



Farzie Shelton, chE; REM

Environmental Affairs Manager of Licensing & Permitting

November 9, 1999

Clair H. Fancy, P.E., Chief
Bureau of Air Regulation
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399

RECEIVED

NOV 10 1999

BUREAU OF AIR REGULATION

**RE: C.D. McIntosh, Jr. Power Plant, Unit No. 3
Request to Revise Permit No. PSD-FL-008
Use of Harvested Biomass as Fuel**

Dear Mr. Fancy:

The City of Lakeland Department of Electric Utilities (Lakeland) understands that the Department of Environmental Protection (Department), due to unforeseen computer problems, has been unable to process the above referenced application in a timely manner. Therefore, Lakeland, as requested by the Department, is hereby writing to waive the requirement of the 90 days permitting clock.

With this letter, Lakeland hopes that its waiver would aid the Department to overcome the time restriction imposed on issuing the draft modified PSD permit for its Unit No. 3.

As always, Lakeland looks forward to working with you and your staff in finding a suitable solution to its permitting request. If you have any questions or need any further information to complete your review, please call me at 863-834-6603.

Sincerely,

Farzie Shelton

cc: A. A. Linero, DEP
Buck Oven, DEP-Siting Coordination
Ronald Tomlin, Lakeland
Ken Kosky, Golder
Angela Morrison, HGSS

City of Lakeland ● Department of Electric

energy input from biomass is expected to be between 10% and 20% of the total.

In addition to these plans, Salix Consortium will plant willow at additional trial sites at various locations throughout the Northeast to lay the basis for eventual scale-up to commercial operation.

Recent Accomplishments

During 1998, Salix participants made a number of advances, including:

- Planted 105 acres of willow near the Dunkirk Station and an additional 34 acres in four areas of central New York
- Completed preliminary design for retrofitting the Dunkirk Station and fuel supply plan
- Installed biomass cofiring systems retrofit and conducted test burns of willow at NYSEG's Greenidge Station
- Produced more than 850,000 willow cuttings at State University New York at Syracuse-College of Environmental Science and Forestry (SUNY-ESF) and Saratoga Tree Nursery
- Modified and tested a willow planter (Cornell University) on 17 acres.

Near-Term Plans

Work will continue in 1999, including:

- Plant additional 200 acres of willow near the Dunkirk Station scheduled for the spring of 1999; harvesting is scheduled for the winters of 2001 and 2002
- Test the cofiring retrofit of Dunkirk Station
- Study environmental benefits, avian biodiversity, root dynamics, soil sustainability, and productivity of willow plantings at SUNY-ESF

- Analyze ash samples from cofiring at the Greenidge, Dunkirk, and Seward stations at GPU, Inc., and test the ash for suitability for use in Portland cement.

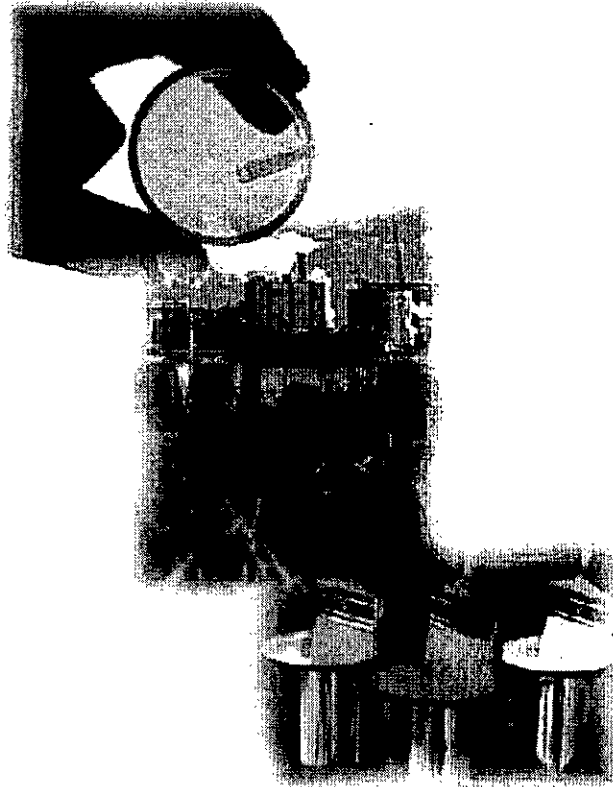
Project Participants

Antares Group, Inc.
Burlington Electric Department
Cornell University
Electric Power Research Institute
FORECON, Inc.
GPU, Inc. (formerly General Public Utilities)
Montreal Botanical Gardens
National Renewable Energy Laboratory
New York State Electric & Gas Company
New York State Energy Research and Development Authority
Niagara Mohawk Power Corporation
Oak Ridge National Laboratory
Ontario Hydro
South Central New York Resource Conservation and Development
State University of New York at Syracuse
U.S. Department of Agriculture
U.S. Department of Energy
University of Toronto



BIOENERGY

Plant/Crop-based Renewables Resources



Background

The U.S. Department of Energy (DOE) through its Office of Industrial Technologies (OIT) supports industries in their efforts to increase energy efficiency, reduce waste and increase productivity. The goal of OIT is to accelerate the development and use of advanced energy efficient, renewable, and pollution prevention technologies that benefit the industry, the environment, and U.S. energy security. The core of OIT is its Industries of the Future program which focuses on basic materials and processing industries such as the Agriculture Industry.

Goals

- Achieve 10 percent of basic chemical building blocks from plant-derived renewable sources (a 5-fold increase from the level today).
- Establish environmentally sensitive manufacturing platforms for renewable plant-based products.
- Build partnerships among industry, growers, academia, and government to develop commercial applications.

Accomplishments

- A strategic vision, "Plant/Crop-Based Renewable Resources 2020," for using crops, trees, and agricultural wastes to manufacture industrial chemicals and a huge range of everyday consumer goods was developed by the U.S. agricultural, forestry and chemical communities.
- Industry has identified the significant barriers that exist in the overall system for conversion of renewable resources into industrial chemicals and everyday consumer goods.

Benefits

- Expand/open new markets to farmers and increase their sales/profits.
- Lessen reliance on imported fossil fuels/improve energy efficiency of products.
- Reduce carbon emissions.

- Establish alternative pathways of making similar or superior products that consumers demand.
- Revitalize the economy in rural regions by co-locating facilities/farm gate.
- Reduce waste generated in the production of chemicals and products.
- Create new opportunities for recycling.

Future Activities

Research and development is being solicited in the high priority areas identified in industry's technology roadmap. Selected high-priority research needs from the technology roadmap include:

Plant Science—Develop understanding of gene regulation and control of plant metabolic pathways, and functional genomics to improve gene manipulation.

Production—Improve production methods (higher plant productivity, more desirable plant components) for an adequate supply of plants for industrial use.

Processing—Improve methods of product separation and develop new, more effective catalysts for creating chemicals and other products from plants rather than hydrocarbons.

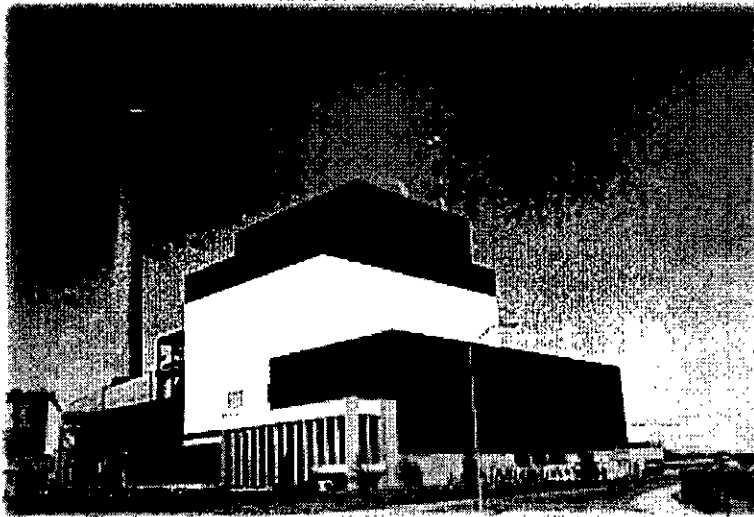
Utilization—Develop understanding of the relationships between the structure and functionality of different plant constituents (e.g., proteins, starch) and sound infrastructure and distribution systems to ensure adequate raw materials supply.

