BEFORE THE PUBLIC SERVICE COMMISSION

DIRECT TESTIMONY OF MYRON R. ROLLINS

ON BEHALF OF

FLORIDA MUNICIPAL POWER AGENCY

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Q. Please state your name and business address.

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

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

A. I am employed by Black & Veatch Corporation. My current position is Project Manager.

Q. Please describe your responsibilities in that position.

A. As a project manager, I am responsible for the management of 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 evaluations, production cost simulations, 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 educational background and experience.

A. I received a Bachelor 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 over twenty-eight years of experience in the power industry specializing in generation planning and project development. In the past ten years, I have been the project manager for over 100 projects, the vast majority of which are for Florida utilities. Florida utilities for which I have worked include Lakeland –Electric, Kissimmee Utility Authority, Florida Municipal Power Agency, Orlando Utilities Commission, JEA, City of St. Cloud, Utilities Commission of New Smyrna Beach, Sebring Utilities Commission, City of Homestead, Florida Power Corporation, and Seminole Electric Cooperative.

I was responsible for the development of Black & Veatch's POWRPRO chronological production costing program and RECOM unit commitment program, and POWROPT optimal generation expansion program. I am also responsible for power market analysis and project feasibility studies. I have been responsible for need for power certification on a number of power plants in Florida including Stanton 1, 2, and A, Cedar Bay, Cane Island 3, McIntosh 5 and the Brandy Branch Combined Cycle Conversion. I also participated in the need for power certification for the Hardee and Hines projects. I have presented expert testimony on several occasions before the Alaska, Indiana, Missouri and Florida public service commissions and have presented numerous papers on strategic planning and cogeneration.

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

A. The purpose of my testimony is to provide an overview and summary of Exhibit No. __ (FMPA-1), the Treasure Coast Energy Center (TCEC) Unit 1 Need for Power Application. In addition to this general summary, I will discuss the economic parameters and the methodology used to evaluate alternatives available to meet the All-Requirements Project's (ARP's) capacity need. I will also discuss the numerous supply side alternatives that were considered to potentially mitigate the need for the TCEC Unit 1. I will describe the detailed economic evaluations and sensitivity analyses conducted to evaluate the cost effectiveness of TCEC Unit 1. I will analyze TCEC Unit 1's consistency with Peninsular Florida's capacity and reliability needs, as well as the 1990 Clean Air Act Amendments. I will conclude my testimony by discussing the consequences of delaying the addition of TCEC Unit 1.

Q. Are you sponsoring any sections of Exhibit No. __ (FMPA-1), the TCEC Unit 1 Need for Power Application?

A. Yes. I am sponsoring Sections 5.1, 5.4, 7, 9, 10, 12, 13, 15, and Appendix E all of which were prepared by me or under my direct supervision.

Economic Parameters

Q. Please describe the economic parameters used in the evaluations of alternatives available to meet the ARP's capacity need.

A. A 2.5 percent annual general inflation rate was used. Escalation rates of 2.5 percent annually were used for capital and O&M costs. A long-term tax exempt bond rate of 5.0 percent was assumed. The rate for interest during construction and the present worth discount rate were also assumed to be 5.0 percent. Alternatives were evaluated over a 20 year planning period from 2005 through 2024.

Q. In your opinion, are these economic parameters appropriate for use in this Need for Power Application?

A. Yes. They are consistent with economic parameters that we have been using in similar evaluations before the Commission and more importantly, they are internally consistent.

Evaluation Methodology

Q. Please briefly describe the process that led to the determination that the addition of TCEC Unit 1 is the most cost-effective alternative available to meet the ARP's capacity need.

A. FMPA applied three general, independent strategies in order to obtain the most cost-effective alternative to meet ARP's capacity need. The first strategy was the solicitation of power supply proposals from third parties. The second strategy investigated was self-build alternatives. The third strategy included the evaluation of demand-side management alternatives. The power supply proposals and the self-build alternatives were all evaluated from a cumulative present worth cost (CPWC) standpoint, and compared to find the least cost alternative.

