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February 3, 1999

Blanca Bayo
Records and Reporting
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, FL 32399-0850

Re: Docket # 990023-EM - Petition by City of Lakeland for determination of need for McIntosh Unit 5 and proposed conversion from simple to combined cycle.

Dear Ms. Bayo:

Enclosed find original and 15 copies of Pre-Filed Testimony for the following:

ACK 4

1. R. Siegel
2. P. Elwing
3. G. Lawrence
4. R. Sanz-Guerrero
5. D. Runyan
6. M. Rollins
7. D. McLain

RECEIVED & FILED
FPSC-BUREAU OF RECORDS

Also, enclosed find Diskette.

Thank you.

Very truly yours,

Roy C. Young

RCY:swp
Enclosures
cc: Cochran Keating (w/o enclosures)

swp\Lakeland\Bayo.203

DOCUMENT NUMBER-DATE
01365 FEB-3 99
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Public Service Commission
PREFILED TESTIMONY AND EXHIBITS

LAKELAND ELECTRIC & WATER

Excellence Is Our Goal, Service Is Our Job

Photo courtesy of Florida Aerial Services, Inc.

C. D. McIntosh
Unit 5 Combined Cycle

BLACK & VEATCH

BEFORE THE PUBLIC SERVICE COMMISSION

CITY OF LAKELAND

TESTIMONY OF ROBERT G. SIEGEL

DOCKET NO. 990023-EM

FEBRUARY 3, 1999

Q Please state your name and address.

A My name is Robert G. Siegel. My business address is 501 East Lemon Street; Lakeland, Florida 33801.

Q By whom are you employed and in what capacity?

A I am employed by the City of Lakeland – Department of Electric Utilities as Managing Director.

Q Please describe your responsibilities in that position.

A I am responsible for Directing all activities relating to the operation of the Department of Electric Utilities. I am responsible for all activities with regard to generation, transmission, and distribution. I am responsible for reporting to the City Commission any new projects that will require the use of new funds for construction.

Q Please state your professional experience and educational background.

A I received a Bachelors of Science degree in Electrical Engineering from University of Miami, Miami Florida. I am also a registered Professional Engineer in the State of Florida.

I have held various positions in the electric utility business over the 42 years of my experience. Of the 42 years, 34 years have been with Lakeland and I have held the Managing Director position since 1982. I have also served as the Assistant Director, Electric Transmission & Distribution Manager, and Power Plant Engineer while working for Lakeland.

Q What is the purpose of your testimony in this proceeding?

A The primary purpose of my testimony is to provide a general description of the project and discuss the need for power that McIntosh Unit 5 and the proposed conversion to combined cycle will fulfill.

Q Please state Lakeland's general philosophy with respect to supplying energy to their existing and future customers.

A Lakeland strives to provide the most cost-effective methods of generation possible to its customers consistent with consideration for reliability and the environment. This is accomplished by reducing costs of operation while maintaining a reliable system. Some of the key factors that impact our systems costs include the efficiency of our units, reliability, maintenance activities required to maintain the units, age of the existing units, and environmental impacts of operating the units. Lakeland analyzes on a continual basis what can be done to meet its goals. The analysis considers new generating opportunities, power purchase contracts, fuel procurement, unit retirements, reliability considerations, and overall cost-effectiveness.

Q Please briefly describe the development of the Project.

A In 1995 Lakeland projected its generating capacity would fall below the required 15 percent reserve margin by winter of 1997/98. To offset the capacity shortfall in 1998, 1999, and 2000, Lakeland's strategy was to purchase from the marketplace, as it was generally a "buyer's market". In late 1996, bids were solicited for 3 to 5 year capacity purchases and many proposals were received. Two contracts were finalized from the bids 1) ENRON contract for 20 MW expiring on December 31, 2001 and 2) TECO contract for 10 MW expiring on September 30, 2006.

During the same time period, discussions were initiated with Foster Wheeler and the Department of Energy (DOE) to site a demonstration project at Lakeland under the Federal Clean Coal Program for a second generation Pressurized Circulating Fluidized Bed (PCFB) coal unit with a capacity of 175 MW for commercial operation in early 2000. In October 1996 Lakeland was awarded $195 million under the Federal Clean Coal Program by Under Secretary, Patricia F. Godley, at the U.S. Department of Energy.

In December 1996, having just received the DOE funding, the plan was to have an Engineer/Procure/Construct (EPC) contract in place by February 1997 with Foster Wheeler. The critical path was permitting this unit under the Florida Electrical Power Plant Siting Act including the Florida Public Service Commission Determination of Need.

In order to ensure the project was the least-cost alternative, an Invitation for Proposals (IFP) was issued in late February 1997 requesting bids for 200 MW

over 20 years for capacity and energy. Proposals were received from 13 bidders. The external bids for 200 MW were evaluated and ranked, and talks began with the apparent low bidder, Tenaska Energy Partners. Tenaska proposed building a 414 MW (winter rating with supplemental firing) Westinghouse 501G 1x1 combined cycle unit at the McIntosh Plant for commercial operation on January 1, 2001.

Negotiations with Foster Wheeler for the PCFB unit stalled, and in June 1997, Lakeland had still not received a firm proposal. In late June 1997, an unsolicited proposal was received from Westinghouse for Lakeland to be the host site for the first 501G simple cycle combustion turbine for operation in the summer of 1999. Instead of building a combustion turbine unit after the PCFB, it could be done before the PCFB. Because of the 501G's larger size, Lakeland could retire some older, less efficient, and less reliable generating units that have higher emissions while reducing overall generation costs.

In August of 1997 a proposal was finally received from Foster Wheeler on the PCFB unit. The EPC price was considerably more than the "budget" price and the in-service date had slipped to late 2002. It was evident that consummating a deal with Foster Wheeler was going to take considerable time and effort and may not occur in time to meet load growth. The Westinghouse offer was evaluated and determined to be the best alternative available. The decision was made to recommend to the City Commission that purchasing the Westinghouse 501G should be the first step in providing for Lakeland's future generation needs. During August and September 1997, several public City Commission meetings

were held regarding the project. On October 6, 1997, the Lakeland City Commission voted approval (7-0) to buy the Westinghouse 501G simple cycle unit, with an EPC price of $49.189 million. The commission also approved a six-year maintenance contract for $25 million, in which Westinghouse has guaranteed an equivalent availability of 92 percent for the 501G combustion turbine.

The unit is currently under construction as a simple cycle combustion turbine with commercial operation scheduled for July 1999. The conversion to combined cycle with the installation of the steam turbine, heat recovery steam generator (HRSG), and associated equipment is scheduled to start in the summer of 2000 with a commercial operation date for the combined cycle conversion of January 1, 2002. The estimated capital cost of the conversion to combined cycle is $80.5 million.

Q Is the conversion of McIntosh Unit 5 the most economic alternative available to Lakeland at this time?

A Yes, this alternative will produce significant economic benefits to Lakeland and its customers. As Mr. Runyan will testify, McIntosh Unit 5 and its conversion to combined cycle is the least-cost alternative for Lakeland. The conversion of McIntosh Unit 5 to combine cycle is $27.7 million lower in costs than the installation of a new 501F combined cycle unit and $71.9 million lower in cost than the installation of a new 501F simple cycle combustion turbine. The conversion of McIntosh Unit 5 to combined cycle is $21.1 million lower in costs than the lowest cost IFP proposal.

Q Under Section 403.519 of the Florida Statutes, the Electrical Power Plant Siting Act, what are the four key points which must be demonstrated to prove a need for construction of new steam power generation?

A The applicant must demonstrate a need for the proposed power plant, taking into account the following:

- Need for electric system reliability and integrity
- Need for adequate electricity at a reasonable cost
- Demonstration that the proposed plant is the most cost effective alternative
- Demonstration that the need for power has been mitigated by the implementation of all cost effective conservation and demand side alternatives

Q Do you believe McIntosh Unit 5 and the proposed conversion to combined cycle meets the statutory requirements of Florida Statutes 403.519?

A Yes.

Q Has Lakeland demonstrated a need for the proposed power plant, taking into account the need for electric system reliability and integrity?

A Yes. Lakeland has demonstrated McIntosh Unit 5 and the proposed conversion to combined cycle are needed for electric system reliability and integrity. Lakeland has demonstrated a need for capacity in 2002 with a 15 percent reserve margin. McIntosh Unit 5 and the proposed conversion to combined cycle contribute to Peninsular Florida's reliability and integrity, as reserve margins in the state are low and highly dependent upon load management and interruptible contracts. This issue is discussed in detail in the testimony of Mr. Elwing and Mr. Runyan.

Q Has Lakeland demonstrated a need for the proposed power plant taking into account the need for adequate electricity at a reasonable cost?

A Yes. McIntosh Unit 5 and the proposed conversion to combine cycle will provide reliable generation with very low power costs. The unit will be the industry's most efficient combined cycle using clean burning natural gas. This issue is further discussed in the testimony of Mr. Elwing and Mr. Runyan.

Q Has Lakeland demonstrated that the proposed power plant is the most cost-effective alternative available?

A Yes. The costs and performance characteristics of McIntosh Unit 5 and the proposed conversion to combined cycle were provided in the Need for Power application with details including information on the site, design, and engineering characteristics. Lakeland studied several generating technologies including conventional, advanced, and renewable energy sources under base case and sensitivity analyses. McIntosh Unit 5 and the proposed conversion to combined cycle has been selected as the least-cost alternative in the base case and sensitivity analyses against numerous self-build alternatives and feasible power purchase proposals received from the IFP. The significantly discounted price that Lakeland obtained from Westinghouse for hosting the first 501G installation contributes to McIntosh Unit 5's low cost. Furthermore, Lakeland has conducted an IFP process to identify potential power supply alternatives. No feasible alternatives were lower in cost than McIntosh Unit 5. This issue is discussed in more detail in the testimony of Mr. Rollins and Mr. Runyan.

Q Finally, has Lakeland demonstrated that there were no conservation

measures taken by or reasonably available which might mitigate the need for the proposed power plant?

A Yes. Lakeland has always supported cost-effective demand-side management programs. Lakeland evaluated 66 potential conversation and demand-side management programs using the FIRE model to compare against the conversion of McIntosh Unit 5 to combined cycle. No conservation or demand-side management programs proved to be cost-effective based on the FIRE modeling conducted.

Lakeland currently has several conservation and load management programs in place to reduce energy and peak demand and plans to continue those programs. Lakeland is also an active participant in the pursuit of solar power, with four programs in operation. This issue is discussed in more detail in the testimony of Mr. Lawrence and Mr. Runyan.

Q Does McIntosh Unit 5 and the proposed conversion to combined cycle meet Lakeland's strategic considerations in selecting a power supply alternative?

A Yes. In selecting a power supply alternative, a utility must consider certain strategic factors, which reflect the utility's long-term ability to provide economical and reliable electric capacity and energy to its consumers. A number of strategic considerations favor the conversion of McIntosh Unit 5 to combined cycle. These include exceptional efficiency, low installation cost on a $/kW basis, low operating costs, domestically produced fuel, existing site which can support the project capacity, electric industry deregulation, and environmental benefits and risks.

Q Is the timing of Lakeland's petition for need for McIntosh Unit 5 and its proposed conversion to combined cycle appropriate?

A Yes, the timing of the petition is critical for McIntosh Unit 5 conversion to combined cycle for commercial operation for January 1, 2002. The timing is critical because Public Service Commission approval for the conversion of McIntosh Unit 5 is necessary before the project can receive certification under the Florida Electrical Power Plant Siting Act. Certification is necessary before construction activities can begin on the conversion to combined cycle. Furthermore, there are significant economic and reliability impacts if the unit is delayed.

Q Will there be adverse consequences if the proposed conversion to combined cycle is not completed in the time frame requested?

A Yes, there are significant potential reliability and economic impacts if the conversion of McIntosh Unit 5 to combined cycle is not completed for the January 1, 2002 commercial operation. Lakeland's reserve margin will fall below the required 15 percent minimum reserve margin in 2002 if Lakeland's request is not granted. This could lead to potential outages and system failures for Lakeland and Peninsular Florida. The customers will suffer adverse consequences with the possibility of inadequate power supply and potentially very high cost electricity. With the low reserve margins projected for the state in 2002, the potential for insufficient power supplies may exist. Furthermore, there are adverse economic effects if the unit is delayed by even one year.