Partners in Success

AIChE, Center for Waste Reduction Technology
 Agriculture Research Institute
 American Soybean Association
 Archer Daniels Midland Company
 CA Institute of Food and Ag Research
 Center for Crops Utilization Research
 Corn Refiners Association
 Genencor International, Inc.
 Grain Processing Corporation
 Institute for Physical Research and Technology
 National Association of State Energy Offices
 National Association of Wheat Growers
 National Corn Growers Association
 New Uses Council, Inc.
 U.S. Department of Agriculture

BIOENERGY

Biomass Cofiring - A Renewable Alternative for Utilities



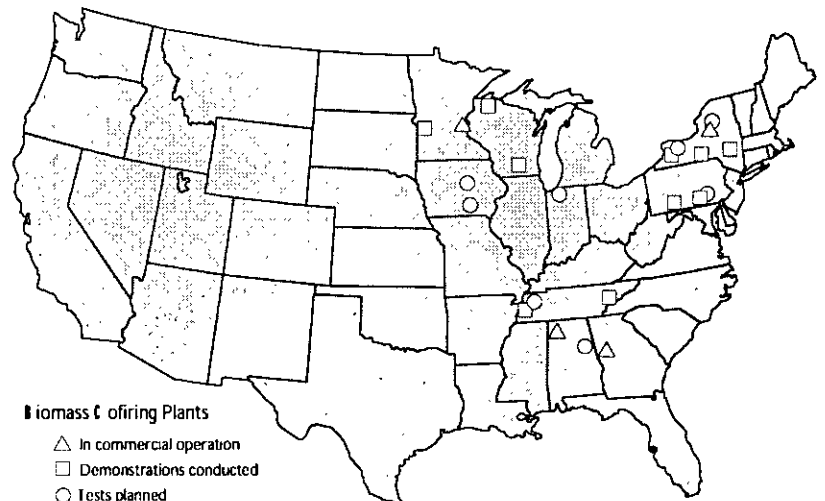
and trials have shown that effective substitutions of biomass energy can be made up to about 15 percent of the total energy input with little more than burner and feed intake system modifications to existing stations. In addition to CO₂ emission benefits, biomass in general contains significantly less sulfur than coal, so there is an SO₂ benefit as well. Early test results also suggest that there is a NO_x reduction potential of up to 30 percent with woody biomass.

Background

Biomass cofiring refers to the practice of introducing biomass as a partial substitute fuel in high efficiency coal boilers. This is the nearest term low-cost option for the efficient conversion of biomass to electricity. Cofiring has been practiced, tested, or evaluated for a variety of boiler technologies. After "tuning" the boiler's combustion output, there is little or no loss in total efficiency, implying that the biomass combustion efficiency to electricity would be close to the 33-37 percent range. Since large-scale coal power boilers represent 310 GW of generating capacity, there is a substantial opportunity for power generation using biomass cofiring. Extensive demonstrations

Economic Requirements

The economics of cofiring are highly site-specific and depend on power plant layout and type and availability of low-cost biomass fuels. A typical cofire installation includes modification to the fuel-handling and storage system to accommodate biomass. Costs can increase significantly if facilities for wood



drying or size reduction are required, or if a separate feed to the boiler is required. For pulverized-coal boilers, retrofit costs range from \$150 to \$300 per kilowatt (kW) of biomass generation. The lowest cost opportunities are with cyclone boilers, for which costs may be as low as \$50 per kW.

The more important cost factor, however, is fuel supply. Costs for biomass fuels depend on a number of factors such as climate, proximity to population centers, and the presence of industries that handle and dispose of wood. Usually the cost of biomass fuels must be equal to or less than the cost of coal (per MBtu) for cofiring to be economically successful. Some utilities reduce fuel costs by cofiring with biomass; the Tennessee Valley Authority, for example, estimates that it will save \$1.5 million per year in fuel costs by using cofiring at its Colbert plant.

Technical Challenges

Several technical questions having to do with fuel feed, boiler chemistry, and ash deposition and disposal have been defined and are approaching resolution. Losses in boiler efficiency due to cofiring are small and are usually due to higher moisture content in the biomass fuels. A consensus is emerging that cofiring is feasible at the majority of coal-fired power plants. However, many power companies sell fly ash for use in making cement; currently the standard set by the American Society for Testing and Materials requires that only "coal ash" be used in the mixture. Until this standard is changed, cofiring biomass may hinder plant managers from selling ash for use in cement. Several utilities are currently working with the U.S. Department of Energy (DOE) to resolve this issue.

Partners in Success

Alliant Power
Auburn University
CharitonValley RC&D
Cornell
EPRI
General Public Utilities
New York Gas
New York State Gas and Electric
Niagara Mohawk Power Corporation
NIPSCO
NY SERDA
Southern Companies
Southern Research Institute
SUNY
Tennessee Valley Authority
University of Toronto
U.S. Department of Agriculture

BIOENERGY

Biomass Power for Rural Development



Background

Using biomass to generate heat or to drive steam engines is nothing new. Historical methods of burning wood, field residues, or waste were not environmentally sound because they emitted polluting carbons and volatile organic compounds into the air. Today, scientists and engineers are developing several new methods to cleanly and efficiently convert biomass to electricity.

Accomplishments

Coproducts from the Heartland: In Southern Minnesota, alfalfa markets weren't strong enough to justify hauling the crop off the farm—until now. A partnership of the Minnesota Valley Alfalfa Producers cooperative, ENRON Capital and Trade, Carbona, Great River Energy, Westinghouse Electric Corporation, the University of Minnesota and DOE are about to get that alfalfa moving. When they build a planned biomass gasification and power generation

facility in Granite Falls, between 50,000 and 75,000 homes and farms will be served with electricity, and companion products like high-protein feed pellets will be produced. These coproducts will bring new revenues to local farmers. The farmers will get more local control and stability in their business, and there will be beneficial side effects, like an economic cushion against the devastating effects of rain damage to crops.

Switchgrass Finds Prairie: Underutilized, marginal land will be put to work through a public/private partnership to grow switchgrass for energy generation in Iowa. Currently, switchgrass is grown to reduce soil erosion or for feed. By cofiring the switchgrass in existing coal boilers, this native crop can generate about 36 megawatts of electrical power, enough to light some 40,000 homes.

Fourteen organizations, representing a broad cross section of business, community, utility and governmental interests, will work with hundreds of farmers and landowners to develop a biomass power system that will reduce acid rain. The partners plan a 4,000-acre demonstration project that will help farmers achieve a sustainable income as a lasting alternative to traditional Federal farm subsidies. In addition, increased use of homegrown renewable energy will keep more energy dollars in Iowa, concentrating the benefits.

Farmed Trees Grow Energy: In Upper Minnesota, 1,870 acres of hybrid poplar have been established on Conservation Reserve Program land by a consortium led by the WesMin Resource conservation and Development District. These four-year-old trees are being managed and studied extensively by scientists to learn how to grow dedicated crops for future energy uses.



Farmers Dedicate Crops to Energy in New York:

The first dedicated crop for energy production in the United States is growing near Syracuse, New York. Under the care of the Salix Consortium, with 25 university, association, corporate utility and government partners, willow trees are grown on land set aside by 26 farmers and landowners. These trees produce a crop every three years that can be efficiently harvested using existing machinery. Several power plants will participate in this project, cofiring the harvested feedstock with other fuels to produce electricity and reduce emissions. Projections indicate that willow crops like this one could be competitive with coal for producing energy without government subsidies.

Benefits

The U.S. Departments of Energy and Agriculture are partnering to further the development of electricity generation systems that use biomass instead of fossil fuels.

Using biomass, such as energy crops, processing waste, and agricultural residues for energy production is beneficial to the nation, and especially to rural areas. The national benefits include lower acid rain-producing emissions, reductions in greenhouse gas emissions, and less dependence on fossil fuels. Rural

benefits start with new sources of income for farmers, more jobs, and economic development, all achieved while preserving the high quality of life, local control, and lack of pollution that help make rural America a good place to live.

When economic development happens without harming the environment or jeopardizing our children's future well-being, we call it sustainable development. In the four projects established throughout the nation to demonstrate and validate biomass power production, we hope to embody the principles of sustainable development at its best.

Partners in Success

Iowa

Chariton Valley RC&D
Alliant Power
Local Farmers/Landowners
Iowa Farm Bureau
Iowa State University
Iowa Department of Natural Resources
Iowa Division of Soil Conservation
R.W. Beck
NBB/CES
Soil and Water Conservation Districts
U.S. Department of Agriculture

Minnesota

Minnesota Valley Alfalfa Producers
Enron Capital and Trade
Carbona Corporation
Kvaerner Pulping
Siemens Westinghouse
Great River Energy
City of Granite Falls
University of Minnesota
U.S. Department of Agriculture

New York

Niagara Mohawk/SUNY
Cornell
New York State Gas and Electric
New York Gas
U.S. Department of Agriculture
NYSERDA
EPRI



From Final Determination

DEPARTMENT'S RESPONSE:

The Department agrees and did not intend to limit the City with respect to the type of oil that may be fired during scrubber or coal feed equipment malfunctions. Therefore Condition 8 is changed as follows:

FROM:

The following fuels may be burned:

Coal only
Low sulfur fuel oil only (≤ 0.5 percent sulfur by weight)
Coal and up to 10 percent refuse (based on heat input)
Low sulfur fuel oil and up to 10 percent refuse (based on heat input)
Coal and up to 20 percent petroleum coke (based on weight)
Coal and up to 20 percent petroleum coke (based on weight) and 10 percent refuse (based on heat input)
Natural gas

TO?

The following fuels may be burned:

Coal only
Low sulfur fuel oil only (≤ 0.5 percent sulfur by weight)
Coal and up to 10 percent refuse (based on heat input)
Low sulfur fuel oil and up to 10 percent refuse (based on heat input)
Coal and up to 20 percent petroleum coke (based on weight)
Coal and up to 20 percent petroleum coke (based on weight) and 10 percent refuse (based on heat input)
High sulfur fuel oil (> 0.5 percent sulfur by weight) consistent with Conditions 2.C. or 2.D.
Natural gas only, or in combination with any of the other fuels or fuel combinations listed above

CONDITION 9.