To obtain the CPWC, the supply-side evaluations of all generating unit alternatives were analyzed using POWROPT and POWRPRO. POWROPT and POWRPRO are Black & Veatch's proprietary capacity expansion plan optimization and system production costing models, respectively. POWROPT analyzes all possible combinations of generating unit alternatives and power purchase options which satisfy the forecast capacity requirements. POWROPT then ranks the potential capacity expansion plans based on the lowest total system CPWC over the planning horizon. POWROPT performs the capacity expansion on an annual basis, considering all possible unit additions, before determining an optimal expansion plan. The results of the capacity expansion plans are input into POWRPRO. POWRPRO is a chronological production costing model used in power supply system planning. It simulates the hour-by-hour operation of power supply systems over the planning horizon which as stated above is the 20 year period from 2005 through 2024. POWRPRO generates various summary reports including each unit's annual generation, fuel costs, operation and maintenance costs, on-line hours, emissions, capacity factor, average net operating heat rate, and unit starts and stops. The production costs are used along with capital costs and other fixed charges to generate the CPWC of each capacity expansion plan.

POWROPT and POWRPRO have been used on numerous other Need for Power Application proceedings before the Commission as well as for numerous Ten-Year Site Plan filings.

Q. Please briefly describe the strategies employed by FMPA to determine the most cost-effective alternative to meet the ARP's capacity needs.

A. FMPA issued a Request for Proposals (RFP) for purchase power. The Power Supply RFP stated that FMPA would consider proposals for the purchase of 100 to 300 MW of physically firm, base or intermediate power from existing specified resources, a portfolio of supply resources with appropriate backup guarantees, and/or a generating facility to be constructed at the proposer's site for unit power sale. The RFP was advertised locally and placed on the Internet. It was issued on September 22, 2004 and bids were due on November 23, 2004. The Power Supply RFP is included in Appendix B of Exhibit No. __ (FMPA-1), the TCEC Unit 1 Need for Power Application.

To investigate the self-build strategy, FMPA commissioned Black & Veatch to develop cost and performance estimates for TCEC Unit 1, a 1 x 1 F-class combined cycle with a steam turbine design to accommodate the maximum duct firing possible. The description of the project is presented in Section 6 including a summary of the cost estimate and the detailed engineering, procurement, and construction (EPC) cost estimate is presented in Appendix B of Exhibit No. __ (FMPA-1), the TCEC Unit 1 Need for Power Application. In addition to TCEC Unit 1, Black & Veatch also developed cost and performance estimates for other self build alternatives including renewable technologies, conventional technologies, advanced technologies, energy storage technologies, multi-fuel generation or distributed generation technologies, and nuclear.

All of these supply side alternatives were investigated along with the purchase power proposals from the RFP process to determine the least cost alternative. Supply side alternatives selected for detailed evaluation were utilized by POWROPT to form expansion plans which were ranked by CPWC.

Supply-Side Alternatives

Q. What other conventional supply-side alternatives were considered?

A. Several conventional supply-side alternatives were considered that could mitigate the need for TCEC Unit 1. These alternatives include simple cycle combustion turbines (General Electric LM6000, 7EA, 7FA), combined cycle plants (General Electric 1x1 7FA), and a pulverized coal unit.

Q. Please describe the combined cycle alternative considered.

A. The combined cycle alternative was identical to TCEC Unit 1. For the first combined cycle to be installed in an expansion plan, the capital cost was assumed equal to TCEC Unit 1. For subsequent combined cycle units installed in an expansion plan, the estimated costs were less reflecting the savings associated with installing additional units at a site. The TCEC site is being designed to accommodate up to four units identical to TCEC Unit 1. The first year that a second combined cycle is allowed to be considered in an expansion plan is 2009 which is a year after the installation date for TCEC Unit 1.

