

**BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION**

**DOCKET NO. 100009-EI  
FLORIDA POWER & LIGHT COMPANY**

**IN RE: NUCLEAR POWER PLANT COST RECOVERY AMOUNT  
TO BE RECOVERED DURING THE PERIOD  
JANUARY - DECEMBER 2011**

**REBUTTAL TESTIMONY OF:**

**TERRY O. JONES**

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5 **AUGUST 3, 2010**

6

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

8 A. My name is Terry Jones and my business address is 700 Universe Blvd., Juno  
9 Beach, FL 33408. I am employed by Florida Power & Light Company (FPL)  
10 as Vice President, Nuclear Power Uprate.

11 **Q. Have you previously provided testimony in this docket?**

12 A. Yes.

13 **Q. Are you sponsoring any rebuttal exhibits in this case?**

14 A. Yes. I am sponsoring the following exhibit, which is attached to my rebuttal  
15 testimony:

- 16
  - TOJ-22, Examples of EPU Scope Changes

17 **Q. What is the purpose of your rebuttal testimony?**

18 A. My rebuttal testimony addresses the direct testimony provided by William R.  
19 Jacobs on behalf of the Office of Public Counsel (OPC). Additionally, I  
20 briefly respond to the testimony of Staff witnesses Lynn Fisher and David  
21 Rich.

22 **Q. Please provide a summary response to Witness Jacobs's testimony.**

23 A. Witness Jacobs's testimony focuses on FPL's non-binding cost estimate for  
24 the EPU project, noting that the estimate has increased since last year, and

1 inferring that FPL should have more certainty with respect to its estimate at  
2 this stage of this multiple year, multiple outage, multiple nuclear unit project.  
3 However, Witness Jacobs fails to take into account the stage of the project,  
4 fails to acknowledge the expanded scope of work required to be conducted for  
5 the project, and overlooks the fact that it is consistent with industry best  
6 practices and experience to gain greater cost certainty as a project of this type  
7 progresses.

8  
9 Witness Jacobs attempts to compare the cost of FPL's EPU project with the  
10 cost of Progress Energy Florida's EPU project. This is not a meaningful  
11 comparison because Witness Jacobs fails to account for the significant  
12 differences between the plants and the projects. He also extrapolates a single  
13 unit-specific cost estimate performed for FPL by High Bridge Associates to  
14 all of the units that will be updated as part of FPL's EPU project, a cost  
15 estimation technique that is not accepted in the industry, and is not useful in  
16 considering FPL's project.

17  
18 Ultimately, Witness Jacobs recommends that FPL file a final cost estimate  
19 next year, and that the Commission develop a "risk-sharing mechanism" for  
20 costs above some established threshold. These recommendations are flawed  
21 both as a practical matter and a policy matter. Practically speaking, while  
22 FPL can and will provide an updated nonbinding cost estimate during 2011,  
23 FPL does not expect to have sufficient information to provide an accurate

1 final cost estimate for the project next year, prior to final design engineering  
2 and implementation planning for all of the units and outages in the project.  
3 Furthermore, exchanging the non-binding cost estimate provided for in the  
4 Florida Statutes and the Commission's rule for a final cost estimate, and  
5 substituting an unauthorized risk-sharing mechanism into the nuclear cost  
6 recovery process, would unfavorably change the basic regulatory and financial  
7 risk profile upon which FPL decided to pursue the EPU project – a project of  
8 great technical complexity and which is fundamentally very beneficial for  
9 FPL's customers.

10  
11 Finally, Witness Jacobs's testimony overlooks the crucial, central fact that the  
12 EPU project continues to be projected as solidly cost-effective for customers,  
13 even if one assumes his hypothetical higher-cost scenario. Furthermore, the  
14 project will provide the fuel-diverse, emission-free, baseload nuclear capacity  
15 that the Florida legislature saw fit to encourage. For all of these reasons,  
16 Witness Jacobs's recommendations should be rejected.

17 **Q. OPC Witness Jacobs asserts on page 7 that FPL does not have a detailed**  
18 **cost estimate for the EPU projects. Do you agree?**

19 **A.** Yes, to the extent he is referring to an estimate for each modification at each  
20 unit that is supported by detailed design engineering and implementation  
21 planning for constructability. The project is not at the stage of detailed design  
22 engineering and field modification engineering for constructability of all or  
23 even most of the work on FPL's units, and will not be until fairly close in time

1 before each element of work is actually performed. This is the normal and  
2 expected process for performing nuclear plant construction and major  
3 modification work.