CITY'S COMMENTS:

The City questions whether it is necessary to demonstrate that the use of petcoke will not result in emission increases of carbon monoxide or sulfuric acid mist given that emissions increases due to petcoke are not expected.

DRAFT

Ms. Farzie Shelton
November XX, 1995
Page Four

Condition 8 (new)

The following fuels may be burned:

Coal only

Low sulfur fuel oil only (\leq 0.5 percent sulfur by weight)

Coal and up to 10 percent refuse (based on heat input)

Low sulfur fuel oil and up to 10 percent refuse (based on heat input)

Coal and up to 20 percent petroleum coke (based on weight)

Coal and up to 20 percent petroleum coke (based on weight) and 10 percent refuse (based on heat input)

Natural gas

Condition 9 (new)

The City shall maintain and submit to the Department on an annual basis for a period of five years from the date the unit is initially co-fired with petroleum coke, information demonstrating in accordance with 40 CFR 52.21 (b) (33) and 40 CFR 52.21 (b) (21) (v) that the operational changes did not result in emissions increases of carbon monoxide, nitrogen oxides, or sulfuric acid mist.

A copy of this amendment letter shall be attached to and shall become a part of Permit PSD-FL-008.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Howard L. Rhodes, Director
Division Air Resources Management



Farzie Shelton, chE; REM

Environmental Affairs Manager of Licensing & Permitting

September 20, 1999

Stephen McKeough
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399

**RE: C.D. McIntosh, Jr. Power Plant, Unit No. 3
Participation in the Partnership for Ecosystem Protection**

Dear Steve:

The City of Lakeland Department of Electric Utilities (Lakeland) requests enrolment of its C.D. McIntosh Power Plant in the Department's Participation in the Partnership for Ecosystem Protection (PEP) programs. Accordingly, Lakeland has requested the Department for revision to its Prevention of Significant Deterioration (PSD) and Site Certification permits for this unit.

Upon receipt of these modified permits, Lakeland anticipates 1-2 years before it can utilize biomass in Unit No. 3. Nevertheless, presently Lakeland utilizes 3 percent of this unit's heat input by burning Refuse Derived Fuel (RDF) which in itself reduces the emission from burning coal. However, future use of biomass and RDF together will significantly reduce emissions of particulate matter, sulfur dioxide, and nitrogen oxides.

With this letter, Lakeland is submitting a completed Progress Verification form certified by Mr. Ronald W. Tomlin Assistant Managing Director. If you should have any questions, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Farzie Shelton", written over a horizontal line.

Farzie Shelton

Attachment

City of Lakeland ● Department of Electric

Progress Verification

Partnership Year: 1999

Extension Requested: Yes _____ No X

Facility Name and Location

1. Facility Owner/Company Name (Name of corporation, agency, or individual owner): Lakeland Electric
2. Facility Name (For example, store name or number): C. D. McIntosh Power Plant
3. Facility Location: Street Address: 3030 East Lake Parker Drive City: Lakeland County: Polk Zip Code: 33805-9513

Owner/operator

4. Name & Title of Owner/Operator: Ronald W. Tomlin P.E. Assistant Managing Director
5. Owner/Operator Mailing Address: Organization/Firm: Lakeland Electric Street Address: 501 East Lemon Street City: Lakeland County: Polk Zip Code: 33801-5079
6. Owner/Operator Telephone Number(s): Telephone: (863) 834-8474 Fax: (863) 834- 6373

Facility Contact (If different from Owner/Operator)

7. Name and Title of Facility Contact (For example, department/section manager): Farzie Shelton Manager of Environmental Licensing & Permitting
8. Facility Contact Address: 501 East Lemon Street Street Address: City: Lakeland County: Polk Zip Code: 33801-5079
9. Facility Contact Telephone Number(s): Telephone: (863) 834-6603 Fax: (863) 603-6335

Regulatory Information

1. Air Permit Number(s) (AIRS): 1050004-005-AV
2. Hazardous Waste Generator Identification Number: FLD000648063
3. Resource Conservation & Recovery Act (RCRA) Identification Number:
4. Water Permit Number(s) 200047.04(SWFWMD); FL0026301

Ecosystem Protection Program/Project Progress Verification Information

1. Name of PEP Project: **Biomass/RDF**

2. Results: (Description of results realized; use additional pages if necessary)

The City of Lakeland Department of Electric Utilities (Lakeland) is proposing to utilize energy crops as well as agricultural and wood wastes as a fuel for Unit 3. McIntosh Unit 3 is currently authorized to burn refuse/refuse-derived (RDF) fuel in quantities up to 10 percent of the total heat input. However, only 3 percent of the total heat input is presently used by utilization of RDF and Lakeland intends to use the remaining 7 percent heat input by utilizing biomass as fuel.

The use of biomass as a fuel for the generation of electricity is currently favored by the U.S. Department of Energy (DOE) as well as the U.S. Environmental Protection Agency (EPA). Both DOE and EPA favor biomass as fuel because it is a renewable source of energy that generally has lower emissions of particulate matter, sulfur dioxide, and nitrogen oxides dioxide (as well as other parameters) than fossil fuels (please refer to table 1 and 2 attached).

Utilization of biomass and RDF in the Unit No. 3 McIntosh Power Plant will displace equivalent amount of mmBtu per year generated by coal. As emission of particulate, sulfur dioxide, and nitrogen oxides when burning biomass and RDF is far less than emission from burning coal. This project should qualify for Partnership for Ecosystem Protection. The reduction in emissions of PM, SO₂, and NO_x is depicted in table 3 (attached). Although the biomass project will not be implemented for one to two years, presently reduction in emission of PM, SO₂, and NO_x is realized by using RDF.

3. Emissions Reductions: (Total emissions reductions per pollutant in tons per year)

	Pollutant	Tons per Year
Pollutant No. 1:	PM	151.33
Pollutant No. 2:	SO ₂	696.28
Pollutant No. 3:	NO _x	420.29
Pollutant No. 4:		
Pollutant No. 5:		
Pollutant No. 6:		

4. Documentation: (May be separate document attached as an integral part of this form)

Certification

I, Ronald W. Tomlin, hereby certify that:

1. I am the designated owner/operator for the facility described herein;
2. That, as such, I am authorized to sign this Annual Progress Verification Form;
3. That the environmental benefits claimed for the facility as a direct result of its PEP Implementation Plan activities are true, accurate and verifiable.

Ronald W. Tomlin
Designated Owner/Operator

Date signed: 9-20-99

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Table 1. Example of Uncontrolled Emission Factors for Particulate Matter (PM)
Sulfur Dioxide (SO₂) and Nitrogen Oxides (NO_x)

Fuel	Emission Factor (lb/ton)			Reference
	PM	SO ₂	NO _x	
Biomass ^a	8.8	0.1	1.5	AP-42 Section 1.6
Refuse Derived Fuel	69.6	3.9	5.02	AP-42 Section 2.1
Coal	80	38	12	AP-42 Section 1.1

^a assumed to be similar to wood waste for purposes of comparison.

Table 2. Example of Uncontrolled Emission Factors for Particulate Matter (PM)
Sulfur Dioxide (SO₂) and Nitrogen Oxides (NO_x)

Fuel	Emission Factor (lb/mmBtu)				Reference
	PM	SO ₂	NO _x	CO	
Biomass ^a	0.98	0.01	0.17	1.51 0.16	AP-42 Section 1.6 - Wood Fired; Stoker AP-42 Section 1.6 - Fluidized Bed Combustor
Refuse Derived Fuel	6.33	0.35	0.46	0.17	AP-42 Section 2.1
Coal	3.64	1.73	0.55	0.02	AP-42 Section 1.1 - NSPS for NO _x

^a assumed to be similar to wood waste for purposes of comparison.

Heat Content (BTU/lb)

Biomass 4,500

Table 1.6-1

Refuse Derived Fuel 5,500

Table 2.1-8

Coal 11,000

Nominal Btu Content

Calculation: lb/mmBtu = lb/ton x ton/2,000lb fuel x lb fuel/Btu x 10⁶/mm

Table 3. Emission Calculation

Fuel	PM ton/yr	SO ₂ ton/yr	Nox ton/yr
Biomass	98.40	3.01	170.70
Refuse Derived Fuel (RDF)	272.40	45.19	197.95
Coal	522.14	744.48	788.95
Total Reduction	151.33	696.28	420.29

Assumptions:

1. Total heat input of biomass = 7% of the 3650 mmBtu
2. Total heat input of RDF = 3% of the 3650 mmBtu
3. Amount of coal displaced = 10% of the 3650 mmBtu
4. Tonnage per year is based on 8760 hours
5. Allow 90% removal of PM for precipitators
6. Allow 70% removal of SO₂ for scrubbers



Farzie Shelton, chE; REM

Environmental Affairs Manager of Licensing & Permitting

RECEIVED

AUG 23 1999

BUREAU OF AIR REGULATION

August 19, 1999

Mr. A.A. Linero, P.E., Administrator
New Source Review Section
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: C.D. McIntosh, Jr. Power Plant, Unit No. 3
DEP File No. 1050004-007-AC (PSD-FL-008)
Use of Harvested Biomass as Fuel

Dear Al:

This correspondence presents information requested in your letter dated August 5, 1999 regarding our request for the use of biomass as a fuel in McIntosh Unit 3. The information is presented according to your request.