Q Please summarize what additional testimony will be presented before the Commission today.

A We will be testifying before the Commission in regards to our petition for determination of need for McIntosh Unit 5 and its proposed conversion from simple cycle to combined cycle. The individuals include Paul H. Elwing, Gary T. Lawrence, Rolando Sanz-Guerrero, Daniel J. Runyan, Myron R. Rollins, and David H. McLain. Each of these individuals will adopt portions of the Need for Power Application as part of their prefiled testimony.

Q Does this conclude your testimony?

A Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION

CITY OF LAKELAND

TESTIMONY OF PAUL H. ELWING

DOCKET NO. 990023-EM

FEBRUARY 3, 1999

Q **Please state your name and address.**

A My name is Paul H. Elwing. My business address is 501 East Lemon Street; Lakeland, Florida 33801.

Q **By whom are you employed and in what capacity?**

A I am employed by the City of Lakeland – Department of Electric Utilities as an Electrical Engineer III in the System Control Division.

Q **Please describe your responsibilities in that position.**

A My responsibilities in this position include transmission planning, transmission regulatory oversight at the State and Federal levels, Florida Public Service Commission liaison and non-environmental regulatory permitting for new generation projects.

Q **Please state your professional experience and educational background.**

A. I have a Bachelors Degree in Electrical Engineering from the University of South Florida, Tampa Florida and have been employed in various positions with the City of Lakeland for 19 years. During my tenure with Lakeland I have held the positions of Planning Engineer I, II & III in the System Planning Division for 7

years, Manager of System Planning for 9 years, Electrical Engineer III in the Production Engineering Division for 2 years and most recently Electrical Engineer III in the System Control Division.

While in the System Planning Division my responsibilities included involvement and management of generation planning and supply side studies, fuel conversion studies, demand side studies and analysis including load research, wholesale power purchase/sales analysis and rate development, development of the Annual Fuel Budget, transmission planning including substation sizing and siting, wholesale transmission business development and one of Lakeland's regulatory interfaces for generation and transmission issues at the local, state, and federal levels. In my most recent two positions in the Production Engineering Division and now System Control Division, my responsibilities are primarily related to electric transmission and regulatory interface as described earlier.

In addition to my direct duties with Lakeland, I have served on the following: Florida Electric Power Coordinating Group (FCG), now called the Florida Reliability Coordinating Council (FRCC), Task Forces: Load Management Task Force, Generation Task Force (now referred to as the Resource Working Group), Fuel Price Forecast Task Force, Transmission Task Force (now referred to as the Transmission Working Group), System Planning Committee, Available Transmission Capacity Working Group, and the FRCC Engineering Committee. While on the Transmission Task Force and System Planning Committee I have served as both Vice–Chair and Chairperson of each of those groups.

Q What is the purpose of your testimony in this proceeding?

A The primary purpose of my testimony is to demonstrate that McIntosh Unit 5 and the proposed conversion to combined cycle are needed for both electric system reliability and integrity, as well as the provision of adequate electricity at reasonable costs. In addition, my testimony will provide a general overview of Lakeland's system, a description of the proposed project, a discussion of planned unit retirements, a discussion of Lakeland's power sales contracts, Lakeland's reliability criteria, and the consequences of delay of the project.

Q Were there subsections of the Lakeland McIntosh Unit 5 Need for Power Application prepared by you or under your direct supervision?

A Yes, the Executive Summary, Section 1.0, Section 2.0, Section 3.0, Section 17.0, Sections 18.0 - 18.1, and Section 20.0.

Q Are you adopting these Sections as part of your testimony?

A Yes, I am.

Q Are there any corrections to these Subsections?

A Yes. Attached as Exhibit PHE-1 are minor typographical corrections to my adopted sections of the Need for Power Application including the retirement dates for McIntosh 1 and 2 in Table 3-1. The correct retirement dates were shown on Page 3-8 of the Need for Power Application.

Q Please describe the operations of Lakeland.

A City of Lakeland is a municipal corporation, duly organized, and legally existing

as part of the government of the City of Lakeland with the Department of Electric Utilities, engaged in the generation, transmission, and distribution of electric power.

The City of Lakeland is a member of the Florida Municipal Power Pool (FMPP) with Orlando Utilities Commission (OUC), Kissimmee Utility Authority (KUA), and Florida Municipal Power Agency (FMPA). As part of FMPP, Lakeland shares in the savings for the combined dispatch of the four municipal utilities. While each municipal utility must plan for system capacity additions for their own system, the benefits of McIntosh Unit 5 will be realized by all participants within FMPP.

Q **Please describe the resources currently available to meet Lakeland's capacity and energy requirements.**

A Lakeland's service area is located within Polk County, Florida. In 1999, Lakeland's total installed winter capacity was 649 MW. Lakeland's existing generating units are located at two sites, Charles Larsen Memorial (Larsen) and C. D. McIntosh Jr. (McIntosh). The Larsen plant has five existing units, which burn natural gas and oil. The McIntosh plant has six existing units. Two units are diesels, three units burn natural gas, and Unit 3's primary fuel is coal. A seventh unit is under construction and will be the 249 MW Westinghouse 501G combustion turbine.

Lakeland is interconnected with Florida Power Corporation (FPC), Orlando Utilities Commission (OUC), and Tampa Electric Company (TECO). Lakeland is

connected to the 500 kV transmission network via FPC.

Q **Does Lakeland currently have any purchase power contracts?**

A Effective January 1, 1999, Lakeland entered into a contract with The Energy Authority (TEA)for 20 MW until March 31, 1999. This recent power purchase is not reflected in the Need for Power Application. Lakeland had a contract with ENRON Power for 20 MW expiring on December 31, 2001 and a contract with Tampa Electric Company for 10 MW expiring on September 30, 2006, but by mutual agreement both contracts have been terminated.

Q **What did Lakeland do to replace the capacity?**

A With the winter peak demand period less than a year away, there was no time to install new capacity to meet reserve requirements. The decision was made to temporarily bring Larsen Unit 6 back into service. Larsen Unit 6 is a 27 MW steam unit that was retired in March of 1997. After McIntosh Unit 5 is installed, Larsen Unit 6 will be retired again in March of 1999.

Q **Does Lakeland also sell power to other utilities?**

A Yes. Lakeland currently has two firm power sales contracts. The first contract was negotiated with The Energy Authority (TEA) for a power sale of 25 MW from Larsen Unit 7 from March 1, 1999 to February 28, 2001. Larsen Unit 7 has recently completed a major maintenance outage to replace plugged and damaged boiler tubes that has allowed Lakeland to return the unit back to its nameplate dispatchable capacity of 50 MW from its current derated capacity of 40 MW.

Lakeland originally planned to retire Larsen Unit 7 coincident with the commercial operation of McIntosh Unit 5 in simple cycle. The sale to TEA effectively has TEA pay for retubing the boiler as well as some O&M costs in addition to fuel costs incurred. By making the sale, Lakeland was able to have the unit repaired and maintain its operation for an extended period.

The second contract is with Florida Municipal Power Agency (FMPA) for capacity and energy. The contract is for 50 MW from December 15, 2000 to June 14, 2001; then 100 MW from June 15, 2001 through December 14, 2010. This contract allows FMPA to choose between a system sale or a specific unit. This decision will be made prior to July 1999.

Q Are there any planned retirements for the City of Lakeland?

A Lakeland plans to retire older, less efficient units as new capacity additions provide more cost effective generating units. This will provide Lakeland with generating units that are more efficient, more reliable, and produce fewer emissions on a kWh basis compared to current generating units. This fulfills many of Lakeland's strategic considerations for the future. The following units will be retired over the upcoming years based upon Lakeland's proposed expansion plan.

Unit Name	Current Age	Summer Capacity	Winter Capacity	Anticipated Retirement Date
Larsen CT1	36	10.0	14.0	05/1998
Larsen 6	39	25.0	27.0	03/1999

Larsen 7	32	50.0	50.0	03/2001
McIntosh 1	27	87.0	87.0	10/2002
McIntosh 2	22	103.0	103.0	07/2004

Q What was the reason for retiring these units at this time?

A The reason each of the units are scheduled for retirements is based upon age, economics, and environmental reasons. Each of the identified units will be greater than 27 years old at the time of retirement with some units as old as 39 years. With the vast improvements in generation technology and emission controls, these units are far less reliable and efficient than new generation.

Larsen CT1 was retired on May 4, 1998 when the combustion turbine was removed from the facility. This unit was in need of significant capital expenditures to maintain its reliability. The need for capital expenditures combined with the units high operating costs led to the decision to economically retire the unit. Lakeland received an offer from General Electric to buy the unit and the unit was thus sold to General Electric for spare parts.

Larsen 6 was returned from cold shutdown to active duty in 1998 to replace the lost capacity from the ENRON and TECO contracts. Larsen Unit 6 is scheduled for retirement after the winter peak for 1999.

The contract with TEA for 50 percent of the unit's output and capacity will terminate on February 28, 2001. This is the date at which the unit is slated for retirement.

McIntosh Unit 1 is scheduled for retirement in October of 2002 after successful demonstration of the 501G combined cycle. McIntosh Unit 1 will be 31 years old at its scheduled retirement date. The unit was originally built to operate on oil but was converted to natural gas operation with oil as a backup fuel. The unit will be replaced with more efficient generation with the proposed combined cycle, thus lowering the operating cost and overall emissions of Lakeland's system.

McIntosh Unit 2 is scheduled for retirement July of 2004 after completion of the DOE Clean Coal Project. The Clean Coal Project will replace the older capacity with a cleaner, more efficient method of generation. McIntosh Unit 2 is also reaching the end of its economic life.

All of these units have outlived their useful life, and no longer represent cost-effective methods of generation as can be seen from their heat rates and availability. The following shows their full load heat rates and average forced outage factors from 1995 to 1998 compared to those projected form McIntosh Unit 5 as a combined cycle unit.

Unit	Full Load Winter Equivalent Forced Heat Rate (Btu/kWh)	Outage Factor (%)
Larsen Unit 6	12,512	6.9
Larsen Unit 7	10,292	26.17
McIntosh 1	10,889	14.92
McIntosh 2	10,561	17.79

McIntosh 5 CC	6,249	4.5

Q Is the capacity available from existing Lakeland power supply resources sufficient to reliably meet future Lakeland capacity and energy requirements?

A No, it is not. To ensure system reliability, Lakeland plans to maintain a minimum 15 percent reserve margin. Applying the base case forecast for peak electrical demand, Lakeland will need additional capacity by the winter of 2002 to maintain a minimum 15 percent annual reserve margin. Table 9-1 of the Need for Power Application summarizes the capacity additions and retirements planned over the first ten years of the planning horizon before the expansion plan is implemented. Table 9-2 presents the projected reserve margins and system deficit for Lakeland's system for the winter period. Table 9-3 presents the projected reserve margins and system deficit for Lakeland's system for the summer period. The winter period is the driver for system capacity planning on Lakeland's system. As Table 9-2 indicates, capacity is clearly needed in the year 2002 to maintain reserve margins.

Table 9-2 indicates that Lakeland needs 52 MW for the 1998/99 winter season to maintain a 15 percent reserve margin. The 25 MW sale to TEA represents 25 MW of that 52 MW requirement; however, the sale to TEA does not commence until March 1, 1999. Generally, Lakeland's winter peak occurs before March 1. Lakeland has also recently purchased 20 MW from TEA from January 1, 1999 until March 31, 1999 which is not reflected in Table 9-2. Furthermore, Lakeland

completed the retubing of Larsen 7 on January 13, 1999 increasing its capability from 40 MW to 50 MW.

Q Please describe the generation resource that is being proposed by Lakeland to meet the future need for power.

A Lakeland is seeking a determination of need by this Commission, as required by the Florida Electrical Power Plant Siting Act, in order to commence detailed engineering and construction activities for the proposed conversion to combined cycle of McIntosh Unit 5.

The basic power generation cycle for McIntosh Unit 5 and the proposed conversion to combined cycle consists of the Westinghouse 501G combustion turbine, 3 stage heat recovery steam generator (HRSG) with a new stack, steam turbine, electric generator, minor modifications to the combustion turbine, and associated balance of plant equipment. Construction of the conversion of McIntosh Unit 5 to combined cycle is proposed to begin in June of 2000. The combined cycle unit has a proposed commercial operating date of January 1, 2002. The actual net output will depend upon the specific steam turbine purchased and the final design.

