

**BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION**

**In re: Petition for Determination  
of Need for Expansion of an Electrical  
Power Plant, for Exemption from Rule  
25-22.082, F.A.C., and for Cost Recovery  
through the Fuel Clause**

DOCKET NO. 060642-E1  
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**DIRECT TESTIMONY  
OF SAMUEL S. WATERS**

**ON BEHALF OF  
PROGRESS ENERGY FLORIDA**

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**IN RE: PETITION FOR DETERMINATION OF NEED FOR  
EXPANSION OF AN ELECTRICAL POWER PLANT, FOR  
EXEMPTION FROM RULE 25-22.082, F.A.C., AND FOR COST  
RECOVERY THROUGH THE FUEL CLAUSE**

**BY PROGRESS ENERGY FLORIDA**

**FPSC DOCKET NO. \_\_\_\_\_**

**DIRECT TESTIMONY OF**

**SAMUEL S. WATERS**

**I. INTRODUCTION AND QUALIFICATIONS**

1 **Q. Please state your name, employer, and business address.**

2 **A.** My name is Samuel S. Waters and I am employed by Progress Energy Carolinas  
3 (“PEC”). My business address is 410 S. Wilmington Street, Raleigh, North Carolina,  
4 27602.

5  
6 **Q. Please tell us your position with PEC and describe your duties and**  
7 **responsibilities in that position.**

8 **A.** I am Director of System Resource Planning for Progress Energy Florida (“PEF” or the  
9 “Company”) and PEC. I am responsible for directing the resource planning process  
10 for both companies. Our resource planning process is an integrated approach to  
11 finding the most cost-effective alternatives to meet each company’s obligation to

1 serve, in terms of long-term price and reliability. We examine both supply-side and  
2 demand-side resources available and potentially available to the Company over its  
3 planning horizon, relative to the Company's load forecasts. In my capacity as  
4 Director of System Resource Planning, I oversaw the completion of the Company's  
5 most recent Ten Year Site Plan ("TYSP") document filed in April 2006.

6  
7 **Q. Please summarize your educational background and employment experience.**

8 **A.** I graduated from Duke University with a Bachelor of Science degree in Engineering  
9 in 1974. From 1974 to 1985, I was employed by the Advanced Systems Technology  
10 Division of the Westinghouse Electric Corporation as a consultant in the areas of  
11 transmission planning and power system analysis. While employed by Westinghouse,  
12 I earned a Masters Degree in Electrical Engineering from Carnegie-Mellon  
13 University.

14 I joined the System Planning department of Florida Power & Light Company  
15 ("FPL") in 1985, working in the generation planning area. I became Supervisor of  
16 Resource Planning in 1986, and subsequently Manager of Integrated Resource  
17 Planning in 1987, a position I held until 1993. In late, 1993, I assumed the position of  
18 Director, Market Planning, where I was responsible for oversight of the regulatory  
19 activities of FPL's Marketing Department, as well as tracking of marketing-related  
20 trends and developments.

21 In 1994, I became Director of Regulatory Affairs Coordination, where I was  
22 responsible for management of FPL's regulatory filings with the FPSC and the

1 Federal Energy Regulatory Commission ("FERC"). In 2000, I returned to FPL's  
2 Resource Planning Department as Director.

3 I assumed the position of Manager of Resource Planning with Progress Energy  
4 in January of 2004, and assumed my current position in October of 2005. I am a  
5 registered Professional Engineer in the states of Pennsylvania and Florida, and a  
6 Senior Member of the Institute of Electrical and Electronics Engineers, Inc. ("IEEE").

7  
8 **II. PURPOSE AND SUMMARY OF TESTIMONY**

9  
10 **Q. What is the purpose of your testimony in this proceeding?**

11 **A.** My primary purpose in this testimony is to present the fuel savings and overall cost  
12 effectiveness to customers of the proposed power uprate project at the Company's  
13 Crystal River Unit 3 ("CR3"), the Company's nuclear unit. A more detailed  
14 description of the CR3 power uprate project is provided in Mr. Roderick's testimony.

15 I will also generally describe the Company, its generation resources, including  
16 purchased power, its transmission and distribution systems, and CR3's place in the  
17 system. Finally, I will generally describe the Company's conservation measures and  
18 explain why conservation measures cannot mitigate the economic need for the CR3  
19 power uprate project.