- **Question/Comment:** Please submit the emissions comparisons on a lb/million Btu heat input or on a lb/MW generated basis. **Information:** Table 2 (attached) presents the emission factors in pounds per million Btu (lb/mmBtu). In the case of McIntosh Unit 3, these fuels are used in the same boiler with refuse/biomass making up only a small amount (10 percent or less) of the heat input. Since using refuse/biomass would not change the overall efficiency of Unit 3 boiler, the lb/MW would be identical to lb/ton as provided previously (i.e., Table 1 in the July 8, 1999 letter request). Please note that these are uncontrolled values with the exception of NO_x for coal. Since McIntosh Unit 3 is an NSPS unit, a controlled emission factor was used. This shows that the controlled emission factor for coal is higher than for either refuse or biomass. For PM and SO₂, the lower uncontrolled emission rate for biomass would lower emissions to the electrostatic precipitator and flue gas desulfurization system. On a lb/mmBtu basis, the emission of PM, SO₂ and NO_x are all less for what is considered "biomass", compared to either refuse derived fuel or coal. As a result, the use of biomass with lower PM, SO₂ and NO_x emissions than either refuse or coal, as well as lower potentially toxic air pollutants (e.g., metals), can be considered as a "pollution control project" under Rule 62-212.400(2)(a)2, F.A.C.
- **Question/Comment:** Include carbon monoxide. It appears that the material assumed has relatively high CO emission characteristics based on our inspection of AP-42. **Information:** Table 2 includes CO emission factors in lb/mmBtu. In lb/ton, the CO emission factors are 1.4 to 13.6 for biomass (represented by wood waste), 1.92 for RDF and 0.5 for coal. A range of CO emission factors was shown for biomass, since CO emissions are highly dependent upon the type of combustion process. As shown in Table 2, the CO emission factor for biomass can envelope those for RDF depending upon the combustion process. When biomass is fired in McIntosh Unit 3, the same process used to burn refuse would be used. This includes the shredding of any biomass material prior to combustion. After shredding, metals and heavy material are taken out of the refuse. The shredded biomass material, which would not contain metals, would be placed along with refuse in a common fuel storage bin prior to injection into the boiler. Biomass would be combusted along with refuse, which contains similar biomass type material (e.g., tree trimmings). Thus, there is little difference in refuse-derived fuel burned in McIntosh Unit 3 and any biomass that would be used in the future. There would also be no difference in CO emissions from the burning either refuse or biomass when they are fired with coal. Moreover, McIntosh Unit 3 is a pulverized coal-fired unit that would not exceed 10

City of Lakeland ● Department of Electric Utilities

Page - 2

percent of heat input of refuse or biomass. As a result, the combustion process and resultant CO emissions would be dominated by the pulverized coal combustion process. The small amount of refuse and biomass has little overall effect on CO emissions. In addition, as noted above, the project can be considered as a "pollution control project" under the Department's rules and emissions of CO can be considered relatively unimportant compared to PM, SO₂ and NO_x.

- **Question/Comment:** This action would not be to clarify that harvested energy crops may be used as fuel. We agree that refuse is permitted. **Information:** The City requests that biomass be included within the definition of refuse/refuse derived fuel that is currently authorized for McIntosh Unit 3. Such material currently is and would be handled in the same manner as general refuse and be substantially similar in fuel properties as RDF with generally lower uncontrolled emission rates.
- **Question/Comment:** Introduction of the term "biomass" for refuse can be problematical. Biomass, for example, can also mean sewage sludge. Please recommend the precise language that you want to be introduced into the permit and make it as narrow as possible. **Information:** The request would be to include biomass within the definition of refuse/refuse derived fuel as a footnote to new condition 8 of PSD-FL-008(B) issued December 11, 1995 and condition I. H. of the modified condition of certification: refuse^a; ^a including biomass; biomass shall include all forms of vegetative matter including but not limited to wood wastes, agricultural crops or crop waste material and specially planted or harvested energy crops. Biomass shall not include any material derived from sewage sludge.

Our request to utilize biomass is quite timely given the recent Presidential Executive Order. On August 12, 1999 the President of the United States issued an Executive Order for Developing and Promoting Biobased Products and Bioenergy. Please find attached a copy of the news release. Thank you for your attention to this request. If you have any questions or need any further information to complete your review, please call me at 941-834-6603.

Sincerely,



Farzie Shelton

Enclosures

cc: Teresa Heron, DEP-BAR
Buck Oven, DEP-Siting Coordination
Steve Palmer, DEP-Siting Coordination
Elsa Bishop
Ronald Tomlin, Lakeland
Ken Kosky, Golder
Angela Morrison, HGSS

EPA
NPS
File

City of Lakeland ● Department of Electric Utilities

Table 2. Example of Uncontrolled Emission Factors for Particulate Matter (PM)
Sulfur Dioxide (SO₂) and Nitrogen Oxides (NO_x)

Fuel	Emission Factor (lb/mmBtu)				Reference
	PM	SO ₂	NO _x	CO	
Biomass ^a	0.98	0.01	0.17	1.51 0.16	AP-42 Section 1.6 - Wood Fired; Stoker AP-42 Section 1.6 - Fluidized Bed Combustor
Refuse Derived Fuel	6.33	0.35	0.46	0.17	AP-42 Section 2.1
Coal	3.64	1.73	0.55	0.02	AP-42 Section 1.1 - NSPS for NO _x

^a assumed to be similar to wood waste for purposes of comparison.

Heat Content (BTU/lb)

Biomass	4,500	Table 1.6-1
Refuse Derived Fuel	5,500	Table 2.1-8
Coal	11,000	Nominal Btu Content

Calculation: $\text{lb/mmBtu} = \text{lb/ton} \times \text{ton}/2,000\text{lb fuel} \times \text{lb fuel/Btu} \times 10^6/\text{mm}$

Table 1. Example of Uncontrolled Emission Factors for Particulate Matter (PM)
Sulfur Dioxide (SO₂) and Nitrogen Oxides (NO_x)

Fuel	Emission Factor (lb/ton)			Reference
	PM	SO ₂	NO _x	
Biomass ^a	8.8	0.1	1.5	AP-42 Section 1.6
Refuse Derived Fuel	69.6	3.9	5.02	AP-42 Section 2.1
Coal	80	38	12	AP-42 Section 1.1

^a assumed to be similar to wood waste for purposes of comparison.

Shelton, Farzie

From: Shelton, Farzie
Sent: Friday, August 13, 1999 10:21 AM
To: 'linero_a@dep.state.fl.us'; 'bishop_e@dep.state.fl.us'
Cc: Tomlin, Ron
Subject: Biomass/Renewable Energy

Al:

I thought you would be interested to read the following. This should help us in support of our application. you would hear from me soon in reply to your inquiries in respect of biomass emission.

Farzie

Clinton Creates Federal Council to Study Energy from Waste Products
Nancy Mathis , Houston Chronicle (August 13, 1999) Aug. 13--

WASHINGTON--Hoping to bolster the development of clean and renewable energy, President Clinton ordered federal agencies Thursday to begin a coordinated effort to accelerate the development of fuels from plant and agricultural wastes.

Clinton, appearing before a panel of experts at the Department of Agriculture, hailed biomass -- trees and crops that are converted into fuels and electricity -- as the energy alternative for the 21st century. He equated the work being done today in the biomass field to the work by William Meriam Burton, the Standard Oil chemist who launched the petrochemical industry at the last turn of the century.

"And on the verge of the 21st century, we may be nearing a similar breakthrough, a technological fix that can help us to meet our economic challenges, maintain our security, sustain our prosperity and ease the threat of global warming. Science will be the key to our progress," Clinton said.

The president signed an executive order that established a permanent council consisting of the heads of the Energy and Agriculture departments, the Environmental Protection Agency, the National Science Foundation and other agencies. The council will develop a research program that will be presented annually as part of the federal budget. Clinton wants to triple the use of biomass energy, which currently represents 3 percent of the fuel being used, by 2010.

The White House action also provided a backdrop for Vice President Al Gore, who spent the day campaigning in Iowa and talking about the same technologies.

Carol Browner, the EPA administrator, said biomass products also can be used to create ink, paints and packing material that will decay after disposal and further reduce pollution.

"Quite simply, biomass is to the next century what petroleum was to this century," Browner said. "It is the next generation of fuels and chemicals." She said that corn-based ethanol alone can in 20 years replace 348 million barrels of imported oil. She said a new biomass industry could provide thousands of jobs and generate new income for farmers.

Dan Reicher, a Department of Energy deputy in charge of energy efficiency and renewable resources, said the use of biomass products has been increasing at the rate of 2 percent a year since 1990. He said the growth, however, is currently too slow to meet concerns about dependence on imported energy, air quality and climate change.