4

5 The EPU project is quite different from the construction of a greenfield,  
6 natural-gas fired combustion turbine unit, or any other new fossil-fueled  
7 generating unit. The EPU project requires retro-fitting, modifying, and/or  
8 replacing existing structures and adding new components in a sequential  
9 manner all during pre-scheduled, time and space limited, nuclear unit  
10 refueling outages for four nuclear units at two sites. Early cost certainty,  
11 therefore, is not possible for this type of project.

12 **Q. Please explain the current state of the EPU project from a cost estimation**  
13 **perspective.**

14 A. The EPU Project is being implemented at each unit over successive scheduled  
15 refueling outages. In each refueling outage, FPL will do a carefully planned  
16 and measured amount of EPU implementation work, after which the newly-  
17 refueled units are scheduled to operate for approximately 16 months, when the  
18 next refueling outage occurs, which is also the next time when large amounts  
19 of EPU implementation work can be performed.

20

21 Consistent with industry practice, FPL's EPU engineering and other work is  
22 most advanced for the work that will be performed in nearer-term outages  
23 rather those that will occur approximately two years from now. For example,

1 the majority of the EPU preparations for the Turkey Point (PTN) Unit 3  
2 outage in the fall 2010, including a detailed cost estimate for that outage, are  
3 complete. For such a near-term outage for which engineering is completed,  
4 FPL has a good grasp of the expected number of craft labor hours, field non-  
5 manual (i.e. supervisory) hours, and all of the many other elements of inputs  
6 and costs required to conduct the outage.

7  
8 In contrast, EPU engineering, procurement, scheduling, and planning for the  
9 following PTN Unit 3 outage that will occur in 2012, is in progress but far  
10 from complete. This is because the resources needed to plan and perform that  
11 work are appropriately being deployed for FPL's nearer-term outages, and it  
12 would not be cost-effective to employ additional skilled engineers to be able  
13 to simultaneously perform all of the work for all of the outages on an  
14 immediate expedited basis (even assuming there were enough engineers and  
15 other skilled nuclear workers available to perform the work), rather than  
16 sequencing the work in a logical way at the present time and over the next  
17 several years.

18  
19 Thus, a detailed cost estimate for the second EPU outage for PTN Unit 3 will  
20 be completed in 2011 when the modification engineering for the 2012 outage  
21 is complete. The estimate will include lessons learned from the completion of  
22 the PTN Unit 3 outage in 2010. Similar detailed estimates will be completed  
23 for the other three nuclear units, all in the carefully sequenced manner that I

1 have described and in conjunction with the performance of all of the other  
2 work that goes into engineering and preparing for the outages.

3  
4 Accordingly, FPL does not have a final detailed cost estimate for the entire  
5 EPU project at this time. In addition, for the reasons I have explained above,  
6 FPL disagrees with Witness Jacobs's implication that one can or should be  
7 developed at this stage of the project.

8 **Q. Is FPL's nonbinding cost estimate range a reasonable cost estimate based**  
9 **upon information available to FPL at the current stage of the project?**

10 A. Yes. FPL's nonbinding cost estimate range accounts for a reasonable estimate  
11 of the cost of known work that needs to be performed, as well as reflects  
12 appropriate consideration of the costs and probabilities of project work which,  
13 based upon current information, may or may not need to be done.

14 **Q. Please comment on Witness Jacob's statement that the top end of FPL's**  
15 **cost estimate range for the EPU project is higher than the cost estimate**  
16 **provided in last year's Nuclear Cost Recovery docket.**

17 A. Witness Jacobs's statement fails to put the current estimate in its proper  
18 context. The cost estimate has increased because of extensive additional  
19 project scope that has been identified as required in order to implement the  
20 project. Good progress has been made in the past year with the engineering  
21 analysis phase and the engineering design modification phase. As a result of  
22 these efforts, we have better knowledge of the required scope of work. FPL's  
23 cost estimate range reflects the project scope information known at the time of

1 its development. It would be inappropriate to assume that this year's cost  
2 estimate range reflects an increase in the cost for the same scope of work  
3 known during last year's nuclear cost recovery docket.