20  
21 **Q. Are you sponsoring any exhibits to your testimony?**

22 **A.** Yes. I have prepared or supervised the preparation of the following exhibits to my  
23 testimony:

- 1 • Exhibit No. \_\_\_\_ (SSW-1), a Summary of Annual Fuel Savings of the
- 2 Proposed Power Upgrade to CR 3; and
- 3 • Exhibit No. \_\_\_\_ (SSW-2), a Summary of the Overall Cost Effectiveness of the
- 4 Proposed Power Upgrade to CR 3 to the retail customer.

5 These exhibits to my testimony are true and correct.

6

7 **Q. Please summarize your testimony.**

8 **A.** There is an economic need for the CR3 power uprate resulting from the substantial

9 fuel savings of over \$2.6 billion that the power uprate will deliver customers for the

10 extended life of CR3 and the enhanced fuel diversity on PEF's system and in Florida.

11 The CR3 power provides retail customers an estimated net fuel savings benefit, when

12 compared to the costs of the power uprate, of \$327 million on a present value basis.

13 In addition, PEF's customers receive additional, reliable base load capacity from the

14 lowest cost fuel generation source available to PEF. No other generation supplier can

15 provide additional base load capacity at a net savings to customers comparable to the

16 CR3 power uprate, thus, the CR3 power uprate projects is the most cost effective

17 option for PEF. All of these benefits demonstrate the clear value of the CR3 power

18 uprate to PEF's customers and support the Company's request that the Commission

19 grant its Petition.

1                                   **III. OVERVIEW OF THE COMPANY AND THE PROJECT**  
2

3 **Q. Please generally describe the Company.**

4 **A.** PEF is an investor-owned public utility, regulated by the Florida Public Service  
5 Commission (“PSC”), with an obligation to provide electric service to approximately  
6 1.6 million customers in its service area, which covers approximately 20,000 square  
7 miles in 35 of the state’s 67 counties. PEF supplies electricity at retail to  
8 approximately 350 communities and at wholesale to 21 municipalities, utilities, and  
9 power agencies in the State of Florida.

10                   PEF serves one of the faster growing areas of the country. Its forecasted annual  
11 customer growth is projected to be 1.7 percent over the next 10 years. Annual sales  
12 growth is projected to be approximately 2.5 percent during the same period.  
13

14 **Q. What are the Company’s current supply-side generation resources?**

15 **A.** PEF currently owns and operates a diverse mix of supply-side resources, consisting  
16 of generation from nuclear, coal, oil, and gas, along with purchases from other  
17 utilities and purchases from non-utility generators such as cogenerators. The existing  
18 generating capacity includes one 788 MW nuclear steam unit (reflecting the  
19 Company’s ownership interest in CR3), four combined cycle units with a total  
20 capacity of 1,910 MW, 12 fossil steam units totaling 3,983 MW in capacity, and  
21 3,069 MW of capacity in 47 combustion turbine units. The Company’s existing total  
22 winter net generating capability is 9,750 MW.

23                   PEF purchases over 1,400 MW of capacity from twenty qualifying facilities

1 and two investor-owned utilities. The qualifying facilities from which the Company  
2 purchases power are fueled by a variety of sources, including natural gas, wood waste,  
3 and municipal waste. PEF is also engaged in two long-term contracts for power. One  
4 contract is with The Southern Company, which sells the Company 414 MW from the  
5 coal-fired Miller and Scherer Plants. The other contract is for system power from  
6 Tampa Electric Company. This contract increased to 70 MW in 2005. Altogether,  
7 these purchased power resources account for approximately thirteen percent of PEF's  
8 generation resources.

9  
10 **Q. What is the Company's Demand-Side Management (DSM) Program?**

11 **A.** To comply with the directives of the Florida Energy Efficiency and Conservation Act  
12 ("FEECA"), PEF must file with the PSC a DSM Plan to meet the conservation goals  
13 established by the PSC pursuant to FEECA. The PSC established conservation goals  
14 for PEF that span the ten-year period from 2000 through 2009 in Order No. PSC-99-  
15 1942-FOF-EG issued October 1, 1999 in Docket No. 971007-EG. Consistent with  
16 these conservation goals established by the PSC, the Company filed its DSM Plan on  
17 December 29, 1999. PEF's DSM Plan was approved by the PSC in Order No. PSC-  
18 00-0750-PAA-EG, Docket No. 991789-EG, issued on April 17, 2000.