"Through a strong industry-government partnership, greatly fostered by today's executive order, we'll accelerate the uses of waste agriculture products like cornstalks or rice straw or sugar cane byproducts or a whole host of other waste to make clean-burning ethanol for our cars," Reicher said. He said companies already are developing several

plants, including one in Louisiana that will convert sugar cane waste into ethanol.

"The long-term technical and economic objective is to make a ton of biomass a viable market competitor to a barrel of imported oil," Reicher said. "In the next century, bio-refineries will crack renewable carbon just like we do fossil carbon today." -----

Visit Houston Chronicle Interactive on the World Wide Web at
<http://www.HoustonChronicle.com>

August 12, 1999
EXECUTIVE ORDER

THE WHITE HOUSE

Office of the Press Secretary

Immediate Release

August 12, 1999

For

EXECUTIVE ORDER

DEVELOPING AND PROMOTING BIOBASED PRODUCTS AND BIOENERGY

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the Federal Advisory Committee Act, as amended (5 U.S.C. App.), and in order to stimulate the creation and early adoption of technologies needed to make biobased products and bioenergy cost-competitive in large national and international markets, it is hereby ordered as follows:

Section 1. Policy. Current biobased product and bioenergy technology has the potential to make renewable farm and forestry resources major sources of affordable electricity, fuel, chemicals, pharmaceuticals, and other materials. Technical advances in these areas can create an expanding array of exciting new business and employment opportunities for farmers, foresters, ranchers, and other businesses in rural America. These technologies can create new markets for farm and forest waste products, new economic opportunities for underused land, and new value-added business opportunities. They also have the potential to reduce our Nation's dependence on foreign oil, improve air quality, water quality, and flood control, decrease erosion, and help minimize net production of greenhouse gases. It is the policy of this Administration, therefore, to develop a comprehensive national strategy, including research, development, and private sector incentives, to stimulate the creation and early adoption of technologies needed to make biobased products and bioenergy cost-competitive in large national and international markets.

Sec. 2. Establishment of the Interagency Council on Biobased Products and Bioenergy. (a) There is established the Interagency Council on Biobased Products and Bioenergy (the "Council"). The Council shall be composed of the Secretaries of Agriculture, Commerce, Energy, and the Interior, the Administrator of the Environmental Protection Agency, the Director of the Office of Management and Budget, the Assistant to the President for Science and Technology, the Director of the National Science Foundation, the Federal Environmental Executive, and the heads of other relevant agencies as may be determined by the Co-Chairs of the Council. Members may serve on the Council through designees. Designees shall be senior officials who report directly to the agency head (Assistant Secretary or equivalent).

(b) The Secretary of Agriculture and the Secretary of Energy shall serve as Co-Chairs of the Council.

(c) The Council shall prepare annually a strategic plan for the President outlining overall national goals in the development and use of biobased products and bioenergy in an environmentally sound manner and how these goals can best be achieved through Federal programs and integrated planning. The goals shall include promoting national economic growth with specific attention to rural economic interests, energy security, and environmental sustainability and protection. These strategic plans shall be compatible with the national goal of

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producing safe and affordable supplies of food, feed, and fiber in a way that is sustainable and protects the environment, and shall include measurable objectives. Specifically, these strategic plans shall cover the following areas:

(1) biobased products, including commercial and industrial chemicals, pharmaceuticals, products with large carbon sequestering capacity, and other materials; and

(2) biomass used in the production of energy (electricity; liquid, solid, and gaseous fuels; and heat).

(d) To ensure that the United States takes full advantage of the potential economic and environmental benefits of bio-energy, these strategic plans shall be based on analyses of:

(1) the economic impacts of expanded biomass production and use; and (2) the impacts on national environmental objectives, including reducing greenhouse gas emissions. Specifically, these plans shall include:

(1) a description of priorities for research, development, demonstration, and other investments in biobased products and bioenergy;

(2) a coordinated Federal program of research, building on the research budgets of each participating agency; and

(3) proposals for using existing agency authorities to encourage the adoption and use of biobased products and bioenergy and recommended legislation for modifying these authorities or creating new authorities if needed.

(e) The first annual strategic plan shall be submitted to the President within 8 months from the date of this order.

(f) The Council shall coordinate its activities with actions called for in all relevant Executive orders and shall not be in conflict with proposals advocated by other Executive orders.

Sec. 3. Establishment of Advisory Committee on Biobased Products and Bioenergy. (a) The Secretary of Energy shall establish an "Advisory Committee on Biobased Products and Bioenergy" ("Committee"), under the Federal Advisory Committee Act, as amended (5 U.S.C. App.), to provide information and advice for consideration by the Council. The Secretary of Energy shall, in consultation with other members of the Council, appoint up to 20 members of the advisory committee representing stakeholders including representatives from the farm, forestry, chemical manufacturing and other businesses, energy companies, electric utilities, environmental organizations, conservation organizations, the university research community, and other critical sectors. The Secretary of Energy shall designate Co-Chairs from among the members of the Committee.

(b) Among other things, the Committee shall provide the Council with an independent assessment of:

- (1) the goals established by the Federal agencies for developing and promoting biobased products and bioenergy;
- (2) the balance of proposed research and development activities;
- (3) the effectiveness of programs designed to encourage adoption and use of biobased products and bioenergy; and
- (4) the environmental and economic consequences of biobased products and bioenergy use.

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Sec. 4. Administration of the Advisory Committee. (a) To the extent permitted by law and subject to the availability of appropriations, the Department of Energy shall serve as the secretariat for, and provide the financial and administrative support to, the Committee.

(b) The heads of agencies shall, to the extent permitted by law, provide to the Committee such information as it may reasonably require for the purpose of carrying out its functions.

(c) The Committee Co-Chairs may, from time to time, invite experts to submit information to the Committee and may form subcommittees or working groups within the Committee to review specific issues.

Sec. 5. Duties of the Departments of Agriculture and Energy. The Secretaries of the Departments of Agriculture and Energy, to the extent permitted by law and subject to the availability of appropriations, shall each establish a working group on biobased products and biobased activities in their respective Departments. Consistent with the Federal biobased products and bioenergy strategic plans described in sections 2(c) and (d) of this order, the working groups shall:

- (1) provide strategic planning and policy advice on the Department's research, development, and commercialization of biobased products and bioenergy; and
- (2) identify research activities and demonstration projects to address new opportunities in the areas of biomass production, biobased product and bioenergy production, and related fundamental research.

The chair of each Department's working group shall be a senior official who reports directly to the agency head. If the Secretary of Agriculture or Energy serves on the Interagency Council on Biobased Products and Bioenergy through a designee, the designee should be the chair of the Department's working group.

Sec. 6. Establishment of a National Biobased Products and Bioenergy Coordination Office. Within 120 days of this order, the Secretaries of Agriculture and Energy shall establish a joint National Biobased Products and Bioenergy Coordination Office ("Office") to ensure effective day-to-day coordination of actions designed to implement the strategic plans and guidance provided by the Council and respond to recommendations made by the Committee. All agencies represented on the Council, or that have capabilities and missions related to the work of the Council, shall be invited to participate in the operation of the Office. The Office shall:

(a) serve as an executive secretariat and support the work of the Council, as determined by the Council, including the coordination of

multi-agency, integrated research, development, and demonstration ("RD&D") activities;

(b) use advanced communication and computational tools to facilitate research coordination and collaborative research by participating Federal and nonfederal research facilities and to perform activities in support of RD&D on biobased product and bioenergy development, including strategic planning, program analysis and evaluation, communications networking, information and data dissemination and technology transfer, and collaborative team building for RD&D projects; and

(c) facilitate use of new information technologies for rapid dissemination of information on biobased products and

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bioenergy to and among farm operators; agribusiness, chemical, forest products, energy, and other business sectors; the university community; and public interest groups that could benefit from timely and reliable information.

Sec. 7. Definitions. For the purposes of this order:

(a) The term "biomass" means any organic matter that is available on a renewable or recurring basis (excluding old-growth timber), including dedicated energy crops and trees, agricultural food and feed crop residues, aquatic plants, wood and wood residues, animal wastes, and other waste materials.

(b) The term "biobased product," as defined in Executive Order 13101, means a commercial or industrial product (other than food or feed) that utilizes biological products or renewable domestic agricultural (plant, animal, and marine) or forestry materials.

(c) The term "bioenergy" means biomass used in the production of energy (electricity; liquid, solid, and gaseous fuels; and heat).

(d) The term "old growth timber" means timber of a forest from the late successional stage of forest development. The forest contains live and dead trees of various sizes, species, composition, and age class structure. The age and structure of old growth varies significantly by forest type and from one biogeoclimatic zone to another.

Sec. 8. Judicial Review. This order does not create any enforceable rights against the United States, its agencies, its officers, or any person.

WILLIAM J. CLINTON

THE WHITE HOUSE,
August 12, 1999.