Currently, McIntosh Unit 5 is under construction as a 249 MW ISO rated simple cycle combustion turbine. McIntosh Unit 5 will operate in simple cycle mode for a period of approximately 18 months and be converted to combined cycle for January 1, 2002 commercial operation.

The unit will burn natural gas as primary fuel and will be capable of burning No. 2 oil as backup fuel. An additional 1.05 million gallon storage tank will allow the unit to operate at full load for approximately two and one-third days on No. 2 oil.

The estimated total cost for the combined cycle conversion of McIntosh Unit 5 is $80.5 million for January 1, 2002 commercial operation. The unit will use the existing operations and maintenance staff with no additional personnel projected to be required. At ISO conditions, the unit is projected to have a net plant output of 369 MW with a net plant full load heat rate of 6,442 Btu/kWh on a higher heating value basis. The combustion turbine is guaranteed to have an equivalent availability of 92 percent under the Westinghouse contract.

Q Please describe the evaluation process by which Lakeland determined that the proposed conversion of McIntosh Unit 5 is the best method of meeting Lakeland's future need for reliable power.

A Lakeland has conducted an exhaustive analysis of alternative methods of meeting Lakeland's future capacity and energy requirements in a reliable least cost, environmentally responsible fashion. Lakeland's analysis, considered a multitude of factors including:

- Alternative generation technologies and sizes
- Compliance with environmental regulations
- Purchase power alternatives
- Conservation and demand-side management alternatives
- Reliability considerations
- Uncertainty and sensitivity analysis

As part of this process, Lakeland conducted an extensive Invitation for Proposals (IFP) for purchased power and evaluation of the proposals received. The results of the evaluation indicated that the conversion of McIntosh Unit 5 with a commercial operation date of January 1, 2002, was the least cost long range alternative that could meet Lakeland's reliability requirements. McIntosh Unit 5 will utilize the most efficient combustion turbine technology currently available. The high efficiency of McIntosh Unit 5 will ensure that the project will remain a competitive resource if or when deregulation occurs in Florida. Once McIntosh Unit 5 is converted to a combined cycle, McIntosh Unit 5 will be the most efficient power generating unit in the state.

Q Has Lakeland considered the implications of the 1990 Clean Air Act Amendments for McIntosh Unit 5 and the proposed conversion to combined cycle?

A Yes. The McIntosh Unit 5 and proposed conversion to combined cycle will be an affected unit under the 1990 Clean Air Act Amendments. The conversion of McIntosh Unit 5 to combined cycle will lower emissions on a kilowatt hour basis from the current simple cycle machine and improve fuel utilization. The 1990 Clean Air Act Amendment requires that affected units have continuous emissions monitors. The cost for these continuous emission monitors has been included in the capital costs for the conversion of McIntosh Unit 5. The 1990 Clean Air Act Amendments also requires that the affected units provide SO_2 allowances when omitting SO_2 through the burning of low sulfur No. 2 oil. The use of No. 2 oil will be limited such that SO_2 emissions will be limited to less than 40 tons per year or

40 allowances per year. This small number of allowances is available from Lakeland's allocation of allowances for the existing units. Currently McIntosh Unit 5 has Dry Low NO_x burners for simple cycle operation and the conversion of McIntosh Unit 5 will include an upgrade to Ultra Low NO_x burners. Since the Ultra Low NO_x burners are still under development, Lakeland has included costs for a conventional SCR in the event that the Ultra Low NO_x burners do not provide sufficient reduction in NO_x emissions.

Q Will there be adverse consequences if the proposed conversion to combined cycle is not completed in the time frame requested?

A Yes, Lakeland's reserve margin will fall below the 15 percent minimum reserve margin in 2002 if Lakeland's request is not granted. This could lead to potential outages and system failures for Lakeland and Peninsular Florida. The customers will suffer adverse consequences with the possibility of inadequate power supply and potentially very high cost electricity. With the low reserve margins projected for the state in 2002, the potential for insufficient power supplies may exist. Mr. Runyan will testify that his analyses indicate an additional cost of $9.3 million would occur with a one year delay in operation.

Q Does this conclude your testimony?

A Yes.

City of Lakeland
Docket No. 990023-EM
Applicant Witness: Paul H. Elwing
Exhibit No. ___ (PHE-1)

The following are corrections to the C.D. McIntosh Unit 5 Need for Power Application for the sections and subsections I have adopted as part of my testimony:

1. On page 2-18, in Section 2.4.7 the availability estimate includes a "4.5" percent forced outage rate instead of a "3" percent.

2. On page 3-6, second paragraph second line of Section 3.2.2 charge "May 15" to "June 14" and in the third line change "May 15, 2001" to "June 15, 2001" and change "May 15, 2010" to "December 14, 2010".

3. On page 3-7, Table 3-1, change the expected retirement date for C.D. McIntosh Unit 1 from "01/04" to "10/02".

4. On page 3-7, Table 3-1, change the expected retirement date for C.D. McIntosh Unit 2 from "01/04" to "07/04".

5. On page 3-8, the winter capacity listed for Larsen Unit 6 in the table should be "27" instead of "22".

BEFORE THE PUBLIC SERVICE COMMISSION

CIYT OF LAKELAND

TESTIMONY OF GARY T. LAWRENCE

DOCKET NO. 990023-EM

FEBRUARY 3, 1999

Q **Please state your name and address.**

A My name is Gary T. Lawrence. My business address is 501 East Lemon Street; Lakeland, Florida 33801.

Q **By whom are you employed and in what capacity?**

A I am employed by City of Lakeland - Department of Electric Utilities as Manager of the Rates Division.

Q **Please describe your responsibilities in that position.**

A My duties in this position as Manager of the Rates Division include the responsibility for rate development and overseeing the various other division activities. These activities include forecasting of future electric retail sales, customers, seasonal peak demands, development of demand-side plans and programs, demand-side management load and energy impacts, forecasting department revenues, load research of customer classes for cost of service studies used in rate development.

Q **Please state your professional experience and educational background.**

A I have a Bachelors Degree in Electrical Engineering Technology from the

Southern Technical Institute in Marietta, Georgia and a Masters in Business Administration from Florida Southern College in Lakeland, Florida. I have been employed in various positions with the City of Lakeland for 17 years. During my tenure with Lakeland I have held the positions of Supervisor of System Planning for 6 1/2 years, and Manager of Rates for 10 1/2 years. Prior to my employment with Lakeland, I worked in various positions with the electric utility of the City of Tallahassee. During my nine (9) years with Tallahassee I worked in various groups, including, transmission and distribution engineering, system protection, and system planning. My responsibilities in system planning included distribution, substation, transmission, and generation planning and forecasting of retail sales and seasonal peak loads.

While in the system planning division with Lakeland, my responsibilities included oversight of generation planning and supply side studies, fuel conversion studies, demand-side studies and analysis including, development of the Department's annual fuel budget, distribution and transmission planning including substation sizing and siting.

Q What is the purpose of your testimony in this proceeding?

A The purpose of my testimony is to provide a general overview of Lakeland's load forecast and existing demand side management programs. I will also testify that Lakeland has reduced energy and demand requirements for its system through cost-effective conservation and demand-side alternatives.

Q Were there Sections of the Lakeland McIntosh Unit 5 Need for Power

Application prepared by you or under your direct supervision?

A Yes, Section 7.0, Section 8.0 - 8.2, and Appendix 21.1.

Q Are you adopting these Sections as part of your testimony?

A Yes, I am.

Q Are there any corrections to these Subsections?

A Yes. Attached as Exhibit GTL-1 is minor word processing correction to page 8-8 which completes the remainder of the paragraph.

Q Was the forecast of power demand and energy prepared by you or under your direct supervision?

A Yes, it was. Lakeland develops forecasts for population, accounts, sales, net energy for load, summer peak demand, and winter peak demand to support planning and Ten-Year Site Plan production. A base case forecast is generated for each of the preceding parameters. The base case summer demand, winter demand, and net energy for load for 1999 are 510 MW, 588 MW, and 2,655 GWH (with conservation) respectively after considering interruptible load. The annual average growth rates (AAGR) of the preceding forecasts are 1.95, 2.53, and 2.31 respectively for the forecast horizon. In support of the Need for Power Application, Black & Veatch developed high load growth and low load growth sensitivities. The high load growth case assumes annual load growth is 1.5 percent higher and the low load growth case assumes annual growth is 1.5 percent lower than the base case.

Q **Please describe the forecasting process utilized by Lakeland to project energy requirements and system peak load.**

A Lakeland develops forecasts for population, accounts, sales, net energy for load, summer peak demand, and winter peak demand. The preceding forecasts are developed, and models are re-evaluated, on a fiscal and annual basis. Lakeland's fiscal year ends on September 30.

Lakeland utilized the 1997 Annual Bureau of Economic and Business Research (BEBR) forecast for projections of Polk County population. Service Territory Population projections are developed for inside and outside Lakeland's city limits.

Lakeland forecasts the number of accounts in residential, general service, general service demand, general service large demand, interruptible, contract, and others (including electric, water, municipal, and private area lighting). For residential, commercial, and industrial accounts, projections are developed for inside and outside Lakeland's city limits.

The total sales forecast for the City of Lakeland is based on normal weather conditions and is a summation of the individual forecasts. Summation of total sales indicates an AAGR of 2.36 percent from 1999 through 2018. A 3.71 percent AAGR was experienced over the last 10 years of historical sales.

Lakeland projects net energy for load based on a regression model using year and historical total sales as the independent variables. The model has an Adjusted R-squared of 99.7 percent. Lakeland projects losses as the difference between sales

and net energy for load. The total percentage of system energy losses remains relatively constant in the short-term and begins to decrease slightly in the long-term. Since Lakeland's projection of net energy for load is based on historical net energy for load, it inherently includes the effect of Lakeland's energy conservation programs.

Lakeland forecasts electric system winter and summer season peak demands for each year using regression models. The winter season is defined as November through March and the summer season is defined as April through October. The regression model for the winter peak demand used minimum temperature, day of the week, prior day's average temperature and year as the independent variables. The regression model for the summer peak demand used maximum temperature and population as the independent variables. The minimum and maximum temperatures used for projecting peak demand were 30° F and 97° F, respectively.

Q **Does the load forecast process utilized by Lakeland consider the major factors that will determine the need for power by the year 2002?**

A Yes, it does. Forecasts of electrical loads for the Lakeland system were developed through the year 2018 for use in the assessment of needs and economic analysis. The load forecasts consist of a base case forecast, and two sensitivity cases to bracket the peak demand growth with a high and low forecast. The forecasts are based upon historical information and detailed forecasting methodology. Lakeland forecasts have considered the major demographic and economic factors, which influence the demand for electricity. We have specifically considered population growth, customer growth by rate class, growth

inside and outside the city limits, the impact of weather, employment levels, and household income levels.

Q Are the forecast assumptions used by Lakeland reasonable?

A Yes. The projection for economic and demographic growth assumptions made for the Lakeland area is a realistic scenario of how the future may unfold. The projections of demographic and economic valuables have been provided by a credible and unbiased source, the 1997 University of Florida's Bureau of Economic and Business Research (BEBR) Annual Forecast.

Projections for the number of accounts, including residential, commercial, industrial, municipal, water, electric, and private area lighting accounts, were based on regression models and historical growth trends. Projections for the sales forecasts, including residential, commercial, industrial, private area lighting, and municipal, were also based on regression models and historical trends. For more precise, specific and provincial data, separate distinct regression model projections were generated for inside and outside Lakeland's city limits.

Lakeland projections for net energy for load were based on a regression model. Lakeland predicts the total percentage of system energy losses to remain relatively constant in the short-term and begin to decrease slightly in the long-term.

For each year, the peak demand forecasts for winter and summer were based using regression models. Winter includes the months from November through March and summer months are April through October.

Lakeland conducted two sensitivity cases to the base case load forecast, reflecting a high load growth and low load growth case. The two sensitivity cases provide a bracket in which Lakeland can evaluate potential power supply planning alternatives and test the robustness of the base case against higher or lower load growth.

