

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

**In re: Petition to Recover Costs of
of Crystal River Unit 3 Uprate through
the Fuel Clause**

**DOCKET NO. 070052
Submitted for filing:
May 4, 2007**

ORIGINAL

**AMENDED DIRECT TESTIMONY
OF SAMUEL S. WATERS**

**ON BEHALF OF
PROGRESS ENERGY FLORIDA**

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**IN RE: PETITION TO RECOVER THE COSTS OF THE CRYSTAL
RIVER 3 UPRATE THROUGH THE FUEL CLAUSE**

BY PROGRESS ENERGY FLORIDA

FPSC DOCKET NO. 070052

AMENDED 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 27601.

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 Planning and Regulatory Performance for Progress Energy
9 Carolinas (PEC). At the outset of this proceeding I was responsible for directing the
10 resource planning process for both Progress Energy Florida (“PEF” or the
11 “Company”) and PEC. In March, I assumed my current position stated above. I
12 continue to testify on behalf of PEF in this proceeding. Our resource planning
13 process is an integrated approach to finding the most cost-effective alternatives to
14 meet each company’s obligation to serve, in terms of long-term price and reliability.

1 We examine both supply-side and demand-side resources available and potentially
2 available to the Company over its planning horizon, relative to the Company's load
3 forecasts. In my capacity as Director of System Planning and Regulatory
4 Performance, I oversaw the completion of the Company's most recent Ten Year Site
5 Plan ("TYSP") document filed in April 2007.

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 the position of Director of System Resource
5 Planning in October of 2005. I am a registered Professional Engineer in the states of
6 Pennsylvania and Florida, and a Senior Member of the Institute of Electrical and
7 Electronics Engineers, Inc. ("IEEE").

8
9 **II. PURPOSE AND SUMMARY OF AMENDED TESTIMONY**

10
11 **Q. Did you previously file direct testimony in this proceeding?**

12 **A.** Yes, I did.

13
14 **Q. What is the purpose of your previously filed testimony in this proceeding?**

15 **A.** My primary purpose is to present the fuel savings and overall cost effectiveness to
16 customers of the proposed power uprate project at the Company's Crystal River Unit
17 3 ("CR3"), the Company's nuclear unit. A more detailed description of the CR3
18 power uprate project is provided in Mr. Roderick's testimony.

19 I also generally describe the Company, its generation resources, including
20 purchased power, its transmission and distribution systems, and CR3's place in the
21 system. Finally, I generally describe the Company's conservation measures and
22 explained why conservation measures cannot mitigate the economic need for the CR3
23 power uprate project.

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Q. Why are you filing amended testimony?

A. The CR3 power uprate project has been divided into three phases, instead of the original two phases, with the first phase beginning in 2007 instead of 2009. As a result, an increase of 12 MWe is expected in 2008, following the first phase of the CR3 power uprate project during the CR3 2007 refueling outage. I have filed amended testimony reflecting the revised net fuel savings resulting from the acceleration of part of the CR3 power uprate project to the 2007 refueling outage. The revised CR3 power uprate phases and the revised schedule for these phases are explained in the amended direct testimony of Daniel L. Roderick.

Because the Commission has granted the Company's petition for a determination of need for the expansion of the CR3 power plant and the exemption from Rule 25-22.082, F.A.C., I have omitted my testimony that was directly related to those requests in the Company's Petition in my amended direct testimony and I included the testimony that is relevant to the Company's petition for recovery of the costs of the CR3 power uprate through the Fuel Clause.

Q. Are you sponsoring any exhibits to your testimony?

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

- Amended Exhibit No. ____ (SSW-1), an amended Summary of Annual Fuel Savings of the Proposed Power Upgrade to CR 3; and

- Amended Exhibit No. ____ (SSW-2), an amended Summary of the Overall Cost Effectiveness of the Proposed Power Upgrade to CR 3 to the retail customer.

These amended exhibits to my testimony are true and correct.

Q. Please summarize your testimony.

A. The CR3 power uprate will provide customers substantial fuel savings of over \$2.6 billion for the extended life of CR3 and enhanced fuel diversity on PEF's system and in Florida. The CR3 power provides retail customers an estimated net fuel savings benefit, when compared to the costs of the power uprate, of \$320 million on a present value basis. In addition, PEF's customers receive additional, reliable base load capacity from the lowest cost fuel generation source available to PEF. All of these benefits demonstrate the clear value of the CR3 power uprate to PEF's customers and support the Company's request that the Commission grant its Petition for cost recovery through the Fuel Clause.