Jeb Bush
Governor

Department of Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
August 5, 1999

David B. Struhs
Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Farzie Shelton, Manager
Environmental Licensing & Permitting
Lakeland Electric & Water Utilities
501 East Lemon Street
Lakeland, Florida 33801-5079

Re: DEP File No. 1050004-007-AC (PSD-FL-008)
McIntosh Unit No. 3, Harvested Biomass

Dear Ms. Shelton:

We received your application on July 9, 1999 regarding the proposed plan to plant and harvest energy crops. We enjoyed meeting with you and your consultant regarding this issue. We fully appreciate the purpose of the project. Before acting on it we will need responses to the following questions and comments:

- Please resubmit the emissions comparisons on a lb/million Btu heat input basis or a lb/MW generated basis.
- Include carbon monoxide. It appears that the material assumed has relatively high CO emissions characteristics based on our inspection of AP-42.
- This action would not be to clarify that harvested energy crops may be used as fuel. We agree that refuse is permitted.
- Introduction of the term "biomass" for refuse can be problematical. Biomass, for example, can also mean sewage sludge. Please recommend the precise language that you want to be introduced into the permit and make it as narrow as possible.

We agree with the objectives of the program and request that you provide a bit more information about it, such as DOE and EPA information that you appear to have reviewed as well as the full scope of the City's plan. In the meantime, we will send the request to EPA so that they can review the request. They issued the original PSD permit, although we revised it a few years ago to expand the fuel slate and adjust the Best Available Control Technology determination.

If you have any questions regarding this matter, please contact me at 850/921-9523.

Sincerely,

A. A. Linero, P.E. Administrator
New Source Review Section

AAL/aal

cc: Gregg Worley, EPA
John Bunyak, NPS
Buck Oven, PPSO
Ken Kosky, P.E. Golder Associates

"Protect, Conserve and Manage Florida's Environment and Natural Resources"

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):

- Addressee's Address
- Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
*Fazie Shelton
 Lakeland Electric & Water
 501 E. Lemon St.
 Lakeland, FL 33801-5079*

4a. Article Number
2333 618 121

4b. Service Type

<input type="checkbox"/> Registered	<input checked="" type="checkbox"/> Certified
<input type="checkbox"/> Express Mail	<input type="checkbox"/> Insured
<input type="checkbox"/> Return Receipt for Merchandise	<input type="checkbox"/> COD

7. Date of Delivery
8-5-99

5. Received By: (Print Name)

6. Signature: (Addressee or Agent)
Bonnie Breen

8. Addressee's Address (Only if requested and fee is paid)

PS Form 3811, December 1994 102595-98-B-0229 Domestic Return Receipt

Is your RETURN ADDRESS completed on the reverse side?

Thank you for using Return Receipt Service.

Z 333 618 121

US Postal Service
Receipt for Certified Mail
 No Insurance Coverage Provided.
 Do not use for International Mail (See reverse)

Sent to	<i>Fazie Shelton</i>
Street & Number	<i>Lakeland Electric</i>
Post Office, State, & ZIP Code	<i>Lakeland FL</i>
Postage	\$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	\$
Postmark or Date	<i>1050004-007-AC 8-6-99 PSO-FL-008</i>

PS Form 3800, April 1995



Farzie Shelton, chE; REM

Environmental Affairs Manager of Licensing & Permitting

July 23, 1999

RECEIVED

JUL 26 1999

Mr. Hamilton S. Oven
Administrator
Office of Siting Coordination
Florida Department of Environmental Protection
2600 Blair Stone Road, MS 48
Tallahassee, FL 32399

BUREAU OF AIR REGULATION

Re: Lakeland Electric; McIntosh Unit No.3 – PA 74-06
Request to Modify Conditions of Certification

Dear Mr. Oven:

On June 14, 1999, the City of Lakeland, Department of Electric Utilities (Lakeland) filed its Application for Site Certification for the McIntosh Unit. No. 5 Steam Cycle Project. As part of that application, Lakeland proposed modifications of the separate conditions of certification for the existing McIntosh Unit. No. 3. Pursuant to our recent discussions, Lakeland agrees with your suggestion that these changes to Unit No. 3 be processed as a separate modification of certification, pursuant to section 403.516, Florida Statutes. The handling of the Unit No. 3 changes as a separate modification from the Unit No.5 certification would allow a more timely and expeditious review of those changes and avoid unnecessarily confusing issues between the two projects. Accordingly, Lakeland is writing to request that the proposed modifications to the McIntosh Unit No.3 certification be addressed as a separate modification of certification under Section 403.516, Florida Statutes.

Specifically, in the McIntosh Unit No.5 site certification application, (pages 1-4 to 1-6, attached), Lakeland identified two modifications to the certification for McIntosh Unit No. 3. First, Lakeland requested that existing Condition of Certification XVI concerning evaluation of reuse water used in the Unit No. 3 cooling tower be modified based upon recent improvements to the City's domestic waste water plants that supply reuse water for that unit. Second, Lakeland requested that the Site Certification for Unit No. 3 be modified to authorize the use of harvested biomass in that unit. McIntosh Unit 3, as you may recall, is currently authorized to burn refuse/refuse-derived fuel in quantities up to 10 percent of the total heat input, which includes some forms of biomass such as yard trimmings, tree trimmings, etc. The use of purposely cultivated or other forms of biomass as a fuel in Unit 3 would be identical to the use of yard trimmings from both combustion and air emission perspectives. Whether the biomass is a yard waste or a specially planted and harvested crop should not prejudice its use as an authorized fuel for Unit 3. Lakeland is therefore requesting a Site Certification modification reflecting that the use of other forms of biomass is also authorized.

Lakeland has separately requested the same authorization: use of harvested biomass in Unit 3, for its Prevention of Significant Deterioration (PSD) Permit No. PSD-FL-008. Based on Site Certification General Condition 12.b. and Rule 62-17.211(4), F.A.C., Lakeland understands that the PSD permit revision will act as an automatic modification of the Conditions of Certification. Lakeland therefore requests that all modifications for Unit 3's Site Certification be combined to simplify the process and avoid any unnecessary duplication of effort.

Lakeland understands that previously submitted fees for modification of the Site Certification are sufficient to cover the costs associated with this request and that there is no cost for the conforming modification. If this is not the case, please let me know.

City of Lakeland ● Department of Electric

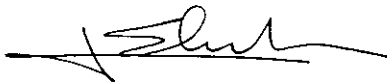
Mr. Hamilton S. Owen
Administrator
Office of Siting Coordination
Florida Department of Environmental Protection

July 23, 1999

Your suggestion is appreciated and Lakeland looks forward to working with you and the staff of the various participating agencies in the review of this request. Should you have any questions, please do not hesitate to contact me.

Sincerely,

Farzie Shelton



cc: Steven Palmer, FDEP Siting Office
Scott Goorland, FDEP Office of General Counsel
All Parties to Site Certification PA74-06-SR, McIntosh Unit No. 3

Enc.

City of Lakeland ● Department of Electric

of the Westinghouse 501G to a combined cycle unit will result in one of the most efficient units operating in the state of Florida and will add 120 MW of new generating capacity without increasing fuel costs or air emissions.

1.5 BENEFITS OF THE PROJECT

With the conversion to combined cycle, Lakeland will realize several benefits, including:

- A 120 MW increase in generation with no additional fuel requirements;
- The combined cycle unit that will meet the emission standards specified in the existing permit (9 ppm NO_x by May 2002);
- The Project site is located on previously cleared industrial land, therefore yielding an increase in power capacity with no new impacts;
- The Unit No. 5 combined cycle will be one of the most efficient units in the state of Florida; and will meet the forecasted energy requirements for the service territory.

1.6 PSC APPROVAL

A petition for need was filed with the Public Service Commission on January 6, 1999. The PSC approved the City's request at a hearing on April 1, 1999 and issued its affirmative determination of need for the Project on May 10, 1999 (attached in Appendix 10.4.3). In its order determining need, the PSC found that the combined cycle conversion Project is the most cost effective alternative for Lakeland both to meet its need for reliability of its electrical system and to meet the established environmental permitting requirements. Conversion of Unit 5 to combined cycle operation will expand Lakeland's natural gas-fired generating capacity to 76 percent of the City's total electrical generating capacity. Use of oil as a backup fuel will reduce the risk that may occur with a shortage of natural gas or spikes in the price of natural gas. No energy conservation measures exist that would affect the need for the Plant.

By this application, Lakeland is requesting the following:

- That the Siting Board issue an order approving the construction and operation of McIntosh Unit 5 as a combined cycle unit, by conversion of the existing simple cycle CT, pursuant to Section 403.509, F.S.;
- That the existing conditions of certification be modified, pursuant to Section 403.516, F.S., to delete Condition of Certification XV for McIntosh Unit 3, concerning evaluation of the reuse water used in the Unit 3 cooling tower, because Lakeland has recently improved the domestic wastewater treatment plants that supply reuse water to Unit 3 and Rule 62-610 F.A.C. does not require such studies for existing cooling towers; or new cooling towers with a 300 ft. property boundary setback utilizing secondary treated reuse water; and
- That the existing conditions of certification for McIntosh Unit 3 be modified, pursuant to Section 403.516, F.S., to clarify that the use of refuse as a fuel in that Unit includes the use of biomass delivered to Unit 3.