Q **Please describe Lakeland's current conservation and solar programs that reduce peak demands and energy consumption.**

A Lakeland has several existing conservation and demand-side management programs that are currently available and address four major areas of demand-side management:

- Reduction in weather-sensitive loads.
- Reduction of energy needs on a per-customer basis.
- Movement of energy to off-peak hours
- Reduce use of expensive petroleum fuels.

Lakeland has two residential load management programs and three commercial load management programs. The residential programs include the SMART program and the loan program. The commercial lighting program, thermal energy storage program, and high-pressure sodium outdoor lighting program make up the commercial load management program. Details of the programs are highlighted in Section 8.1 of the Need for Power Application. Lakeland has several other conservation programs that provide no demonstrable demand and energy savings from a measurable standpoint, but strives to reduce consumption of energy.

These programs include residential energy audits, public awareness programs, mobile display units, speakers bureau, informational bill inserts, commercial energy audits, demand-side management technology research, direct expansion ground-source heat pump studies, whole-house demand controllers, and time-of day rates.

The City of Lakeland is considering several alternatives for future conservation and demand-side management programs. Lakeland is considering three solar projects and is currently researching their application. The three programs under consideration include distributed generation using solar-thermal collectors, utility-interactive residential photovoltaic systems, and integrated photovoltaics for Florida residences. Section 8.2 of the Need for Power Application provide details of each of these programs.

Q Has Lakeland effectively mitigated power consumption by implementation of all cost-effective conservation and demand-side alternatives?

A Yes. Lakeland has several conservation and demand-side programs in-place to reduce energy consumption and reduce peak demands. Also Lakeland has analyzed, as Mr. Runyan will testify to, new conservation and demand-side management programs against the supply-side alternative. There were no conservation measures that were cost-effective.

Q Does this conclude your testimony?

A Yes.

City of Lakeland
Docket No. 990023-EM
Applicant Witness: Gary T. Lawrence
Exhibit No. ___ (GTL-1)

The following are corrections to the C.D. McIntosh Unit 5 Need for Power Application for the sections and subsections I have adopted as part of my testimony:

1. On page 8-8, change the incomplete sentence in the last paragraph of Section 8.2.3 from "The objective of the solar house" to the complete sentence "The objective of the solar house design was to be as efficient as possible, not cost effective. The next objective will be to make the model cost effective."

BEFORE THE PUBLIC SERVICE COMMISSION

CITY OF LAKELAND

TESTIMONY OF ROLANDO SANZ-GUERRERO

DOCKET NO. 990023-EM

FEBRUARY 3, 1999

Q **Please state your name and address.**

A My name is Rolando Sanz-Guerrero. My business address is 501 East Lemon Street in Lakeland, Florida 33801.

Q **By whom are you employed and in what capacity?**

A I am employed by the City of Lakeland - Department of Electric Utilities as Manager of Business Development and Fuels.

Q **Please describe your responsibilities in that position.**

A I am accountable for all purchases and sales of all fuel and energy types including coal, petroleum coke, natural gas, oil, and electric contracts with durations of over one month. I am also responsible for all wholesale business development.

Q **Please state your professional experience and educational background.**

A I have a Masters degree in economics from the University of South Florida. I have 11 years experience with City of Lakeland ranging from forecasting to economic analyses to strategic analyses. My forecasting experience encompasses Chair and Vice Chair of the Forecast and Research Committee of the Florida Electric Power Coordinating Group (FCG), Vice Chair of the Fuel Forecasting

Committee of the FCG and Vice and Chair of the Electric Forecasting group SHAPES.

I have completed studies in Economics, Business Administration, and Management from Aquinas College, University of Seville, Florida Southern College, and the University of South Florida.

Q What is the purpose of your prefiled testimony in this proceeding?

A The purpose of my testimony is to discuss the Invitation for Proposal (IFP) process and evaluations, Lakeland's fuel price projections, and fuel for McIntosh Unit 5.

Q Were there Sections of the Need for Power Application prepared by you or under your direct supervision?

A Yes, Sections 10.1 – 10.2, Appendix 21.2, and Appendix 21.3 were prepared under my supervision.

Q Are you adopting these Sections as part of your testimony?

A Yes, I am.

Q Are there any corrections to these Sections?

A Yes. Attached as Exhibit RSG-1 is a minor typographical correction to my adopted section of the Need for Power Application. In addition, the table for the low fuel price forecast in Appendix 21.2 which was prepared by Black & Veatch has incorrect values listed for coal. The corrected values are shown in Exhibit

RSG-1 and do not affect other numbers in the Need for Power Application.

Q Has Lakeland adequately explored and evaluated the availability of purchase power from other electric utilities and independent power producers?

A Yes. Lakeland issued an Invitation for Proposals on February 21, 1997. The IFP stated that Lakeland foresees the need for capacity and energy beginning January 1, 2002 for a twenty-year period. The IFP required bidders to include only bids that were from identifiable resources. Identifiable resources included specific generating units, specific plant sites comprised of one or more units, or multiple plant sites comprising multiple units. The IFP also requires firm capacity and must be countable for reserves in the state of Florida, with delivery to Lakeland's system. The IFP requested a minimum of 200 MW in 50 MW blocks for January 1, 2002 through December 31, 2021. The IFP is included in Appendix 21.3 in the Need for Power Application.

Lakeland received proposals from 13 bidders for the IFP issued. While several of the bids did not meet the minimum criteria of the IFP and were not considered by Lakeland, all bids were modeled in the Need for Power Application to determine the economic viability of each bid. Subsections 10.2.1 through 10.2.13 of the Need for Power Application provide a brief summary of the bids, with Table 10-1 included as an overall summary.

Q Has Lakeland adequately explored and evaluated the availability of purchase power from qualifying facilities and non-utility generators?

A Yes the IFP process did not exclude qualifying facilities or non-utility generators.

Q Does Lakeland have purchase power alternatives that are lower in cost than the conversion of McIntosh Unit 5?

A No. Lakeland evaluated purchase power bids from the extensive IFP process. All of the purchase power bids were significantly more expensive than the conversion of McIntosh Unit 5. The lowest cost bid was $21.073 million dollars more expensive than the self-build alternative as will be testified by Mr. Runyan.

Q Did you develop the fuel price projections used in the Need for Power Application?

A Yes. I developed the base case fuel price projections contained in Appendix 21.2 based on my specific experience in purchasing fuel for Lakeland. Black & Veatch developed the high case, low case, and constant differential case from my base case projections.

Q Has Lakeland provided adequate assurances regarding available primary and secondary fuel to serve the proposed facility on a long term and short term basis at a reasonable cost?

A Yes. Lakeland has reviewed available forecasts and determined that there will be adequate supply capacity for natural gas and oil to fuel McIntosh Unit 5 and the proposed conversion to combined cycle. Lakeland currently maintains approximately 50 percent of its natural gas commodity and transportation requirements under contract with the remaining amount bought on the spot market.

Q Has Lakeland adequately provided appropriate assurances that sufficient natural gas pipeline capacity will be available to transport natural gas to the proposed combined cycle unit?

A Yes, Lakeland has provided appropriate assurances that sufficient natural gas pipeline capacity will be available to transport natural gas to the proposed combined cycle unit. The existing pipeline from the St. Petersburg lateral to the McIntosh site is sized for approximately 800 MW of natural gas generation. Lakeland currently has nearly 40,000 Mcf/Day of FTS-1 and FTS-2 transportation capacity under contract from Florida Gas Transmission Company (FGT). Lakeland is also currently negotiating with third parties for additional natural gas transportation and commodity. FGT's Phase IV expansion will ensure that adequate natural gas transportation capacity is available to supply McIntosh Unit 5. Lakeland's planned unit retirements also makes additional natural gas transportation capacity available for McIntosh Unit 5.

Q Does this conclude your testimony?

A Yes, it does.

The following are corrections to the C.D. McIntosh Unit 5 Need for Power Application for the sections and subsections I have adopted as part of my testimony:

1. On page 10-1, change the date in the first sentence of the first paragraph from "February 24, 1997" to " February 21, 1997".

2. In Appendices 21.2, on page labeled 21-9, change page number "21-9" to 21.2-9".

3. In Appendices 21.2, on page labeled 21-10, change page number "21-10" to 21.2-10".

4. Revised page 21.2-11 and 21.2-12 as attached.

Lakeland Electric & Water Utilities
Annual Projected Cost of Fuel By Type
Low Case
$/MMbtu

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1999	~~$1.80~~ 1.72	$2.24	$3.01	$4.22	$4.42	$1.06	($2.36)
2000	~~$1.78~~ 1.69	$2.21	$2.99	$4.18	$4.40	$1.09	($2.48)
2001	~~$1.75~~ 1.67	$2.17	$2.96	$4.15	$4.39	$1.09	($2.60)
2002	~~$1.73~~ 1.65	$2.13	$2.93	$4.11	$4.36	$1.08	($2.72)
2003	~~$1.71~~ 1.62	$2.11	$2.91	$4.09	$4.34	$1.07	($2.86)
2004	~~$1.68~~ 1.60	$2.09	$2.90	$4.06	$4.31	$1.06	($2.98)
2005	~~$1.66~~ 1.58	$2.07	$2.89	$4.05	$4.31	$1.05	($3.13)
2006	~~$1.63~~ 1.55	$2.07	$2.88	$4.04	$4.30	$1.04	($3.28)
2007	~~$1.61~~ 1.53	$2.07	$2.88	$4.04	$4.36	$1.03	($3.43)
2008	~~$1.60~~ 1.52	$2.06	$2.89	$4.04	$4.41	$1.03	($3.59)
2009	~~$1.57~~ 1.50	$2.06	$2.89	$4.06	$4.43	$1.02	($3.76)
2010	~~$1.55~~ 1.47	$2.06	$2.90	$4.08	$4.45	$1.01	($3.94)
2011	~~$1.53~~ 1.45	$2.03	$2.86	$4.02	$4.39	$1.00	($4.08)
2012	~~$1.51~~ 1.43	$2.01	$2.82	$3.96	$4.33	$0.98	($4.23)
2013	~~$1.49~~ 1.41	$1.98	$2.78	$3.91	$4.27	$0.97	($4.39)
2014	~~$1.47~~ 1.39	$1.95	$2.75	$3.86	$4.21	$0.95	($4.54)
2015	~~$1.45~~ 1.37	$1.92	$2.71	$3.80	$4.15	$0.94	($4.71)
2016	~~$1.43~~ 1.36	$1.90	$2.67	$3.75	$4.10	$0.93	($4.88)
2017	~~$1.41~~ 1.34	$1.87	$2.63	$3.70	$4.04	$0.92	($5.06)
2018	~~$1.37~~ 1.30	$1.82	$2.57	$3.61	$3.94	$0.89	($5.18)
AAI	-1.44%	-1.08%	-0.84%	-0.82%	-0.80%	-0.91%	4.23%

AAI = Average Annual Increase
(1) Natural gas price is for commodity only (no transportation)

City of Lakeland
Docket No 990023-EM
Applicant Witness: Rolando Sanz-Guerrero
Exhibit No ____ (RSG-1)
Page 2 of 2

Lakeland Electric & Water Utilities
Annual Projected Cost of Fuel By Type
Constant Differential
$/MMbtu

1999	$1.76	$2.30	$3.08	$4.31	$4.46	$1.08	($2.23)
2000	$1.78	$2.32	$3.10	$4.33	$4.48	$1.10	($2.21)
2001	$1.80	$2.34	$3.12	$4.35	$4.50	$1.12	($2.19)
2002	$1.82	$2.36	$3.14	$4.37	$4.52	$1.14	($2.17)
2003	$1.84	$2.38	$3.16	$4.39	$4.54	$1.16	($2.15)
2004	$1.86	$2.40	$3.18	$4.41	$4.56	$1.18	($2.13)
2005	$1.88	$2.42	$3.20	$4.43	$4.58	$1.20	($2.11)
2006	$1.90	$2.44	$3.22	$4.45	$4.60	$1.22	($2.09)
2007	$1.92	$2.46	$3.24	$4.47	$4.62	$1.24	($2.07)
2008	$1.95	$2.49	$3.27	$4.50	$4.65	$1.27	($2.04)
2009	$1.97	$2.51	$3.29	$4.52	$4.67	$1.29	($2.02)
2010	$1.99	$2.53	$3.31	$4.54	$4.69	$1.31	($2.00)
2011	$2.01	$2.55	$3.33	$4.56	$4.71	$1.33	($1.98)
2012	$2.04	$2.58	$3.36	$4.59	$4.74	$1.36	($1.95)
2013	$2.06	$2.60	$3.38	$4.61	$4.76	$1.38	($1.93)
2014	$2.08	$2.62	$3.40	$4.63	$4.78	$1.40	($1.91)
2015	$2.10	$2.64	$3.42	$4.65	$4.80	$1.42	($1.89)
2016	$2.13	$2.67	$3.45	$4.68	$4.83	$1.45	($1.86)
2017	$2.15	$2.69	$3.47	$4.70	$4.85	$1.47	($1.84)
2018	$2.18	$2.72	$3.50	$4.73	$4.88	$1.50	($1.81)
AAI	1.12%	0.88%	0.67%	0.49%	0.47%	1.73%	-1.08%

AAI = Average Annual Increase
(1) Natural gas price is for commodity only (no transportation)

BEFORE THE PUBLIC SERVICE COMMISSION

CITY OF LAKELAND

TESTIMONY OF DANIEL J. RUNYAN

DOCKET NO. 990023-EM

FEBRUARY 3, 1999

Q **Please state your name and address.**

A My name is Daniel J. Runyan. My business address is 11401 Lamar, Overland Park, Kansas 66211.