Q. Was a 2x1 combined cycle considered?

A. No.

Q. Why not?

A. The size of FMPA's system is such that a unit larger than the 300 MW TCEC Unit 1 would represent too large of a loss during forced outages and maintenance. It is prudent to limit the size of the largest unit on a utility's system to no more than the level of reserves that the utility carries. Thus if the loss of its largest resource occurs, the utility would still be able to meet its loads. This is often referred to as an "n minus one" criterion. TCEC Unit 1 will represent about 19 percent of FMPA's projected load when it goes in service which is close to FMPA's 18 percent summer reserve margin criteria. A 2x1 combined cycle would be about twice the size and represent approximately

38 percent of FMPA's load in 2008 which would be too great of an exposure to be prudent.

Q. Please describe the process through which alternatives were selected for detailed analysis.

A. The generating unit alternatives considered were evaluated and screened with respect to availability of resources and commercial development. Generating unit alternatives which were deemed to be commercially available and have adequate resources available were considered for further evaluation.

Q. Please describe the methodology used to evaluate the conventional supply-side alternatives?

A. In developing the cost and performance estimates, a specific manufacturer (General Electric) and specific models were analyzed. These alternatives were evaluated, not to indicate a preference to a specific manufacturer, but rather to generalize the properties of similar generating technologies with similar attributes. Capital costs were developed using direct and indirect costs, with an allowance of Owners' costs. General assumptions, as well as assumptions for direct and indirect costs are presented in Exhibit No. __ (FMPA-1), the TCEC Unit 1 Need for Power Application. Owner's cost items are presented in Table 7-14 of the same exhibit. Fixed and variable O&M costs estimates were developed for each of the conventional alternatives. Performance estimates for output and heat rate were also developed. Degradation was included in the output and heat rate performance estimates. The construction period for the conventional alternatives also was estimated.

Q. Besides conventional alternatives, were any other supply side alternatives considered?

A. Yes. Cost and performance estimates were developed for renewable, advanced, energy storage, multi-fuel or distributed generation, and nuclear technologies.

Q. How were these other technologies evaluated?

A. A screening analysis was conducted for the conventional technologies as well as these other technologies. The screening analysis considered cost, availability, and availability of required resources.

Q. What was the result of the screening analysis?

A. The screening analysis indicated that only the conventional alternatives along with integrated gasification combined cycle (IGCC) which was an advanced alternative merited detailed system economic evaluation.

Economic Evaluation

Q. How was the detailed system economic evaluation conducted?

A. FMPA's system was modeled with POWROPT over a 20 year period from 2005 through 2024. FMPA's system consisted of FMPA existing power supply resources consisting of existing power plant and power purchases. FMPA's system also consisted of FMPA's committed units. The committed units are other units that FMPA plans to install. The committed units are a LM6000 simple cycle combustion turbine to be installed in Key West in 2006, two unsited LM6000 simple cycle combustion turbines to be installed in 2007, 250 MW of a jointly owned coal unit to be installed in 2011, and an LM6000 simple cycle combustion turbine to be installed in Key West in 2018. The committed units are described in more detail by Witness Casey. Even though there are a large number of units under consideration for retirement, as shown in Table 2-8 of Exhibit No. __ (FMPA-1), the TCEC Unit 1 Need for Power Application, none of these units were assumed to be retired through the end of the evaluation period. If some of these units actually retire, it only increases the need for TCEC Unit 1.

POWROPT models FMPA's system as described above and selects generating unit alternatives to meet the system capacity requirements presented in Table 4-3 of Exhibit No. __ (FMPA-1), the TCEC Unit 1 Need for Power Application. Additional capacity is first needed in the summer of 2008. In selecting power supply alternatives, POWROPT selects the power supply alternatives considering capital, fuel, and O&M costs such that the alternatives represent the least cost expansion plan on a CPWC basis over the planning period. All alternatives are analyzed as additions to FMPA's system. The analysis also includes the effects on the dispatch of existing units.