19 PEF proposed new conservation goals for the ten year period from 2005  
20 through 2014, as well as a new DSM Plan for meeting the proposed goals, in a filing  
21 with the Commission as part of Docket No. PSC-040031-EG. Over the five  
22 years from 2005 to 2009 the proposed conservation goals are generally lower than the  
23 existing set of goals, reflecting less available savings from demand-side resources.

1 The proposed new conservation goals were approved by the Commission in Order  
2 No. PSC-04-0769-PAA-EG, Docket No. PSC-040031-EG, on August 9, 2004. The  
3 new approved conservation goals will lead to an increase in PEF's firm winter and  
4 summer peak demand.

5 Approximately 345,000 customers participated in the Energy Management  
6 program in the Company's DSM plan at the end of 2005, contributing about 700,000  
7 kW of winter peak-shaving capacity for use during high load periods.

8  
9 **Q. Can you please provide a general description of the Company's transmission  
10 and distribution facilities?**

11 **A.** Yes. PEF is part of a nationwide interconnected power network that enables power to  
12 be exchanged between utilities. PEF has approximately 5,000 circuit miles of  
13 transmission lines including about 200 circuit miles of 500 kV lines and about 1,500  
14 circuit miles of 230 kV lines. PEF has distribution lines of approximately 35,000  
15 circuit miles, including about 13,000 circuit miles of underground cable. Distribution  
16 and transmission substations in service have a transformer capacity of approximately  
17 45,000,000 kVA in 614 transformers. Distribution line transformers numbered  
18 356,930 with an aggregate capacity of about 18,000,000 kVA.

19  
20 **Q. Please describe the CR3 unit.**

21 **A.** CR3 is the Company's nuclear unit. It was the third unit built at the Crystal River  
22 site, which is a 4,700 acre site located in Citrus County, Florida. The other units  
23 located at the Crystal River site are all coal-fired units (Crystal River Units 1, 2, 4,



1 and 5). The CR3 unit is a pressurized water reactor that currently generates  
2 approximately 900 MWe. A more detailed description of the CR3 unit is provided in  
3 the testimony of Mr. Roderick.  
4

5 **Q. What is the CR3 power uprate project?**

6 **A.** The CR3 power uprate project consists of two stages of modifications and efficiency  
7 enhancements that will increase the power output of CR3 from about 900 MWe by  
8 180 MWe to 1,080 MWe. The CR3 power uprate project will be performed during  
9 the scheduled refueling outages for the CR3 unit in 2009 and 2011. Additional detail  
10 about the CR3 power uprate project is contained in the testimony of Mr. Roderick.  
11

#### 12 **IV. BENEFITS OF THE CR3 POWER UPRATE PROJECT**

13

14 **Q. Please describe how the CR 3 power uprate will benefit PEF's customers.**

15 **A.** There are two important ways that increasing the amount of nuclear energy available  
16 to PEF customers will provide benefits (1) decreased system fuel costs and (2) a  
17 lower need for new capacity in the future. By increasing the amount of power  
18 available from CR3, additional energy will be produced, and nuclear energy is the  
19 lowest cost energy available to the system. Additional energy from the unit will  
20 displace energy from other, higher cost, generation sources that would otherwise be  
21 used to meet the total demand for electricity, resulting in substantial fuel savings to  
22 the system, which translates to lower fuel charges to customers.  
23

1 **Q. Can you estimate the prospective fuel savings to PEF's customers?**

2 **A.** Yes. Using a detailed production costing model, I have calculated the expected  
3 savings resulting from the combined uprates of 40 MW in December of 2009, and  
4 140 MW in November of 2011. The results of the analysis are shown in my Exhibit  
5 No. \_\_\_ (SSW-1). As shown in this exhibit, the total nominal fuel savings for the  
6 years 2009 through 2025 are more than \$1.4 billion. If we look out through 2036  
7 (when the license extension will end), we expect nominal savings to exceed \$2.6  
8 billion.