Q **By whom are you employed and in what capacity.**

A I am employed by Black & Veatch as a System Planning Consultant in the Plant Services Department of the Power Division.

Q **Please describe your responsibilities in that position.**

A As a System Planning Consultant for Black & Veatch, I am responsible for providing consulting services for utility and non-utility clients. The consulting services encompass a wide variety of tasks including: load forecasts, conservation and demand-side management evaluations, reliability criteria and evaluations, development of generation unit addition alternatives, optimal generation expansion modeling, production cost modeling, economic and financial evaluations, feasibility studies, pro forma analysis, and power market studies.

Q **Please state your professional experience and educational background.**

A I received a Bachelors of Science degree in Mechanical Engineering from the

University of Missouri – Columbia. I have taken and passed the FE exam and I am an Associate Member of American Society of Mechanical Engineers.

I have been employed by Black & Veatch since 1996 as a System Planning Consultant in the Power Sector Advisory Services area. Since then I have provided planning services for several projects including many projects in Florida. I have provided system planning consulting services for the following Florida utilities: City of Lakeland – Department of Electric Utilities (Lakeland), Kissimmee Utility Authority (KUA), Florida Municipal Power Agency (FMPA), Orlando Utilities Commission (OUC), and Jacksonville Electric Authority (JEA). In 1998 I assisted several utilities in Florida to prepare their 1998 Ten-Year Site Plans including Lakeland, KUA, JEA, and OUC. Also in 1998, I have provided consulting services for KUA and FMPA for their recent Cane Island Unit 3 Need for Power Application.

I have extensive experience with providing consulting services using production cost and optimal generation expansion programs including POWRPRO, POWROPT, EGEAS and PROSYM. I have used these programs in providing services to the following firms:

- Kissimmee Utility Authority
- Florida Municipal Power Agency
- Jacksonville Electric Authority
- City of Lakeland – Department of Electric Utilities
- Texaco
- Western Farmers Cooperative

- Empire Electric District
- City of Sterling, Kansas
- Atlantic City, Iowa
- Puerto Rico Power Authority
- Wyoming Public Service Commission

Q What is the purpose of your testimony in this proceeding?

A The primary purpose of my testimony is to address Lakeland's reliability and economic need for power as it relates to McIntosh Unit 5 and the proposed conversion to combined cycle. In my discussion of Lakeland's need for McIntosh Unit 5 and its proposed conversion to combined cycle, I will discuss the reliability requirements for the Lakeland system, summarize the methodology applied in the economic evaluations conducted to determine the least-cost generation alternative for Lakeland, demonstrate that the proposed conversion to combined cycle is the most cost-effective alternative available, discuss the sensitivity analyses conducted, and summarize the impacts of delaying the conversion of McIntosh Unit 5.

Q Were there Sections of the McIntosh Unit 5 Need for Power Application prepared by you or under your direct supervision?

A Yes, the Table of Contents, Sections 8.3, 9.0, 10.3, 12.0, 13.0, 14.0, 15.0, and 18.2.

Q Are you adopting these Sections as part of your testimony?

A Yes, I am.

Q Are there any corrections to these Sections?

A Yes. Attached as Exhibit DJR-1 are minor corrections to these sections.

Q Did you evaluate the reliability need for the conversion of McIntosh Unit 5 to combined cycle?

A Yes. I explored three different methods of determining Lakeland's reliability need for the conversion of McIntosh Unit 5 to combined cycle. Those three methods include traditional reserve margin, loss of load probability, and probabilistic reserve margin.

Q Please discuss the traditional reserve margin approach.

A Lakeland uses a 15 percent minimum reserve margin. The 15 percent minimum reserve margin has been adopted by the Florida Reliability Coordinating Council (FRCC). The minimum 15 percent reserve margin is also required in 25-6.035(1) Fla. Admin. Code for the purposes of sharing responsibility for grid reliability. Furthermore, the 15 percent reserve margin is also used by many other utilities both within and outside of Florida and appears reasonable for capacity planning purposes. Under a 15 percent minimum reserve margin criterion, Lakeland needs to add capacity for the 2001/02 winter season.

Q Please discuss the loss of load probability approach.

A Loss of load probability (LOLP) approach is often used for large systems such as FRCC. For smaller heavily interconnected systems such as Lakeland's, it is less appropriate. In order to maintain the typical standard of 0.1 days LOLP per year

on an isolated system basis, a very large level of reserve capacity would be required. If, however, support from interconnections are considered for a heavily interconnected system such as Lakeland's, a very low level of reserves would be required to maintain the 0.1 days LOLP per year. For these reasons, LOLP was not used to evaluate Lakeland's need for capacity.

Q Please discuss the probabilistic reserve margin approach.

A The probabilistic reserve margin approach is based on a methodology presented by the Public Service Commission staff during the 1998 Ten Year Site Plan Workshop. The methodology evaluates the uncertainty of several factors related to the utility's ability to serve load. Factors considered include forecasted generation, peak demand, import energy, interruptible load, and load management. Applying the probabilistic reserve margin approach to Lakeland results in a projected weighted average reserve margin of 6.5 percent for 2002 compared to the 14.1 percent reserve margin before the installation of the conversion of McIntosh Unit 5 to combined cycle. The weighted average 6.5 percent inherently includes the probabilistic effect of many of the uncertainties that the 15 percent reserve margin criteria is designed to cover. A standard for the minimum reserve margin for the probabilistic approach has not been developed. In any event, nothing in the probabilistic reserve margin approach indicated that Lakeland does not have a need for additional capacity in 2002 and in fact appears to indicate an even greater need than indicated by the 15 percent reserve margin criteria.

Q Please describe the evaluation process by which Lakeland determined that

the proposed conversion of McIntosh 5 is the best method of meeting Lakeland's future need for reliable power.

A Lakeland has conducted an exhaustive analysis of alternative methods of meeting Lakeland's future capacity and energy requirements in a reliable, least-cost, and environmentally responsible fashion. Lakeland's analysis considered a multitude of factors including:

- Alternative generation technologies and sizes
- Compliance with environmental regulations
- Purchase power alternatives
- Conservation and demand-side management alternatives
- Reliability considerations
- Uncertainty and sensitivity analysis

With the numerous supply-side alternatives considered, a screening analysis was required to reduce the number of alternatives that would be modeled in detail. A two-phase screening analysis was conducted for the supply-side alternatives. The first phase of the screening analysis eliminated alternatives that were still under commercial development and were not technically feasible with Lakeland's natural resources. The alternatives that passed the first phase of the screening analysis were evaluated on a busbar analysis. The busbar analysis considers the capital costs, fixed operating costs, variable O&M costs, and fuel costs for each alternative. Figures 12-1 and 12-2 of the Need for Power Application provide the screening curves for the alternatives.

After the screening curves were generated, the alternatives that possessed

potential as expansion candidates were modeled in POWROPT. POWROPT is an optimal generation expansion program developed by Black & Veatch that analyzes all potential combinations of feasible expansion plans based upon specified expansion candidates. POWROPT output indicates the top expansion plans based upon the cumulative present worth revenue requirements for a specified period. The cumulative present worth revenue requirements include system fuel costs, fixed and variable O&M costs for new unit additions, and capital costs for new unit additions.

Based upon the POWROPT output, the optimal expansion plans are modeled in the POWRPRO chronological production cost model. Black & Veatch also developed POWRPRO. POWRPRO provides the detailed production cost information based upon the units modeled for each run. POWROPT and POWRPRO use the same unit commitment and dispatch algorithms thus ensuring consistency.

The optimal expansion plan identified from the supply-side evaluation was applied against the demand-side alternatives to determine if cost-effective demand-side management (DSM) alternatives existed that would delay or mitigate the need.

After it was determined that no new DSM programs were cost-effective, and thus would not delay or mitigate the need for power, each of the purchase power alternatives from the Invitation for Proposals (IFP) were modeled against the self-build expansion plan. This was conducted using POWROPT and POWRPRO.

The proposals were then compared against the self-build alternative on the basis of a cumulative present worth revenue requirements.

Several sensitivity cases were analyzed compared to the base case to test the robustness of the expansion plan. The sensitivity analyses conducted included the following:

- High and low load growth
- High and low fuel price projections
- Constant differential between coal prices and all other fuels maintained over the planning horizon
- High and low discount rate
- 20 percent minimum reserve margin case
- 501F 1x1 combined cycle is installed in 2002 versus the conversion of McIntosh Unit 5 to combined cycle
- 501F simple cycle combustion turbine is installed in 2002 versus the conversion of McIntosh 5 to combined cycle.

Lakeland also evaluated the benefits the Florida Municipal Power Pool (FMPP) will receive from McIntosh Unit 5 and the proposed conversion to combined cycle.

Q Has Lakeland adequately explored alternative generating technologies?

A Yes, Lakeland reviewed and evaluated numerous generating technologies, including both unconventional and conventional alternatives.

Several conventional supply-side alternatives were considered for Lakeland's expansion planning based upon screening analysis. The size of the alternatives selected considered the need for capacity and the suitability of the Lakeland site for the installation of the alternatives. Conventional alternatives considered for capacity expansion include:

- Pulverized Coal Unit
- Atmospheric Fluidized Bed Unit
- Pressurized Circulating Fluidized Bed Unit
- Combined Cycles
- Simple Cycle Combustion Turbines

Capital cost, performance, and O&M cost estimates were compiled for each capacity addition alternative. Details of the conventional alternatives are provided in Subsection 11.6 of the Need for Power Application.

Q Please describe the results of the analysis undertaken to evaluate the cost effectiveness of potential DSM programs.

A A total of 66 different potential DSM programs, which were identified by Synergic Resources Corporation in the study of Electricity Conservation and Energy Efficiency in Florida, were evaluated to assess their cost-effectiveness. It was concluded that none of the programs evaluated represent a cost-effective alternative to the conversion of McIntosh 5 to a combined cycle unit. This analysis was conduced using the Florida Integrated Resource Evaluator (FIRE) model.

Q What was the process by which potential DSM programs were evaluated?

A The process used to evaluate the cost-effectiveness of DSM programs conforms to that required in Rule 25-17.008, Fla. Admin. Code. Specifically, the procedures used are those set forth in the Florida Public Service Commission Cost-effectiveness Manual for Demand Side Management Programs and Self Service Wheeling Proposals. The Florida Integrated Resource Evaluator (FIRE) spreadsheet, originally developed by Florida Power Corporation was used to assess the potential effectiveness of DSM programs.

Using the procedures specified in Rule 25-17.008 Fla. Admin. Code, FIRE provides a systematic framework for identifying the benefits and costs associated with specific DSM programs. Avoided utility costs are economically evaluated against DSM costs and load impacts to assess the effectiveness of the program over its useful life. Three DSM program cost / benefits tests are produced by the FIRE model and are used in considering DSM cost-effectiveness. These tests are the Rate Impact Test (RIM), the Total Resource Cost Test (TRC) and the Participants Test. The results of the three cost-effectiveness tests for the DSM programs evaluated are shown in Table 13-7 of the Need for Power Application.