III. OVERVIEW OF THE COMPANY AND THE PROJECT

Q. Please generally describe the Company.

A. PEF is an investor-owned public utility, regulated by the Florida Public Service Commission ("PSC"), with an obligation to provide electric service to approximately 1.6 million customers in its service area, which covers approximately 20,000 square miles in 35 of the state's 67 counties. PEF supplies electricity at retail to

1 approximately 350 communities and at wholesale to 22 municipalities, utilities, and
2 power agencies plus 9 rural electric cooperatives in the State of Florida.

3 PEF serves one of the faster growing areas of the country. Its forecasted annual
4 customer growth is projected to be 1.8 percent over the next 10 years. Annual sales
5 growth is projected to be approximately 2.5 percent during the same period.
6

7 **Q. What are the Company's current supply-side generation resources?**

8 **A.** PEF currently owns and operates a diverse mix of supply-side resources, consisting of
9 generation from nuclear, coal, oil, and gas, along with purchases from other utilities
10 and purchases from non-utility generators such as cogenerators. The existing
11 generating capacity includes one 788 MW nuclear steam unit (reflecting the
12 Company's ownership interest in CR3), four combined cycle units with a total
13 capacity of 1,885 MW, 12 fossil steam units totaling 4,008 MW in capacity, and
14 3,087 MW of capacity in 47 combustion turbine units. The Company's existing total
15 winter net generating capability is 9,768 MW.

16 PEF purchases over 1,300 MW of capacity from 19 qualifying facilities and
17 two investor-owned utilities. The qualifying facilities from which the Company
18 purchases power are fueled by a variety of sources, including natural gas, wood waste,
19 and municipal waste. PEF is also engaged in two long-term contracts for power. One
20 contract is with The Southern Company, which sells the Company 414 MW from the
21 coal-fired Miller and Scherer Plants. The other contract is for system power from
22 Tampa Electric Company. This contract increased to 70 MW in 2005. Altogether,
23 these purchased power resources account for approximately 12 percent of PEF's

1 generation resources.

2
3 **Q. What is the Company's Demand-Side Management (DSM) Program?**

4 **A.** To comply with the directives of the Florida Energy Efficiency and Conservation Act
5 ("FEECA"), PEF must file with the PSC a DSM Plan to meet the conservation goals
6 established by the PSC pursuant to FEECA. The PSC established conservation goals
7 for PEF that span the ten-year period from 2000 through 2009 in Order No. PSC-99-
8 1942-FOF-EG issued October 1, 1999 in Docket No. 971007-EG. Consistent with
9 these conservation goals established by the PSC, the Company filed its DSM Plan on
10 December 29, 1999. PEF's DSM Plan was approved by the PSC in Order No. PSC-
11 00-0750-PAA-EG, Docket No. 991789-EG, issued on April 17, 2000.

12 PEF proposed new conservation goals for the ten year period from 2005
13 through 2014, as well as a new DSM Plan for meeting the proposed goals, in a filing
14 with the Commission as part of Docket No. PSC-040031-EG. Over the five
15 years from 2005 to 2009 the proposed conservation goals are generally lower than the
16 existing set of goals, reflecting less available savings from demand-side resources.
17 The proposed new conservation goals were approved by the Commission in Order
18 No. PSC-04-0769-PAA-EG, Docket No. PSC-040031-EG, on August 9, 2004. The
19 new approved conservation goals will lead to an increase in PEF's firm winter and
20 summer peak demand.

21 Approximately 389,000 customers participated in the Energy Management
22 program in the Company's DSM plan at the end of 2006, contributing about 755,000
23 kW of winter peak-shaving capacity for use during high load periods.

1
2 **Q. Can you please provide a general description of the Company's transmission**
3 **and distribution facilities?**

4 **A.** Yes. PEF is part of a nationwide interconnected power network that enables power to
5 be exchanged between utilities. PEF has approximately 5,000 circuit miles of
6 transmission lines including about 200 circuit miles of 500 kV lines and about 1,500
7 circuit miles of 230 kV lines. PEF has distribution lines of approximately 35,000
8 circuit miles, including about 13,000 circuit miles of underground cable. Distribution
9 and transmission substations in service have a transformer capacity of approximately
10 45,000,000 kVA in 614 transformers. Distribution line transformers numbered
11 356,930 with an aggregate capacity of about 18,000,000 kVA.