9  
10 **Q. What are the costs associated with the increased rating to CR3?**

11 **A.** There are three components to the costs associated with the proposed increase in  
12 rating. First, there are the costs associated with the power uprate itself, and Mr.  
13 Roderick has identified total costs of approximately \$250 million. Second, there are  
14 the costs for additional cooling at the site, and the costs are estimated at \$43 million,  
15 according to Mr. Roderick. Third, additional transmission requirements to  
16 accommodate the power increase will result in a cost of approximately \$89 million, as  
17 explained by Mr. Roderick. The total costs to achieve the benefit of the full 180 MW  
18 power increase is estimated to be \$381.8 million.

19  
20 **Q. Does the rating increase to CR3 provide savings to PEF customers?**

21 **A.** Yes. I have compared the net present value of savings to costs in my Exhibit No. \_\_\_  
22 (SSW-2), which shows a net benefit of approximately \$327 million NPV to the retail  
23 customer.

1  
2 **Q. How does the increase in ratings reduce the need for new capacity in the future?**

3 **A.** PEF plans to a 20 percent reserve margin, so each additional MW that is available  
4 from CR3 reduces the need for one MW of new capacity to maintain the same reserve  
5 margin. The 180 MW of “new” capacity that will be available therefore reduces the  
6 need for 180 MW of capacity beyond 2011.

7  
8 **Q. Have you quantified the value of the capacity benefit provided by the increase in  
9 rating?**

10 **A.** No. To be conservative, I have not added these benefits, but there is no question that  
11 the additional capacity will reduce future needs. The 180 MW is roughly equivalent  
12 to one new combustion turbine eliminated from the future capacity plan. The real  
13 need for the CR3 power uprate project however, is economic, not reliability. As I  
14 have explained, the total nominal fuel savings will exceed \$2.6 billion and the present  
15 value of net savings to retail customers will be approximately \$327 million. There is  
16 no other generation alternative available to the Company that can provide an  
17 additional 180 MW of reliable, base load energy at a net savings to PEF’s customers.  
18 The CR3 power uprate project is, therefore, cost effective even without consideration  
19 of the additional capacity benefits.

1 **Q. Are there other benefits provided by the CR3 unit power uprate?**

2 **A.** Yes. Not only is nuclear energy the lowest cost energy available to the system,  
3 history has shown that the nuclear fuel commodity (uranium) is more stable in price  
4 than gas or oil and lately even coal, and this stability will help to reduce the overall  
5 fuel price volatility to PEF's customers. Consider, for example, that a 10% change in  
6 nuclear fuel prices might result in a change in the energy delivered from a nuclear unit  
7 of 50 to 75 cents per MWh, while a 10% change in gas prices might result in a change  
8 in energy delivered from a combined cycle unit of 5 to 7.5 dollars, based on prices  
9 recently experienced. Beyond the impact that equal percentage changes in fuel prices  
10 may have on the customer bill, clearly oil and gas prices have been extremely volatile  
11 in recent times, with natural gas prices varying by as much as 50% just in the last  
12 year.

13 In addition to the cost impacts, there is also a value to increasing fuel diversity  
14 and lessening dependence on oil and gas in the Company's overall fuel mix. Even a  
15 relatively small increase in the nuclear capacity contributes to a decrease in the  
16 exposure of the system, and therefore customers, to interruption in natural gas, oil and  
17 coal supplies.

18  
19 **Q. Was the CR3 power uprate project included in the Company's most recent**  
20 **TYSP filed with the Commission in April 2006?**

21 **A.** No, it was not. At the time the CR3 power uprate project was developed, during the  
22 Company's preparation for the steam generator replacement and related work during

1 the upcoming nuclear fuel outages, the Company's future capacity needs had already  
2 been identified for filing in the TYSP. The project, therefore, was not included in the  
3 Company's reserve margin requirements and for that reason it is not included in  
4 PEF's TYSP. As I have explained, the CR3 power uprate project is needed to achieve  
5 the economic benefits of substantial fuel savings for PEF's customers and to increase  
6 the Company's fuel diversity.