Q Please describe the three DSM tests used to evaluate DSM programs.

A All the DSM cost effectiveness tests are based on the comparison of discounted present worth benefits to costs for a specific DSM program. Each test is designed to measure costs and benefits from a different perspective.

The Rate Impact Test is a measure of the expected impact on customer rates

resulting from a DSM program. The test statistic is the ratio of the utility's benefits (avoided supply costs and increased revenues) compared to the utility's costs (program costs, incentives paid, increased supply costs and revenue losses). A value of less than one indicates an upward pressure on rate levels as a result of the DSM program.

The Total Resources Cost Test measures the benefit / cost ratio by comparing the total program benefits (both the participant's and utility's) to the total program costs (equipment costs, supply costs, participant costs).

The Participants Test measures the impact of the DSM program on the participating customer. Benefits to the participant may include bill reductions, incentives paid, and tax credits. Participants' costs may include equipment costs, operation and maintenance expenses, equipment removal, etc.

Q **Which cost-effectiveness test was utilized by Lakeland in evaluating DSM programs?**

A All three cost–effectiveness tests were calculated for each DSM programs analyzed and considered in our evaluation. As a practical manner, cost-effectiveness based upon the rate impact test plays a critical role in assessing the practicality of implementing any DSM program. Based on this criteria, no DSM programs that were evaluated were considered to be cost effective

Q **Has Lakeland demonstrated that its proposed conversion of McIntosh 5 to a combined cycle unit is the most cost effective alternative?**

A Yes, Lakeland has conducted detailed analysis to determine the least-cost supply plan to meet the growing needs of its customers. Lakeland has evaluated the proposed conversion to combined cycle against 10 self-build alternatives, 66 DSM alternatives, and the 13 proposals submitted in the Invitation for Proposal (IFP) process. The proposed conversion to combined cycle is the least-cost alternative compared to all options.

McIntosh Unit 5 will utilize the most efficient combustion turbine technology currently available. The high efficiency of McIntosh 5 will ensure that the project will remain a competitive resource when deregulation occurs in Florida. Once McIntosh Unit 5 is converted to a combined cycle, McIntosh Unit 5 will be the most efficient power generating unit in the state and will operate at base load. The conversion to combine cycle allows Lakeland to generate electricity without burning additional fuel. This provides a resource addition that has very low operating costs and produces electricity for Lakeland customers and Peninsular Florida at low costs. The unit will also provide electricity to customers with low emissions. With the conversion to combined cycle, the unit will actually produce less emissions per kWh because the unit will utilize the waste heat from the combustion turbine.

For the two cases in which a combined cycle unit and a simple cycle unit are installed in 2002 instead of the conversion of McIntosh Unit 5 to combined cycle, cumulative present worth revenue requirements increased $27.2 million and $71.9 million respectively.

Q Are there any adverse consequences to Lakeland customers if the proposed conversion of McIntosh 5 to combined cycle unit is not completed in the time frame requested?

A Yes, Lakeland's reserve margin is projected to fall below the 15 percent minimum reserve margin in 2002 if Lakeland's request is not granted. This could lead to potential outages and system failures for Lakeland and Peninsular Florida. The customers will suffer adverse consequences with the possibility of inadequate power supply and potentially very high cost electricity. With the low reserve margins projected for the state in 2002, the potential for insufficient power supplies may exist. There is also a potential for severe economic consequences if the project is delayed or denied. If the project is delayed by even one year it is projected to cost Lakeland $9.35 million dollars on a cumulative present worth basis.

Q Does this conclude your prefiled testimony?

A Yes.

The following are corrections to the C.D. McIntosh Unit 5 Need for Power Application for the sections and subsections I have adopted as part of my testimony:

1. Revise page TC-11 as attached.

2. On page 9-1, Subsection 9.1.1, the first sentence of the second paragraph, change the solitary "s" to an "a".

3. Revise Table 9-1 as attached.

4. Revise Table 9-2 as attached.

5. Revise Table 9-3 as attached.

6. On page 13-3, change the Summer Capacity and Winter Capacity units from "MW" to "kW".

List of Figures

Table 9-1

Lakeland Generating Capacity for Planning Horizon (Before Expansion Plan)

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Larsen CT1	14	-	-	-	-	-	-	-	-	-	-	-	-	-
Larsen CT2	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Larsen CT3	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Larsen 6	-	27	-	-	-	-	-	-	-	-	-	-	-	-
Larsen 7	40	50	50	50	-	-	-	-	-	-	-	-	-	-
Larsen 8CT	93	93	93	93	93	93	93	93	93	93	93	93	93	93
Larsen 5ST	31	31	31	31	31	31	31	31	31	31	31	31	31	31
McIntosh 1	87	87	87	87	87	-	-	-	-	-	-	-	-	-
McIntosh 2	103	103	103	103	103	103	103	-	-	-	-	-	-	-
McIntosh 3	205	205	205	205	205	205	205	205	205	205	205	205	205	205
McInstoh 1GT	20	20	20	20	20	20	20	20	20	20	20	20	20	20
McIntosh D1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
McInstosh D2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
McIntosh 5SC	-	-	~~249~~ 264	~~249~~ 264	~~249~~ 264	~~249~~ 264	~~249~~ 264	~~249~~ 264	~~249~~ 264	~~249~~ 264	~~249~~ 264	~~249~~ 264	~~249~~ 264	~~249~~ 264
TEA Sale	-	-25	-25	-25	-	-	-	-	-	-	-	-	-	-
FMPA sale	-	-	-	-~~100~~ 52	-100	-100	-100	-100	-100	-100	-100	-100	-100	-
Total	**626**	**624**	~~846~~ 861	~~746~~ 811	~~721~~ 736	~~634~~ 649	~~634~~ 649	~~531~~ 546	~~531~~ 546	~~531~~ 546	~~531~~ 546	~~531~~ 546	~~531~~ 546	~~631~~ 646

Capacity balance remains the same (before the expansion plan) after 2011.

City of Lakeland
Docket No. 990023-EM
Applicant Witness: Dan J. Runyan
Exhibit No ____ (DJR-1)
Page 3 of 5

Table 9-2
Projected Reliability Levels - Winter / Base Case

Year	Net Generating Capacity	Net System Purchases	Net System Sales	Net System Capacity	System Peak Demand		Reserve Margin		Excess/ (Deficit) to Maintain 15%	
					Before Interruptible and Load Management	After Interruptible and Load Management	Before Interruptible and Load Management	After Interruptible and Load Management	Before Interruptible and Load Management	After Interruptible and Load Management
1998/99	649	0	25	624	593	588	5.23	6.12	(58)	(52)
1999/00	886	0	25	861	612	607	40.69	41.85	157	163
2000/01	886	0	~~125~~ 75	~~761~~ 811	631	626	~~20.60~~ 28.53	~~21.59~~ 29.55	~~35~~ 85	~~41~~ 91
2001/02	836	0	100	736	650	645	13.23	14.11	(11)	(6)
2002/03	749	0	100	649	668	663	(2.84)	(2.11)	(119)	(113)
2003/04	749	0	100	649	687	682	(5.53)	(4.84)	(141)	(135)
2004/05	646	0	100	546	706	701	(22.66)	(22.11)	(266)	(260)
2005/06	646	0	100	546	725	720	(24.69)	(24.17)	(288)	(282)
2006/07	646	0	100	546	744	739	(26.61)	(26.12)	(310)	(304)
2007/08	646	0	100	546	761	756	(28.25)	(27.78)	(329)	(323)
2008/09	646	0	100	546	780	775	(30.00)	(29.55)	(351)	(345)
2009/10	646	0	100	546	799	794	(31.66)	(31.23)	(373)	(367)
2010/11	646	0	0	646	818	813	(21.03)	(20.54)	(295)	(289)
2011/12	646	0	0	646	837	832	(22.82)	(22.36)	(317)	(311)
2012/13	646	0	0	646	856	851	(24.53)	(24.09)	(338)	(333)
2013/14	646	0	0	646	875	870	(26.17)	(25.75)	(360)	(355)
2014/15	646	0	0	646	894	889	(27.74)	(27.33)	(382)	(376)
2015/16	646	0	0	646	912	907	(29.17)	(28.78)	(403)	(397)
2016/17	646	0	0	646	931	926	(30.61)	(30.24)	(425)	(419)
2017/18	646	0	0	646	951	946	(32.07)	(31.71)	(448)	(442)

City of Lakeland
Docket No. 990023-EM
Applicant Witness: Dan J. Runyan
Exhibit No. ____ (DJR-1)
Page 4 of 5

Table 9-3
Projected Reliability Levels - Summer / Base Case

Year	Net Generating Capacity	Net System Purchases	Net System Sales	Net System Capacity	System Peak Demand		Reserve Margin		Excess/ (Deficit) to Maintain 15%	
					Before Interruptible and Load Management	After Interruptible and Load Management	Before Interruptible and Load Management	After Interruptible and Load Management	Before Interruptible and Load Management	After Interruptible and Load Management
1999	797	0	25	772	498	493	55.02	56.59	199	205
2000	797	0	25	772	512	507	50.78	52.27	183	189
2001	747	0	100	647	522	517	23.95	25.15	47	52
2002	~~660~~ 747	0	100	~~560~~ 647	535	530	~~4.67~~ 20.93	~~5.66~~ 22.08	~~(55)~~ 32	~~(50)~~ 38
2003	660	0	100	560	546	541	2.56	3.51	(68)	(62)
2004	557	0	100	457	556	551	(17.81)	(17.06)	(182)	(177)
2005	557	0	100	457	569	564	(19.68)	(18.97)	(197)	(192)
2006	557	0	100	457	579	574	(21.07)	(20.38)	(209)	(203)
2007	557	0	100	457	592	587	(22.80)	(22.15)	(224)	(218)
2008	557	0	100	457	602	597	(24.09)	(23.45)	(235)	(230)
2009	557	0	100	457	614	609	(25.57)	(24.96)	(249)	(243)
2010	557	0	100	457	625	620	(26.88)	(26.29)	(262)	(256)
2011	557	0	0	557	637	632	(12.56)	(11.87)	(176)	(170)
2012	557	0	0	557	648	643	(14.04)	(13.37)	(188)	(182)
2013	557	0	0	557	660	655	(15.61)	(14.96)	(202)	(196)
2014	557	0	0	557	671	666	(16.99)	(16.37)	(215)	(209)
2015	557	0	0	557	683	678	(18.45)	(17.85)	(228)	(223)
2016	557	0	0	557	693	688	(19.62)	(19.04)	(240)	(234)
2017	557	0	0	557	704	699	(20.88)	(20.31)	(253)	(247)
2018	557	0	0	557	716	711	(22.21)	(21.66)	(266)	(261)

City of Lakeland
Docket No. 990023-EM
Applicant Witness: Dan J. Runyan
Exhibit No. ____ (DJR-1)
Page 5 of 5

BEFORE THE PUBLIC SERVICE COMMISSION

CITY OF LAKELAND

TESTIMONY OF MYRON R. ROLLINS

DOCKET NO. 990023-EM

FEBRUARY 3, 1999

Q Please state your name and address.

A My name is Myron R. Rollins. My business address is 11401 Lamar, Overland Park, Kansas 66211.

Q By whom are you employed and in what capacity?

A I am employed by Black & Veatch as a Project Manager in the Plant Services Department of the Power Division.

Q Please describe your responsibilities in that position.

A As a Project Manager in the Plant Services Department, I am responsible for managing various projects for utility and non-utility clients. These projects encompass a wide variety of services for the power industry. The services include load forecasts, conservation and demand-side management, reliability criteria and evaluation, development of generating unit addition alternatives, fuel forecasts, screening evaluation, production cost simulation, optimal generation expansion modeling, economic and financial evaluation, sensitivity analysis, risk analysis, power purchase and sales evaluation, strategic considerations, analyses of the effects of the 1990 Clean Air Act Amendments, feasibility studies, qualifying facility and independent power producer evaluations, power market studies and

power plant financing.

Q Please state your professional experience and educational background.

A. I received a Bachelors of Science degree in Electrical Engineering from the University of Missouri – Columbia. I also have two years of graduate study in nuclear engineering at the University of Missouri - Columbia. I am a licensed professional engineer and a Senior Member of the Institute of Electrical and Electronic Engineers.

