Collective approach- similar to a farmer's cooperative

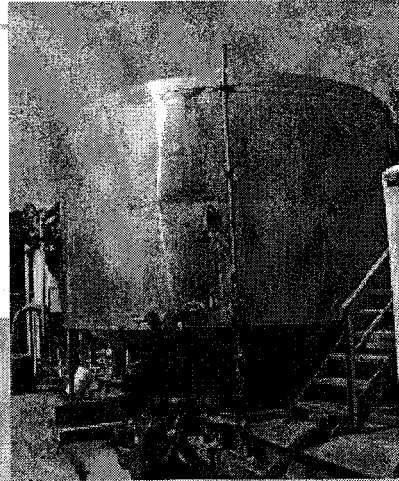
Anaerobic Digestion of Poultry Litter- It began with a visit to WVSU



1. On our visit to WVSU we met Dr. Mark Chatfield and John Bombardiere
2. We also learned quite a bit about digesters
3. Daryl Bishop, CEM General Manager Pepco Energy Services also attended the trip (taking pic)

WVSU Digester

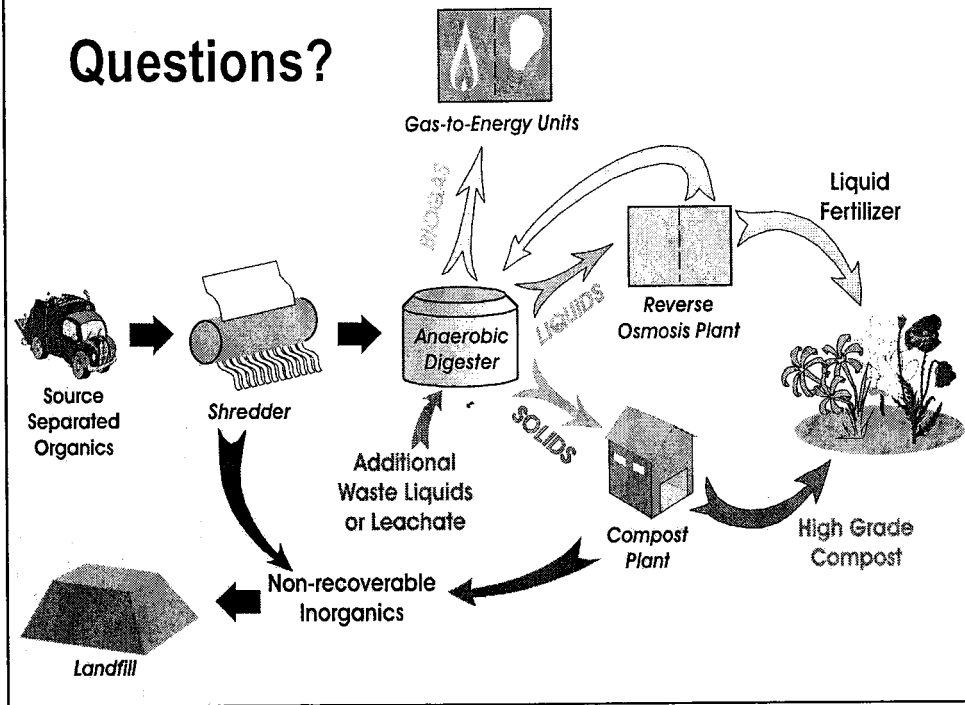
- 10,000 gallon
- Anaerobic
 - No Oxygen
- Thermophilic
 - 125 -140° F
- 10 Day HRT



We learned that Anaerobic Digesters Are.....

- Are producers of clean, renewable energy
- A component of waste and nutrient management systems
- Pathogen and odor killers
- Biological systems- managing the “bugs”
- Proven/Mature technology for processing organic wastes, including poultry litter
- Grants are available – Cumberland farmers applied and received a \$37,000 grant from USDA for a feasibility study & business plan

Questions?

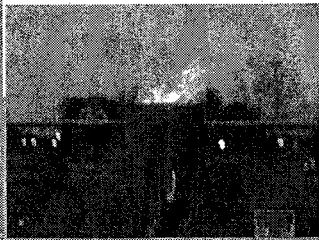


Feedstock- Litter from Poultry Houses is a great feedstock



Products of Anaerobic Digestion

- Biogas
- Solid fertilizer and compost
- Liquid fertilizer



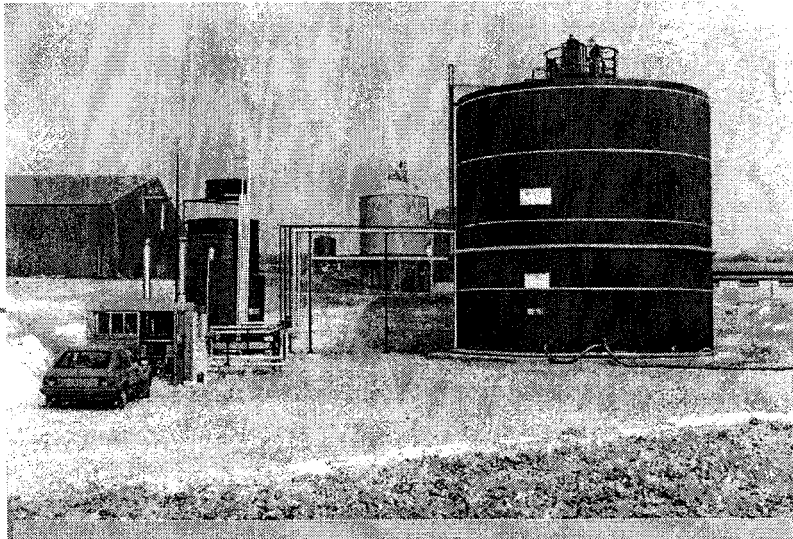
Uses of Biogas

- Electricity – sold as green power for a premium
- Boiler- to preheat the digester to 134 degrees and steam clean trucks for bio-security
- Direct use as Natural Gas substitute- direct sale to co-located businesses or neighbors

Potential Revenue

- Gas or electricity sales
- Renewable energy credits
- Fertilizer sales- liquid & solid
- Certified organic compost
- Tipping fees
- Carbon credits

**ECL Digester Plant- Cumberland Plant
should be similar scale as picture**



Status

- Ag Renewable Resources, LLC was formed by 8 Cumberland farmers in 2008
- ARR plans to construct and operate a generation facility capable of 1.5 MW
- ARR facility will use 40 tons of litter/day
- ARR is pursuing capitalization and membership commitment for the project