Lakeland requests that the conditions of certification for McIntosh Unit 3 be modified to authorize the use of "biomass" as a fuel to supplement refuse/refuse-derived fuel, which may constitute no more than 10 percent of the total heat input for the unit. Currently refuse/refuse-derived fuel up to 10 percent of the total heat input is authorized under the certification for Unit 3, and refuse/refuse-derived fuel includes yard wastes (e.g., tree trimmings, yard clippings, etc.). The type of biomass that Lakeland requests approval to use as a fuel in Unit 3 is virtually identical to yard wastes but may not be considered a refuse/refuse-derived fuel since it could include energy crops (plants specifically planted and harvested for energy recovery) as well as agricultural and wood wastes. The use of "biomass" as a fuel is known as a "renewable" energy form and is currently being promoted by the United States Department of Energy (DOE). In fact, Lakeland plans to participate in DOE's financial incentive program entitled "The Renewable Energy Production Incentive" that is part of the Federal Energy Policy Act of 1992. This DOE program promotes increases in the generation and utilization of electricity from

renewable energy sources, such as biomass, and provides financial incentive payments to qualifying facilities.

The use of biomass as a fuel for energy production is favored not only by DOE as an alternate fuel source but also by EPA because of the reductions in sulfur dioxide emissions which cause acid deposition and because of the low carbon content which reduces greenhouse gas emissions that may lead to global warming. The use of biomass in Unit 3 would displace the use of coal, which has much higher carbon and sulfur contents. While Unit 3 is authorized to utilize refuse/refuse-derived fuel in quantities up to 10 percent of the total heat input rate and the biomass would be part of this 10 percent, historically lower quantities of refuse/refuse-derived fuels have been utilized in McIntosh Unit 3 and those quantities are not anticipated to decrease as a result of the use of biomass. Rather, the quantity of refuse/refuse-derived fuel used is expected to remain constant, allowing the use of biomass to displace the use of coal.

Because air emissions are not expected to increase as a result of combusting biomass in Unit 3, no additional air quality analyses have been performed, and Lakeland requests that the Conditions of Certification be revised to reflect biomass as an alternative fuel for Unit 3. A separate request to revise the Prevention of Significant Deterioration (PSD) permit for Lakeland's McIntosh Unit 3 will be submitted.



Farzie Shelton, chE; REM

Environmental Affairs Manager, Licensing & Permitting

RECEIVED
JUL 09 1999
BUREAU OF AIR REGULATION

July 8, 1999

Clair H. Fancy, P.E., Chief
Bureau of Air Regulation
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399

RE: C.D. McIntosh, Jr. Power Plant, Unit No. 3
Request to Revise Permit No. PSD-FL-008
Use of Harvested Biomass as Fuel

1050004-007-AC
PSD-FL-008(b)

Dear Mr. Fancy:

The City of Lakeland Department of Electric Utilities (Lakeland) requests revision to the above-referenced Prevention of Significant Deterioration (PSD) permit for the C.D. McIntosh, Jr. Power Plant Unit No. 3. This revision will clarify that specially planted and harvested energy crops as well as agricultural and wood wastes may be used as a fuel for Unit 3. Lakeland has separately requested that the Conditions of Certification for Unit 3 also be revised to make this clarification.

McIntosh Unit 3, as you may recall, is currently authorized to burn refuse/refuse-derived fuel in quantities up to 10 percent of the total heat input. Presently Unit 3 is permitted and authorized to utilize, as fuel, some forms of biomass such as yard trimmings, tree trimmings, etc. The use of purposely cultivated or other forms of biomass as a fuel in Unit 3 would be identical to the use of yard trimmings from both combustion and air emission perspectives. Therefore, Lakeland is requesting an administrative clarification in both the PSD permit and Site Certification that the use of other forms of biomass is also authorized. Whether the biomass is a yard waste or a specially planted and harvested crop should not prejudice its use as an authorized fuel for Unit 3.

As you are well aware, the use of biomass as a fuel for the generation of electricity is currently favored by the U.S. Department of Energy (DOE) as well as the U.S. Environmental Protection Agency (EPA). Both DOE and EPA favor biomass as fuel because it is a renewable source of energy that generally has lower emissions of sulfur dioxide, nitrogen oxides, particulate matter, and carbon dioxide (as well as other parameters) than fossil fuels. While the use of non-waste biomass should not constitute a physical or operational change for Unit 3 since some biomass is currently being utilized, no emissions increase would result and therefore a modification is not triggered. As shown in the attached summary by Ken Kosky of Golder and Associates, biomass has lower uncontrolled emissions than other forms of refuse/refuse derived fuel, coal, petroleum coke, or fuel oil (all fuels authorized to be used in Unit 3).

City of Lakeland ● Department of Electric

July 8, 1999

Clair H. Fancy, P.E., Chief
Bureau of Air Regulation
Florida Department of Environmental Protection

Lakeland simply requests that the PSD permit conditions and Site Certification clarify that "biomass," regardless of its origin, is an authorized fuel as part of "refuse/refuse-derived fuel" (in quantities not to exceed 10 percent of the total heat input).

Thank you for your attention to this request. If you have any questions or need any further information to complete your review, please call me at 941-834-6603.

Sincerely,



Farzie Shelton, ChE

Enclosures

cc: A. A. Linero, DEP-BAR
Buck Oven, DEP-Siting Coordination
Steve Palmer, DEP-Siting Coordination
Ronald Tomlin, Lakeland
Ken Kosky, Golder
Angela Morrison, HGSS

Page 2

City of Lakeland ● Department of Electric

CITY OF LAKELAND - MCINTOSH UNIT 3 (PSD-FL-008)

AUTHORIZATION FOR BIOMASS

(July 7, 1999)

The City of Lakeland Department of Electric Utilities (Lakeland) is requesting revision to the PSD permit and Conditions of Certification for the C.D. McIntosh, Jr. Power Plant Unit No. 3. Specifically, this revision is to clarify that vegetative crops specifically planted and harvested for energy recovery can be burned along with other forms of biomass such as agricultural and wood wastes to supplement the refuse/refuse derived fuel already authorized for this unit.

Lakeland is currently authorized to use and typically uses at least some forms of biomass as a "refuse/refuse-derived fuel." The total amount of refuse/refuse derived fuel including all forms of biomass would not exceed the amounts currently authorized (10 percent of the total heat input). From emissions, process input, and applicable requirement perspectives, Lakeland's request to use other types of biomass as a fuel is consistent with this current authorization. There will be no change in any applicable requirement for the facility nor will actual or potential emissions increase.

The amount of refuse/refuse derived fuel identified in the Site Certification Application for Unit 3 was based on 4,500 Btu/lb. This is identical to the average expected heat content of energy crops and very similar to wood waste identified in Section 1.6 of AP-42. Moreover, these forms of biomass would be expected to have lower uncontrolled emissions than other types of either refuse/refuse derived fuel or coal based on information available in AP-24. A comparison of uncontrolled emission factors is presented in Table 1.

GOLDER ASSOCIATES INC.



Kennard F. Kosky

Principal

Professional Engineer Registration No. 14996

July 7, 1999

KFK/jkk

SEAL 7/5

Table 1. Example of Uncontrolled Emission Factors for Particulate Matter (PM), Sulfur Dioxide (SO₂), and Nitrogen Oxides (NO_x)

Fuel	Emission Factor (lb/ton)			Reference
	PM	SO ₂	NO _x	
Biomass ^a	8.8	0.1	1.5	AP-42 Section 1.6
Refuse-Derived Fuel	69.6	3.9	5.02	AP-42 Section 2.1
Coal	80	38	12	AP-42 Section 1.1

^aAssumed to be similar to wood waste for purposes of comparison.



POWER PRODUCTION
McINTOSH POWER PLANT
3030 E. LAKE PARKER DR.
LAKELAND, FLORIDA 33805

ph: (941) 499-6600
FAX: (941) 603-6335

TELECOPY REQUEST COVER PAGE

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AL:
As per your request, attached is the important pages for our 1998 stack testing results in accordance with the requirements of 40 CFR 52.21(b)(21)(V), (b)(33), and 40 CFR 52.21(b)(33). Please let me know if you need any more info.

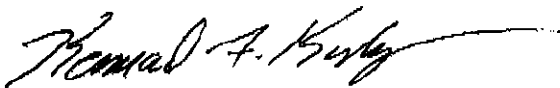
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**City of Lakeland McIntosh Unit 3
PSD-FL-008(B); PA 74-06
Co-Firing of Coal and Petroleum Coke
Emissions of Sulfuric Acid Mist
Compliance Certification**

This certification addresses the requirements of Specific Condition 9 of the Prevention of Significant Deterioration (PSD) regarding the increase of emissions when co-firing petroleum coke and coal. As required by Specific Condition 9, information must be submitted to demonstrate that operational changes did not result in emissions increases of Sulfuric Acid Mist (H_2SO_4). In accordance with 40 CFR 52.21 (b)(21)(v) and (b) (33) and 40 CFR 52.21 (b) (33), for an electric steam generating unit the emissions resulting from increased utilization due to electric demand is not included in calculating any emissions increase. Since McIntosh Unit 3 is a base load unit and its operation is not affected by co-firing petroleum coke and coal, the appropriate comparison is the emissions rates when co-firing petroleum coke with coal and firing coal only.