Expansion plans were developed considering only self build alternatives and considering the purchase power alternatives described in Section 8 and

Appendix D of Exhibit No. __ (FMPA-1), the TCEC Unit 1 Need for Power Application.

Q. How were natural gas transportation costs handled in the economic evaluations?

A. For TCEC Unit 1 and additional combined cycle units considered, firm natural gas transmission costs were included for the units. The cost for firm natural gas transportation was included as a fixed O&M cost in POWROPT and is included in the fixed O&M shown in the summary spreadsheets in Appendix E of Exhibit No. __ (FMPA-1), the TCEC Unit 1 Need for Power Application. The amount of firm natural gas transportation assumed was based on Florida Gas Transmission Company's (FGT's) tariff which allows a maximum of 6 percent of the daily transportation allotment to be used in a single hour. The amount of firm natural gas transportation purchased allows TCEC Unit 1 and the additional combined cycle units to operate at full load including duct firing considering the 6 percent per hour limitation. The actual amount of firm natural gas transportation included in the evaluations for TCEC Unit 1 was 37,355 MBtu per day. The cost was based on FGT's FTS-2 firm gas transportation rate.

Natural gas transportation costs for the purchase power bids were based on the specifics of the purchase power bid. For example, Bidders A and C provided firm natural gas transportation costs for specified allotments of natural gas in their bids. Bidder B assumed the use of interruptible gas in their bid. The allotment of firm natural gas included in Bidder A's bid was significantly less than the allotment included for TCEC Unit 1.

Q. How were natural gas transportation costs handled for volumes in excess of the firm transportation allotments included in the bids?

A. We assumed that additional transportation requirements were obtained through interruptible gas transportation on a per MBtu basis; however, we assumed that this interruptible gas would not be interrupted and in essence was firm.

Q. What affect does that assumption have on the analysis of Bidder A's proposals?

A. Because interruptible gas transportation is much cheaper than firm transportation, this assumption provides a tremendous benefit to Bidder A, whose proposals included a lower allotment of firm transportion. We used that assumption only to provide the maximum amount of benefits to the purchase power bids compared to TCEC Unit 1.

Q. What were the results of the economic evaluations?

A. For the self build alternatives, the expansion plan consisting of TCEC Unit 1 in 2008 was the least cost. The expansion plan with TCEC Unit 1 in 2008 was $23 million lower in CPWC than the next least cost self build plan which installed two LM6000 simple cycle combustion turbines in 2008. It should be noted that POWROPT selects TCEC Unit 1 for addition in 2009 in that plan.

The expansion plan with TCEC Unit 1 in 2008 is also the least cost expansion plan compared to expansion plans containing the purchase power bids. The expansion plan containing Bidder A's 20 year proposal was the lowest in cost of all the expansion plans containing the purchase power bids based on the favorable assumption that interruptible gas would be available on a firm basis. The expansion plan with Bidder A's purchase power offer was $14 million in CPWC more expensive than the expansion plan with TCEC Unit 1 in 2008. However, Bidder A's purchase power offer is $279 million more expensive than TCEC Unit 1 if interruptible natural gas is not assumed to be available.

Q. Are there any other considerations relative to the cost effectiveness of TCEC Unit 1?

A. Yes. As discussed in Witness Armbruster's testimony, it is expected that TCEC Unit 1 will cost less than the cost estimate shown in Table 6-3 of Exhibit No. __ (FMPA-1), the TCEC Unit 1 Need for Power Application. If TCEC Unit 1 costs less than the Table 6-3 estimate used in the evaluations, it will be even more cost effective.

Q. Is TCEC Unit 1 the most cost-effective alternative available to FMPA?

A. Yes. TCEC Unit 1 is the least cost alternative available to FMPA and thus is the most cost-effective alternative available.