12
13 **Q. Please describe the CR3 unit.**

14 **A.** CR3 is the Company's nuclear unit. It was the third unit built at the Crystal River
15 site, which is a 4,700 acre site located in Citrus County, Florida. The other units
16 located at the Crystal River site are all coal-fired units (Crystal River Units 1, 2, 4,
17 and 5). The CR3 unit is a pressurized water reactor that currently generates
18 approximately 900 MWe. A more detailed description of the CR3 unit is provided in
19 the amended testimony of Mr. Roderick.

20
21 **Q. What is the CR3 power uprate project?**

22 **A.** The CR3 power uprate project consists of three stages of modifications and efficiency
23 enhancements that will increase the power output of CR3 from about 900 MWe by

1 180 MWe to 1,080 MWe. The CR3 power uprate project will be performed during
2 the scheduled refueling outages for the CR3 unit in 2007, 2009 and 2011. Additional
3 detail about the CR3 power uprate project is contained in the amended testimony of
4 Mr. Roderick.

5
6 **IV. BENEFITS OF THE CR3 POWER UPRATE PROJECT**

7
8 **Q. Please describe how the CR 3 power uprate will benefit PEF's customers.**

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

17
18 **Q. Can you estimate the prospective fuel savings to PEF's customers?**

19 **A.** Yes. Using a detailed production costing model, I have calculated the expected
20 savings resulting from the combined uprates of 12 MW in January of 2008, 28 MW in
21 December of 2009, and 140 MW in November of 2011. The results of the analysis
22 are shown in my amended Exhibit No. ____ (SSW-1). As shown in this exhibit, the
23 total nominal fuel savings for the years 2009 through 2025 are more than \$1.4 billion.

1 If we look out through 2036 (when the license extension will end), we expect
2 nominal savings to exceed \$2.6 billion.

3
4 **Q. What are the costs associated with the increased rating to CR3?**

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

13
14 **Q. Does the rating increase to CR3 provide savings to PEF customers?**

15 **A.** Yes. I have compared the net present value of savings to costs in my amended
16 Exhibit No. ____ (SSW-2), which shows a net benefit of approximately \$320 million
17 NPV to the retail customer. This amount has been updated since my original direct
18 filed testimony to consider the early addition of 12 MWe from the initial MUR
19 (Measurement Uncertainty Recovery) phase being completed at the end of 2007 as
20 opposed to 2009. The reasons for the change in timing are discussed in detail in the
21 Amended Direct Testimony of Daniel L. Roderick. As we updated our calculations
22 for this change, we noticed that the calculation of AFUDC had a formula error in the

1 outer years. This error has been corrected and the effects are included in the revised
2 numbers in amended Exhibit No. __ (SSW-2).
3

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

5 **A.** PEF plans to a 20 percent reserve margin, so each additional MW that is available
6 from CR3 reduces the need for one MW of new capacity to maintain the same reserve
7 margin. The 180 MW of "new" capacity that will be available therefore reduces the
8 need for 180 MW of capacity beyond 2011.
9

10 **Q. Have you quantified the value of the capacity benefit provided by the increase in
11 rating?**

12 **A.** No. To be conservative, I have not added these benefits, but there is no question that
13 the additional capacity will reduce future needs. The 180 MW is roughly equivalent
14 to one new combustion turbine eliminated from the future capacity plan. The real
15 need for the CR3 power uprate project however, is economic, not reliability. As I
16 have explained, the total nominal fuel savings will exceed \$2.6 billion and the present
17 value of net savings to retail customers will be approximately \$320 million. There is
18 no other generation alternative available to the Company that can provide an
19 additional 180 MW of reliable, base load energy at a net savings to PEF's customers.
20 The CR3 power uprate project is, therefore, cost effective even without consideration
21 of the additional capacity benefits.
22

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 TYSP filed with**
20 **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 was not included in
4 PEF's 2006 TYSP. As I have explained, the CR3 power uprate project is needed to
5 achieve the economic benefits of substantial fuel savings for PEF's customers and to
6 increase the Company's fuel diversity.

7
8 **Q. Does this conclude your testimony?**

9 **A. Yes.**

10

Docket No. 070052

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	\$320,369
NPV Benefits, (000's) in 2006 \$'s	\$639,844
Net Benefit to Retail Customers, (000's) in 2006 \$'s	\$319,475