## 8 **V. NEED FOR THE CR3 POWER UPRATE PROJECT**

9  
10 **Q. Is there a need for the CR3 Power Uprate Project?**

11 **A.** Yes, there is a clear economic need for the project. The CR3 power uprate is the most  
12 cost effective alternative for PEF customers, providing them with 180 MW of  
13 additional power at a net savings, not a net cost. The project further provides  
14 additional benefits in the form of additional, reliable base load capacity and  
15 improvement of fuel diversity on the PEF system.

16  
17 **Q. Can this economic need be met or exceeded by requests for proposals to other  
18 potential suppliers?**

19 **A.** No. As I have explained, the CR3 power uprate project results in the lowest cost  
20 supply of electricity because it offers additional base load capacity at a net savings  
21 and not a net cost to the Company's customers. The bid rule was established to  
22 determine the most cost-effective alternative to the Company's generation proposal.

1 No other generation supplier can provide the generation benefits of the CR3 power  
2 uprate project at a net savings to customers. All other potential generation suppliers  
3 would likely provide additional capacity at a net cost to the customer, and they  
4 certainly would not be able to provide the environmental and fuel diversity benefits of  
5 nuclear generation. The CR3 power uprate project is by definition, then, the lowest  
6 cost supply of reliable electricity to customers and the most cost effective alternative  
7 for the Company.  
8

9 **Q. Is the CR3 power uprate project consistent with the needs of Peninsular**  
10 **Florida?**

11 **A.** Yes, it is. The CR3 power uprate project will assist Peninsular Florida in attaining the  
12 15 percent minimum level of planning reserves targeted for the FRCC region. It will  
13 also increase the fuel diversity in Florida by adding additional nuclear fuel capacity.  
14 This will advance the State's goal, recently expressed by the Florida legislature in the  
15 2006 session energy legislation, of increasing fuel diversity and reducing the reliance  
16 on fossil fuels.  
17

## 18 VI. CONSERVATION MEASURES

19

20 **Q. Can the need for the CR3 power uprate be mitigated by the Company pursuing**  
21 **conservation measures reasonably available to it?**

1 A. No. As I have explained, the need for the CR3 power uprate project is based on  
2 economics and supported by environmental and fuel diversity objectives. The  
3 significant net fuel savings to customers, fuel diversity benefits, and environmental  
4 benefits define the need for the project. The Company has identified and  
5 implemented a set of cost-effective DSM programs that have already successfully met  
6 the Commission-established goals. Additional conservation programs, if used to  
7 avoid the CR3 power uprate project, would be disadvantageous to customers. The  
8 CR3 uprate will produce more incremental energy into the system than an equivalent  
9 amount of conservation can save. Put another way, the energy produced by 180 MW  
10 of CR3 will be greater than the energy saved by 180 MW of conservation. This  
11 occurs because conservation generally saves energy in proportion to the participant's  
12 load factor, or less, making the energy savings equivalent to a 60% load factor or less,  
13 while CR3 would be expected to produce energy at a 90% capacity factor. The  
14 difference in energy would have to be made up by the remaining generating units on  
15 the system, increasing fossil-fired generation and system emissions compared to  
16 implementation of the uprate. If the comparison were to be done on equivalent  
17 energy alone, it would take more MW of conservation to save an amount of energy  
18 equivalent to the energy produced by the CR3 upgrade, which would result in higher  
19 costs to customers. In addition to these considerations, the CR3 uprate project is  
20 expected to produce more in production cost savings alone, without consideration of  
21 its capacity benefit, than its cost to implement, suggesting that deferral or avoidance  
22 of the project by any means would be a detriment to customers. For these reasons, I

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3  
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6

believe that the CR3 uprate project could not be avoided by conservation measures that would be considered reasonably available.

**Q. Does this conclude your testimony?**

**A. Yes.**





Docket No. \_\_\_\_\_

Progress Energy Florida

Exhibit No. \_\_\_\_ (SSW-2)

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Exhibit No. \_\_\_\_ (SSW-2)

**Summary of Overall Cost Effectiveness of the Proposed Upgrade to Crystal River Unit 3  
to the Retail Customer**

NPV Costs, (000's) in 2006 \$'s	\$303,450
NPV Benefits, (000's) in 2006 \$'s	\$630,375
Net Benefit to Retail Customers, (000's) in 2006 \$'s	\$326,925