Q. Will TCEC Unit 1 provide adequate electricity at reasonable cost?

A. Yes. TCEC Unit 1 meets FMPA's electric generation needs at the lowest cost of all the alternatives evaluated.

Q. Will TCEC Unit 1 meet FMPA's need for electric system reliability and integrity?

A. Yes. The expansion plan with TCEC Unit 1 in 2008 meets FMPA's reserve margin requirements and as a reliable efficient unit meets FMPA's need for reliability and integrity.

Sensitivity Analyses

Q. Did you conduct any sensitivity analyses relative the TCEC Unit 1?

A. Yes, several sensitivity analyses were conducted on the expansion plans containing TCEC Unit 1 and the Bidder A 20 year offer which had the lowest expansion plan cost of all the purchase power bids. We conducted sensitivity analyses for high and low fuel prices, high and low load growth, high and low capital costs, and a higher present worth discount rate.

Q. What was the result of the sensitivity analyses?

A. For every case except the high capital cost case, the TCEC Unit 1 expansion plan was the least cost alternative. For the high capital cost case which consisted of increasing the capital costs 10 percent or $21.8 million for TCEC Unit 1 while holding the capacity payments constant for Bidder A's purchase power bid, the expansion plan with TCEC Unit 1 was $0.5 million more expensive than Bidder A's. However, this sensitivity analysis assumed that Bidder A could obtain additional transportation requirements through interruptible gas transportation on a per MBtu basis. As discussed above, this assumption is extremely favorable to Bidder A Furthermore, as discussed in Witness Armbruster's testimony, the cost of TCEC Unit 1 is not expected to increase; thus, the high capital cost scenario is unlikely, Details of the sensitivity analyses are presented in Section 10 of Exhibit No. __ (FMPA-1), the TCEC Unit 1 Need for Power Application.

Peninsular Florida Needs

Q. What are the benefits to Peninsular Florida associated with the addition of TCEC Unit 1?

A. As reliable efficient generation, TCEC Unit 1 will increase reliability in Peninsular Florida. TCEC Unit 1 will be more efficient than much of the natural gas fired generation in the state and thus will displace operation of less efficient gas fired generation. Since TCEC Unit 1 produces less emissions than most of the gas fired generating units, emissions will be reduced as well.

The most important benefit to Peninsular Florida will be TCEC Unit 1's location on the southern portion of the grid. By adding generation in the south, TCEC Unit 1 will help mitigate the difficulty of moving power from north to south in the state.

Clean Air Act

Q. Have pollution control costs been properly included in the cost estimates for the TCEC Unit 1?

A. Yes. The capital and operating cost estimates for TCEC Unit 1 contain adequate costs for pollution control equipment. TCEC Unit 1 will be equipped with SCR and will utilize ultra low sulfur oil as a backup fuel.

The Clean Air Act also requires that affected units provide SO_2 allowances for SO_2 emissions. The estimated SO_2 emission allowance requirements from TCEC Unit 1 are approximately 57 tons/year. These allowances can be obtained from excess allowances available to FMPA or they could be purchased on the open market. At a current allowance cost of $575/ton, the cost of purchasing allowances would be approximately $33,000 per year. The cost for allowances is included in the variable O&M costs.

Consequences of Delay

Q. What are the consequences to FMPA of delaying TCEC Unit 1?

A. Delaying TCEC Unit 1 would result in reduced reliability and higher costs. If TCEC Unit 1 is delayed, FMPA's reserve margin will fall to 12 percent in 2008 which is well below FMPA's 18 percent requirement. The lower reserve margin would increase the probability that FMPA would not be able to serve the ARP member loads.

If other capacity would be installed to retain FMPA's 18 percent summer reserve margin, costs would increase. The least cost self build expansion plan without TCEC Unit 1 in 2008 is $23.1 million more in CPWC than the expansion plan with TCEC Unit 1 in 2008.

Q. Does this conclude your pre-filed testimony?

A. **Yes.**