The results of tests conducted in December 1998 to determine H_2SO_4 emissions are summarized in Table 1. The procedure used to evaluate all the H_2SO_4 data was that provided in 40 CFR Part 60 Appendix C for determining an emission change under EPA regulations. The upper and lower confidence intervals are determined using Student's "t" test, which is commonly used to compare the means of small sample sizes. This procedure can account for operational variability associated with emission rates and provide a statistical comparison for determining whether differences between mean values exist at a specified confidence level.

Table 1 also presents the average (mean), standard deviation and the upper and lower 95 percent confidence interval of the mean values. The statistical evaluation was conducted for both mass emissions in pounds per hour (lb/hr) and concentration in parts per million (ppm). The statistical evaluation shows that the confidence intervals overlap and that there is no statistically significance difference between the means of the coal only tests and the tests conducted while co-firing petroleum coke and coal. This suggests no statistically significant difference in annual emissions when co-firing coal and petroleum coke.



Kennard F. Kosky, P.E.
Principal
Florida Professional Engineer License No. 14996
July 7, 1999

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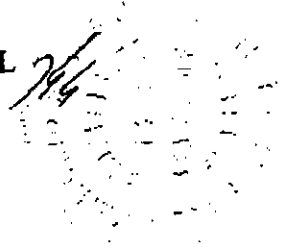


Table 1. Statistical Evaluation of Sulfuric Acid Mist Emissions (lb/hr and ppm) for City of Lakeland McIntosh Unit 3 When Firing Coal and Co-Firing Coal and Petroleum Coke

	Coal (lb/hr)	Coal/Petroleum Coke (lb/hr)	Coal (ppm)	Coal/Petroleum Coke (ppm)
Test Run 1	34.30	23.60	2.70	2.00
Test Run 2	20.14	32.59	1.70	2.70
Test Run 3	24.90	29.50	2.00	2.30
Average	26.45	28.56	2.13	2.33
Standard Deviation	7.21	4.57	0.51	0.35
Upper Confidence Interval ^a	38.59	36.26	3.00	2.93
Lower Confidence Interval ^a	14.30	20.86	1.27	1.74
Are Means Statistically Different?	No	No	No	No

^aBased on 40 CFR Appendix C using "Student T" Distribution

$$\text{Confidence Interval} = \text{Average} \pm T \times \text{Standard Deviation} / (N)^{1/2}$$

where: T = the value of the "T" distribution at 95% and N-1
degrees of freedom: 2.92

1.0 Introduction

Catalyst Air management, Inc. (Catalyst) was contracted by the City of Lakeland to perform the annual compliance testing for sulfuric acid mist emissions at C.D. McIntosh Power Plant Unit 3, in Lakeland, FL.

The sampling program was conducted December 15 and 16, 1998. The testing was performed by Messers. Mike Taylor and Steve Webb of Catalyst, with the assistance of personnel assigned by the City of Lakeland. Mr. John Guisseppi of Lakeland coordinated plant operation during the testing.

2.0 Summary of Test Results

A summary of test results developed by this source sampling program are presented in Tables 1 and 2. The summary tables are presented as follows:

<u>Table</u>	<u>Description</u>	<u>Page</u>
1	Summary of Sulfuric Acid Mist Emissions	1
2	Isokinetic Summary – Coal	2
3	Isokinetic Summary – Coal/Petroleum Coke	3

TABLE 1
Summary of Sulfuric Acid Mist Emissions
C.D. McIntosh Power Plant
Unit 3

Fuel	Acid Mist (ppm)	Acid Mist (gr/dscf)	Acid Mist (lb/hr)
Coal	2.1	4.41E-07	26.45
Coal/Pet Coke	2.4	4.90E-07	28.56

3.0 Results of Testing

The individual test run results are shown in Tables 2 and 3, and are tabulated in Appendix 1.

4.0 Description Of Combustion Units

McIntosh Unit 3 is a steam generating utility boiler. The unit is permitted to burn natural gas, No. 6 residual fuel oil, bituminous coal, and co-fired with refuse derived fuel (RDF) and petroleum coke at a maximum heat input rate of 3,640 MMBtu/hr. The rated generation capacity of the turbine/generator is approximately 364 MW gross. The flue gas from the unit is passed through an electrostatic precipitator and wet scrubber for control of particulate and SO₂ emissions. Low Nox burners are used to control NOx emissions. The flue gas is exhausted into the Unit 3 stack.

TABLE 2
Isokinetic Summary - Coal

Client: **City of Lakeland**
Plant: **McIntosh Unit 3**
Location: **Stack**

Run Number:	1-Coal	2-Coal	3-Coal
Date:	12/15/98	12/15/98	12/15/98
Run Time: Start	10:36	12:26	14:11
End	11:56	13:37	15:23
DN - Nozzle Diameter:	0.191	0.191	0.191
Pbar - Barometric Pressure:	29.99	29.99	29.99
TT - Sampling Time:	60	60	60
VM - Meter Volume:	45.512	42.502	42.59
TM - Avg. Meter Temp(F):	66	68	69
PM - Avg. Delta H (in. of H2O):	1.602	1.423	1.496
Y - Meter Calibration Factor:	1.01	1.01	1.01
VMSTD - Std. Gas Volume (SCF):	46.393	43.123	43.143
Vlc - Volume Water Collected:	102	93	88
%M - Percent Moisture:	9.4	9.2	8.8
Bws - Mole Fraction, Dry:	0.09	0.09	0.09
%CO2 - Carbon Dioxide, Dry:	11.6	11.6	11.6
%O2 - Oxygen, Dry:	7.7	7.7	7.7
MD - Dry Molecular Weight:	30.16	30.16	30.16
MS - Wet Molecular Weight:	29.02	29.04	29.10
A - Stack Area, SQ.FT:	271.84	271.84	271.84
PS - Static Press. (in. of H2O):	30.03	30.03	30.04
TS - Stack Temp. (F):	153	160	159
CP - Pitot Coefficient:	0.84	0.84	0.84
VS - Stack Gas Velocity (AFPS):	79.6	77.0	78.4
QS - Stack Gas Volume (DSCFM):	1,016,982	974,469	998,444
QA - Stack Gas Volume (ACFM):	1,298,882	1,255,544	1,278,971
%I - Isokinetic Ratio:	103.9	100.8	98.4
H2SO4/SO3			
PPM - Emission Concentration:	2.7	1.7	2.0
Gr/DSCF - Emission Concentration:	5.62E-07	3.44E-07	4.16E-07
LBS/HR - Emission Rate:	34.30	20.14	24.90
	Average PPM	2.1	
	Average Gr/DSCF	4.41E-07	
	Average LBS/HR	26.45	

TABLE 3
Isokinetic Summary - Coal/Petroleum Coke

Client: City of Lakeland
Plant: McIntosh Unit 3
Location: Stack

Run Number:	1-Pet Coke	2-Pet Coke	3-Pet Coke
Date:	12/16/98	12/16/98	12/16/98
Run Time: Start	14:10	16:00	20:58
End	15:21	17:11	22:08
DN - Nozzle Diameter:	0.181	0.181	0.181
Pbar - Barometric Pressure:	29.98	29.98	29.98
TT - Sampling Time:	60	60	60
VM - Meter Volume:	37.292	38.393	39.587
TM - Avg. Meter Temp(F):	65	67	63
PM - Avg. Delta H (in. of H2O):	1.331	1.398	1.556
Y - Meter Calibration Factor:	1.02	1.02	1.02
VMSTD - Std. Gas Volume (SCF):	38.457	39.441	41.011
Vlc - Volume Water Collected:	73	80	88
%M - Percent Moisture:	8.2	8.7	9.2
Bws - Mole Fraction, Dry:	0.08	0.09	0.09
%CO2 - Carbon Dioxide, Dry:	11.1	11.1	11.1
%O2 - Oxygen, Dry:	8.1	8.1	8.1
MD - Dry Molecular Weight:	30.10	30.10	30.10
MS - Wet Molecular Weight:	29.11	29.04	28.99
A - Stack Area, SQ.FT:	271.84	271.84	271.84
PS - Static Press. (in. of H2O):	30.02	30.02	30.02
TS - Stack Temp. (F):	173	175	169
CP - Pitot Coefficient:	0.84	0.84	0.84
VS - Stack Gas Velocity (AFPS):	75.6	77.2	80.8
QS - Stack Gas Volume (DSCFM):	946,748	960,030	1,008,490
QA - Stack Gas Volume (ACFM):	1,232,342	1,259,682	1,317,676
%I - Isokinetic Ratio:	103.1	104.2	103.2
H2SO4/SO3			
PPM - Emission Concentration:	2.0	2.7	2.3
Gr/DSCF - Emission Concentration:	4.15E-07	5.66E-07	4.88E-07
LBS/HR - Emission Rate:	23.60	32.59	29.50
	Average PPM	2.4	
	Average Gr/DSCF	4.90E-07	
	Average LBS/HR	28.56	