I have been employed by Black & Veatch since 1976 in the Power Sector Advisory Services area. In the last ten years, I have been the project manager for over 100 projects. I have conducted a majority of my work for Florida utilities. Florida utilities for which I have worked include City of Lakeland-Department of Electric Utilities, Kissimmee Utility Authority, Florida Municipal Power Agency, Orlando Utilities Commission, Jacksonville Electric Authority, City of St. Cloud, Utilities Commission of New Smyrna Beach, Sebring Utilities Commission, City of Homestead, Florida Power Corporation, and Seminole Electric Cooperative.

I attempt to stay abreast of Florida Public Service Commission (PSC) proceedings. For instance, I was the Project Manager for projects that prepared 1998 Ten Year Site Plans for Kissimmee Utility Authority, City of Lakeland, Orlando Utilities Commission, and Jacksonville Electric Authority. I have previously presented testimony before the PSC for the Stanton 1 & 2 and AES-Cedar Bay need for power certification and had my testimony stipulated for Kissimmee Utility Authority and Florida Municipal Power Agency's Cane Island

Unit 3 need for power certification. I have also participated in the preparation of testimony for the Seminole Electric's Hardee County Combined Cycle Project, the Cypress Project, and the Hines Energy Center Project need for power certification.

Q What is the purpose of your testimony in this proceeding?

A The purpose of my testimony is to address Lakeland's need for power as it relates to McIntosh Unit 5 and the proposed conversion to combined cycle. In my testimony, I will discuss the methodology used to evaluate the need for McIntosh Unit 5 and its proposed conversion to combined cycle. I will also discuss economic assumptions used in the evaluations as well as the fuel price projections used. In my discussion of Lakeland's need for McIntosh Unit 5, and its conversion to combined cycle, I will discuss potential supply side alternatives to the project and the consistency of the project with Peninsular Florida's needs. I will show that Lakeland has adequately explored alternative generating technologies and the project will provide adequate electricity at a reasonable cost and will contribute to the electric system reliability and integrity of Lakeland and Peninsular Florida.

Q Were there Sections of the Lakeland McIntosh Unit 5 Need for Power Application prepared by you or under your direct supervision?

A Yes, Sections 4.0, 5.0, 6.0, 11.0 and 16.0.

Q Are you adopting these Sections as part of your testimony?

A Yes, I am.

Q Are there any corrections to these Sections?

A Yes. Attached as Exhibit MRR-1 are corrections to my adopted sections of the Need for Power Application. The corrections are minor typographical errors except that the forecasted price of coal has changed on Table 6-5: Low Fuel Price Forecast Summary. The revised low fuel price case coal prices decreased due to a spreadsheet error. The decreased coal prices do not affect any of the other numbers in the Need for Power Application since the optimal expansion program did not select any coal fueled alternatives other than McIntosh Unit 4 whose fuel price was calculated from another spreadsheet since it burns high sulfur coal for the first four years and petroleum coke thereafter.

Q Please describe the methodology used to determine the need for McIntosh Unit 5 and its conversion to combined cycle.

A There are two basic aspects of the need for McIntosh Unit 5 and its conversion to combined cycle that are addressed by the methodology. The first is the reliability need that involves comparing the load forecast plus reserve margin requirements to available capacity to determine the need for new capacity additions. Mr. Lawrence has testified to the load forecast including the effects of existing conservation programs and reductions in peak demand from load management and interruptible loads. Mr. Runyan has testified that there are no additional demand-side management programs that are cost effective that would reduce loads. Mr. Elwing has testified to the 15 percent reserve margin criteria Lakeland uses which is applied to the peak demand forecast to obtain capacity requirements. Mr. Elwing has also testified to Lakeland's existing units, planned

unit retirements, and power sales contracts which determine Lakeland's available capacity. The available capacity has been compared to the capacity requirements by Mr. Runyan to determine the need for additional capacity.

The second aspect of the need for McIntosh Unit 5 and its conversion to combined cycle that is addressed by the methodology is the economic need. The methodology for determining the economic need is the determination that McIntosh Unit 5 and its conversion to combined cycle is the least-cost alternative available. Lakeland conducted an Invitation for Proposals (IFP) as described by Mr. Sanz-Guerrero to obtain purchase power bids. Lakeland also developed several self-build alternatives in addition to the conversion of McIntosh Unit 5 to combined cycle as I will discuss later in my testimony. These alternatives were modeled with Black and Veatch's POWROPT Optimal Generation Expansion Program to select the least cost expansion plans. Mr. Runyan's testimony described these evaluations. The evaluations based on cumulative present worth revenue costs were conducted over a typical 20 year planning horizon from 1999 through 2018. The cumulative present worth revenue costs include fuel costs for all units, fixed and variable O&M costs for new units, and capital costs for new units. In addition to the base case evaluations, the methodology used numerous sensitivity analyses as described by Mr. Runyan to ensure that McIntosh Unit 5 and its conversion to combined cycle was the least cost alternative under a wide variety of assumptions and conditions.

Q What economic parameters were assumed?

A A consistent set of economic parameters were assumed for the evaluations. A

general inflation rate of 2.5 percent was used. The general inflation rate was selected as being generally representative of future inflation rates assuming a continuation of current economic conditions. An escalation rate of 2.0 percent was used for capital costs and 3.0 percent for O&M costs. The escalation rate for capital costs was selected based on the general perception that power plant capital cost increases will not quite keep pace with general inflation. This may be especially true with escalation rates applied to current combustion turbine based power plant costs which have increased significantly recently due primarily to increases in the cost of combustion turbines. Likewise, the escalation rate for O&M was perceived to increase slightly faster than general inflation due primarily to increases in labor costs. Lakeland's long-term bond interest rate is assumed to be 5.5 percent and the same interest rate was assumed for interest during construction. These were both selected to be consistent with a 2.5 percent general inflation rate. A 10 percent present worth discount rate was used. The 10 percent present worth discount rate is somewhat higher than the bond interest rate which is often used as a present worth discount rate in municipal utility economic evaluations. The 10 percent present worth discount rate was selected to provide additional conservatism in the evaluations. Use of a higher discount rate guards against high capital expenditures being made to reduce operating costs in the future when uncertainty of future conditions might negate those future operating cost savings. Sensitivity analyses were conducted with the 5.5 percent present worth discount rate as well as a 15 percent discount rate which might better represent the rate payer's own discount rate. A fixed charge rate of 8.41 percent was developed based on the 5.5 percent bond interest rate and applied to the capital cost for new unit additions in the evaluations.

Q Why was a fixed charge rate used in the evaluations when Lakeland plans to pay cash for the conversion of McIntosh Unit 5 to combined cycle?

A A fixed charge rate was applied to all alternatives evaluated in order to have a fair and consistent evaluation between all alternatives even though Lakeland plans to pay cash for the conversion of McIntosh Unit 5 to combined cycle.

Q What fuel forecasts were developed for the Need for Power Application?

A Forecasts were developed for the delivered price of coal, high and low sulfur No. 6 oil, diesel fuel, natural gas, petroleum coke, and refuse derived fuels. The coal price projection is based on the coal currently being burned in McIntosh Unit 3. The fuel forecast used in the evaluations is based on the real fuel price projections contained in Appendix 21.2 and sponsored by Mr. Sanz-Guerrero. The general inflation rate of 2.5 percent is added to make the fuel prices consistent with the economic assumptions in the evaluations. The base case fuel price projection in Appendix 21.2 is the same as presented in Lakeland's 1998 Ten Year Site Plan. High and low band fuel price projections were developed by adding an additional 2.5 percent annually to the base case forecast for the high band and subtracting 2.5 percent annually from the base case forecast for the low band. The plus and minus 2.5 percent band represents an even wider band than the 1.5 percent band used in Lakeland's 1998 Ten Year Site Plan to further ensure that the selection of the conversion of McIntosh Unit 5 to combined cycle as the least cost alternative is a very robust decision.

Q Has Lakeland compared their fuel cost projections with other fuel price

forecasts?

A Lakeland conducted a thorough review of industry price forecasts. The intent of the review was to ensure Lakeland's view of future prices of fuel is similar to industry recognized forecasts. When compared with forecasts such as American Gas Association (AGA), Gas Research Institute (GRI), Annual Energy Outlook (AEO) published by the US Department of Energy, and the DRI forecast contained in the Cane Island Unit 3 Need for Power Application, Lakeland's forecast is similar to the industry recognized forecasts. Below is the fuel price review for Lakeland's delivered fuel price projections as compared against industry fuel price forecasts for coal, oil, and natural gas. The industry forecasts are for average prices for the nation. Coal costs for Florida are much higher than the nation as a whole due to general lack of ability to use low cost western coal in Florida and higher transportation costs associated with moving coal to Florida.

Forecast	2000 Price (1)			2015 Price (1)		
	Gas	Oil	Coal	Gas	Oil	Coal
1997 Lakeland	2.32	3.14	1.78	2.94	4.13	2.10
1998 AGA	2.25	2.74	NA	2.35	3.72	1.05
1998 GRI	2.24	2.71	NA	2.40	2.71	1.15
1998 AEO	2.54	3.03	1.20	3.04	3.41	1.03
1998 KUA/FMPA/DRI	2.06	2.55	1.62	2.51	3.50	1.54

(1) Forecast Prices are in 1997 dollars (real basis) $/MBtu.

Q **How were the delivered natural gas prices developed?**

A The delivered natural gas prices were developed by adding a transportation charge

of $0.65/MBTU to the natural gas commodity fuel price.

Q How was the $0.65 MBTU transportation price developed?

A The $0.65/MBTU transportation price is Lakeland's estimate of their future average price for natural gas transportation. It takes into consideration a number of factors including Lakeland's existing FTS-1 and FTS-2 entitlements and pricing, Phase IV capacity and pricing, relinquishment and acquisition of permanent capacity, and sale and purchase of interruptible capacity.

Q Are the fuel price projections developed reasonable for use in evaluating different generating unit alternatives?

A Yes. The fuel price projections are consistent with current fuel prices for existing units at Lakeland and are reasonable to use to evaluate different generating unit alternatives.

Q Does Lakeland have adequate FTS-1 and FTS-2 natural gas transportation to operate McIntosh Unit 5?

A Lakeland has significant amounts of FTS-1 and FTS-2 natural gas transportation which can be used for McIntosh Unit 5. Lakeland's FTS-1 and FTS-2 maximum daily quantities (MDQ) are shown below.

Maximum Daily Quantity (Mcf/Day)

	Oct.	Nov.	Dec.-Feb.	Mar.	Apr.	May.-Sept.
FTS-1	17,952	17,724	11,485	3,261	7,672	8,306
FTS-2	20,948	13,444	13,444	20,944	22,636	20,223
	38,900	31,168	24,929	24,205	30,308	28,529

Q Describe FGT's Phase IV expansion plans.

A On August 15, 1997 FGT initiated an "open season" for a proposed expansion of mainline transmission capability to serve new and existing markets. Open season refers to the industry practice of conducting a survey of future market demands for transport of natural gas prior to the design and construction of new line construction or expansion projects on existing pipeline systems. The survey is employed to evaluate regional demand for transportation capacity by requesting that potential shippers submit non-binding expressions of interest or requests for new, additional (incremental), or relinquishment of firm transmission service. This process allows FGT to estimate the extent of pipeline capacity expansion volumes needed and to determine the overall economic feasibility of a system expansion. The open season is conducted under defined ground rules to assure the integrity of the shipper's submissions and the non-discriminatory analysis of the response.

Q When will FGT's Phase IV expansion be implemented?

A This initiative was structured to gauge the potential demand for the prospective FGT Phase IV expansion project with an estimated in-service date of mid-year 2001. FGT filed for Federal Energy Regulatory Commission (FERC) approvals of the Phase IV expansion program December 2, 1998. The filing consists of expanding services to Southwest Florida with 205 miles of underground pipelines. Additionally FGT proposes to add 48,570 horsepower of compression to its system. FGT anticipates construction of this project will begin in March of 2000, and is scheduled for completion and placement into service by May 2001.

Q What incremental transportation charges will Lakeland likely incur as a result of FGT's Phase IV expansion expenditures?

A The proposed additions will add 272,000 MBtu per day of incremental firm transportation service to Peninsular Florida. The estimated cost of the expansion is $350 million. The Phase IV expansion of the FGT system should be capable of implementation at a relatively low incremental cost impact to existing and prospective customers. Transportation charges for incremental gas service should be less than FTS-2 rates.

Q Did Lakeland nominate Phase IV gas?

A No, not directly. Lakeland is currently negotiating with third parties that have nominated Phase IV gas. Lakeland's negotiations are for both commodity and transportation.

Q Once implemented, will FGT's Phase IV expansion provide the necessary transportation capacity to support McIntosh Unit 5 and the proposed conversion to combine cycle?

A Yes. The natural gas supply at the delivery point to the McIntosh site will be fully adequate in terms of quantity and delivery pressure to support the facility. The ten mile 16 inch pipeline that Lakeland owns from the St. Petersburg lateral to the McIntosh site is capable of delivering enough natural gas for approximately 800 MW of generating capacity.

Q Has Lakeland adequately provided for natural gas transportation for

McIntosh Unit 5 to provide adequate and reliable electricity at a reasonable cost?

A Yes. Lakeland has significant amounts of natural gas transportation already under contract and is negotiating with third parties for additional transportation. The installation of Phase IV will ensure adequate natural gas transportation is available. In addition, McIntosh Unit 5 will have No. 2 oil as backup, which will ensure reliability and provide opportunities for further savings on natural gas transportation costs.

Q **Please describe the generating unit alternatives that were developed as alternatives to the conversion of McIntosh Unit 5.**

A Cost and performance estimates were developed for conventional, advanced, nuclear, energy storage systems, and renewable and waste energy resources as potential capacity addition alternatives. Although many of the technologies are not viable at this time, cost and performance data were developed in as much detail as possible to provide the most accurate resource planning evaluation.

Conventional alternatives were found to be the most technically viable and cost effective through a two-phase screening analysis developed on Section 12.0 of the Need for Power Application. The conventional generating unit alternatives developed included:

- Pulverized coal
- Atmospheric fluidized bed
- Pressurized circulating fluidized bed
- Combined cycle

- Simple cycle combustion turbine

Capital cost, performance and O&M cost estimates have been compiled for each capacity addition alternative. The estimates provide representative values for each generation alternative.

A 250 MW pulverized coal unit with dry scrubber, electrostatic precipitator and selective catalytic reduction (SCR) was selected as a solid fueled alternative. The unit is assumed to be located at the existing McIntosh site with rail delivered coal and mechanical draft tower cooling.

Another solid fueled alternative is a 250 MW atmospheric circulating fluidized bed unit (AFB) with selective non-catalytic reduction (SNCR). The unit is assumed to be located at the existing McIntosh site with rail delivered coal and mechanical draft tower cooling.

Lakeland is pursuing a project utilizing the pressurized circulating fluidized bed technology. The flexibility, low cost, and efficiency of this technology will provide low cost generation for many years. The pressurized circulating fluidized bed is essentially a combined cycle burning solid fuel. The pressurized circulating fluidized bed will operate on coal the first four years of operation under a Department of Energy (DOE) contract. Following the first four years of operation, the unit is assumed to burn petroleum coke. Negotiations between Lakeland and the technology providers are progressing at this time of filing.

The combined cycle units all utilize conventional, heavy duty, industrial type, combustion turbines. The combined cycles will be dual fueled with natural gas as the primary fuel and fuel oil as the secondary fuel. The units are assumed to be located at the McIntosh site with dry low NO_x combustors for emissions control. As described in Section 11.6.6, the combined cycle units modeled in this Need for Power Application include:

- 1 x 1 General Electric 7EA
- 2 x 1 General Electric 7EA
- 1 x 1 Westinghouse 501F
- 1 x 1 Westinghouse 501G

The simple cycle combustion turbines will be dual fueled with natural gas as the primary fuel and low sulfur No. 2 fuel oil as the secondary fuel. The units are assumed to be located at the McIntosh site with dry low NO_x combustors for emissions control. Combustion turbine alternatives were based on the size and performance of specific machines. There are a number of combustion turbines available from different manufacturers with similar sizes and performance characteristics. As described in Section 11.6.7, the simple cycle combustion turbines modeled in this Need for Power Application include:

- General Electric LM 6000
- General Electric 7EA
- Westinghouse 501F

Q Is the proposed project consistent with Peninsular Florida's needs?

A Yes, the Florida Reliability Coordinating Council (FRCC) has selected a

minimum 15 percent reserve margin criterion to ensure reliability for Peninsular Florida. Based on information provided in the FRCC's 1998 Ten Year Plan for the State of Florida, the available capacity meets the 15 percent reserve margin requirements in 2002. This 15 percent reserve margin is met by fully exercising all load management and interruptible loads. If all of these loads were served at the time of peak demand without the implementation of load management and interruptible load, Peninsular Florida would only have 6 percent reserve margin in 2002. The available capacity consists of existing capacity, capacity which has been certified under the Florida Electrical Power Plant Siting Act, and proposed capacity changes not requiring certification under the Florida Electrical Power Plant Siting Act. McIntosh Unit 5 will provide capacity to contribute to maintaining the 15 percent reserve margin as well as provide generating capacity in lieu of the load management and interruptible capacity being used to meet the 15 percent reserve margin.

Q Does this conclude your prefiled testimony?

A Yes.

The following are corrections to the C.D. McIntosh Unit 5 Need for Power Application for the sections and subsections I have adopted as part of my testimony:

1. Change the 2000 price for 1997 Lakeland Coal from "1.76" to "1.78".

2. Revise Table 6-5 as attached.

Table 6-5: Low Fuel Price Forecast Summary (Delivered Price $/MBtu)

Year	Coal	Natural Gas	High Sulfur Oil	Low Sulfur Oil	Diesel	Pet. Coke	RDF
1999	~~$1.90~~ 1.80	$3.01	$3.17	$4.44	$4.64	$1.12	($2.48)
2000	~~$1.92~~ 1.82	$3.03	$3.22	$4.51	$4.74	$1.18	($2.67)
2001	~~$1.94~~ 1.84	$3.05	$3.27	$4.58	$4.84	$1.20	($2.87)
2002	~~$1.96~~ 1.86	$3.06	$3.32	$4.65	$4.94	$1.22	($3.08)
2003	~~$1.98~~ 1.88	$3.09	$3.38	$4.74	$5.04	$1.24	($3.31)
2004	~~$2.00~~ 1.90	$3.13	$3.45	$4.83	$5.13	$1.26	($3.55)
2005	~~$2.02~~ 1.92	$3.18	$3.52	$4.93	$5.25	$1.28	($3.81)
2006	~~$2.04~~ 1.94	$3.24	$3.60	$5.04	$5.37	$1.30	($4.09)
2007	~~$2.06~~ 1.96	$3.30	$3.68	$5.17	$5.58	$1.32	($4.39)
2008	~~$2.09~~ 1.99	$3.36	$3.79	$5.30	$5.79	$1.35	($4.72)
2009	~~$2.11~~ 2.01	$3.42	$3.89	$5.45	$5.96	$1.37	($5.06)
2010	~~$2.13~~ 2.03	$3.49	$4.00	$5.62	$6.14	$1.39	($5.43)
2011	~~$2.16~~ 2.05	$3.52	$4.05	$5.68	$6.20	$1.41	($5.77)
2012	~~$2.18~~ 2.08	$3.55	$4.09	$5.74	$6.27	$1.42	($6.13)
2013	~~$2.21~~ 2.10	$3.59	$4.13	$5.80	$6.34	$1.44	($6.51)
2014	~~$2.23~~ 2.12	$3.62	$4.18	$5.87	$6.41	$1.45	($6.92)
2015	~~$2.25~~ 2.14	$3.65	$4.22	$5.93	$6.48	$1.47	($7.34)
2016	~~$2.28~~ 2.17	$3.68	$4.27	$6.00	$6.55	$1.48	($7.80)
2017	~~$2.30~~ 2.19	$3.72	$4.32	$6.06	$6.62	$1.50	($8.29)
2018	~~$2.30~~ 2.21	$3.71	$4.31	$6.06	$6.62	$1.50	($8.71)
AAI	**1.03%**	**1.12%**	**1.64%**	**1.65%**	**1.89%**	**1.57%**	**6.84%**

AAI = Average Annual Increase

BEFORE THE PUBLIC SERVICE COMMISSION

CITY OF LAKELAND

TESTIMONY OF DAVID H. MCLAIN

DOCKET NO. 990023-EM

FEBRUARY 3, 1999

Q Please state your name and address.

A My name is David H. McLain. My business address is 501 East Lemon Street; Lakeland, Florida 33801.

Q By whom are you employed and in what capacity.

A I am employed by the City of Lakeland - Department of Electric Utilities as Manager of Business Operations.

Q Please describe your responsibilities in that position.

A As Manager of Business Operations, I am responsible for external reporting for the utility, utility budget preparation, long-range budget forecasting, financing of projects, liaison with bond underwriters and financial advisors and other finance related functions.

Q Please state your professional experience and educational background.

A I received a Bachelors of Science Degree in Accounting from Arkansas State University and a Masters in Accounting from Memphis State University. I have been employed by the City of Lakeland - Department of Electric Utilities for ten

years. During this period I have held the position of Finance Officer and my current position of Manager of Business Operations. Prior to this time period I was employed as an Audit Partner with Evans, Parish & Fisk for seven years and employed as an auditor for Ernst & Whinney for seven years.

In my current position I am responsible for budgeting, outside reporting and bond issues. I also oversee the Rates and Information Services Divisions. My past experience includes auditing clients in various industries including banking, real estate development, retail & wholesale food, and the electric industry.

Q **What is the purpose of your prefiled testimony in this proceeding?**

A The purpose of my prefiled testimony is to address the financial feasibility of the City of Lakeland's McIntosh Unit 5 and proposed conversion to combined cycle.

Q **Were there sections of the Lakeland McIntosh Unit 5 Need for Power Application prepared by you or under your direct supervision?**

A Yes, Section 19.0.

Q **Are you adopting this Section as part of your testimony?**

A Yes, I am.

Q **Are there any corrections to these Subsections?**

A Yes. Attached as Exhibit DHM-1 is a minor correction to Section 19.0. The Lakeland Bond Ordinances require a minimum coverage ratio of 1.30 (not 1.25).

Q Does Lakeland have adequate access to funds to finance this project?

A Yes. The City of Lakeland has a track record of strong financial performance and plant operation. Lakeland Bond Ordinances require a minimum coverage ratio of 1.30 to ensure sound financial performance. Currently Lakeland has a 5.45 debt coverage ratio for senior debt and a 2.53 debt coverage ratio for combined senior and junior debt.

Q How will this Project be financed for the City of Lakeland?

A Even though Lakeland could easily obtain financing for the construction of McIntosh Unit 5 and the proposed conversion to combined cycle, Lakeland currently intends to pay for the project primarily out of cash funds. Lakeland does not intend to issue long-term debt for the project financing.

Q Why is the City of Lakeland using cash as a means for paying for McIntosh Unit 5 and the proposed conversion to combined cycle?

A To eliminate long-term financial responsibility and reduce indirect costs, Lakeland intends to pay cash for the construction and engineering of McIntosh Unit 5 and the proposed conversion to combined cycle.

Q What is the financial impact of paying with cash?

A There are no potential adverse financial implications with using cash to pay for the proposed conversion. Paying with cash eliminates Lakeland's long-term financial responsibility, and decreases the financial burden on the Lakeland ratepayers. The use of cash will result in savings of $2,905,000 of interest during construction costs alone assuming a 5.5 percent interest rate and an 18 month

construction schedule.

Q Despite using cash as the method of payment, why is the proposed conversion modeled as if it were financed using debt.

A As explained in Mr. Rollins testimony, the capital cost of the various alternatives varied widely. Therefore, we believe that a more fair comparison between alternatives would be to evaluate them with traditional tax exempt municipal financing. Thus, for evaluation purposes, the alternatives were evaluated assuming tax exempt financing.

Q Does this conclude your testimony?

A Yes it does.

City of Lakeland
Docket No. 990023-EM
Applicant Witness: David H. McLain
Exhibit No. ___ (DHM-1)

The following are corrections to the C.D. McIntosh Unit 5 Need for Power Application for the sections and subsections I have adopted as part of my testimony:

1. On page 19-1, change the minimum coverage ratio in the first sentence of the second paragraph from "1.25" to "1.30".