4 **Q. Please explain how the scope of the project has changed.**

5 A. The additional project scope can be best explained in four categories: (i)  
6 Nuclear Regulatory Commission (NRC) and other regulatory requirements,  
7 (ii) discovery of issues that can only be revealed through the process of  
8 detailed design engineering and testing; (iii) the need to preserve adequate  
9 plant operating margin in the uprate condition; and (iv) discovery of issues  
10 during the implementation phase. The need for such scope changes is normal  
11 and expected for a project of this magnitude and complexity, but the extent of  
12 the scope changes can only become known as the project progresses.

13  
14 An example of additional work scope that is necessary to comply with  
15 regulatory requirements is the installation of a mini-purge system for the St.  
16 Lucie (PSL) Unit 1 containment structure. The containment pressure analysis  
17 performed in 2009 determined that the containment pressure calculated for  
18 EPU conditions would exceed the pressure allowed under NRC requirements.  
19 Therefore, a new mini-purge system will be added to ensure compliance with  
20 NRC requirements for uprate conditions.

21  
22 An example of additional work scope discovered through the process of  
23 detailed design engineering is the need to modify the turbine building  
24 structural steel to accommodate the increased structural loads due to new



1 components required for EPU. These modifications could not be determined  
2 until the new components were designed and the structural steel was analyzed.

3  
4 An example of scope that was discovered during design engineering and is  
5 necessary to preserve plant margin in the uprate condition is the replacement  
6 of Turbine Cooling Water (TCW) heat exchangers. An analysis performed in  
7 2008 determined that the existing TCW heat exchangers do not have adequate  
8 cooling capacity for EPU conditions. Therefore, the TCW heat exchangers  
9 will be replaced with new heat exchangers that preserve the cooling capacity  
10 margin under EPU conditions.

11  
12 An example of work scope discovered during the implementation phase is the  
13 modification of several feedwater heaters to support unit operation in the  
14 uprate conditions. In 2009, FPL determined based upon a vendor  
15 recommendation, it would need to conduct feedwater heater inspections prior  
16 to the uprate. During the spring 2010 PSL Unit 1 refueling outage, the  
17 inspections were performed, the required modifications were determined, and  
18 those modifications were implemented.

19  
20 Exhibit TOJ-22, Examples of EPU Scope Changes, provides examples of  
21 scopes of work that have been discovered in each of these categories. Each of  
22 these examples of increased scope is included in the current cost estimate.

1       **Q.    On page 7, OPC Witness Jacobs compares the cost of FPL’s EPU project**  
2       **to the cost of Progress Energy Florida’s EPU project on a per kilowatt**  
3       **basis. Please comment.**

4       A.    A comparison on a per kilowatt basis between the projects is not meaningful  
5       because of all the differences between the companies’ plants. The FPL and  
6       PEF units being uprated both utilize pressurized water reactor technology.  
7       However, the application of the technology varies greatly between each of the  
8       units. The units are much different sizes, have different manufacturers,  
9       different design vintages, different regulatory requirements, and different  
10      design margins. The license amendment request for each unit requires  
11      engineering evaluations and analyses of the safety design margins, structures,  
12      systems, and components. These differences directly affect the scope and  
13      costs of modifications necessary to implement the extended power uprate.

14  
15      The Progress Energy Florida, Crystal River Nuclear Unit 3 EPU is being  
16      performed on a single unit Babcock & Wilcox designed pressurized water  
17      reactor. The FPL EPU, on the other hand, is being performed on its four  
18      nuclear units, two of which are Combustion Engineering designed pressurized  
19      water reactors and two of which are Westinghouse Electric Company  
20      designed pressurized water reactors. The many differences in these two EPU  
21      Projects make cost comparisons between the two EPU Projects impractical.  
22      Furthermore, such a comparison loses sight of the fundamental consideration

1 that FPL's EPU project is projected to be solidly cost-effective for FPL's  
2 customers.

3 **Q. After comparing the costs of the two companies' EPU projects, Witness**  
4 **Jacobs addresses FPL's hiring of High Bridge Associates. Why did FPL**  
5 **hire High Bridge Associates?**

6 A. High Bridge Associates (High Bridge) was hired to develop a cost estimate for  
7 PTN Unit 3, for use primarily as a tool for FPL management in negotiations  
8 with the Engineering, Procurement, and Construction (EPC) vendor. The EPC  
9 vendor is currently creating cost estimates for the engineering and  
10 implementation of the EPU Project modifications (long lead equipment  
11 procurement has been completed by FPL). An independent cost estimate is  
12 helpful in negotiations with the EPC vendor and will help ensure the  
13 reasonableness of vendor estimates.

14  
15 FPL does not have the resources in-house to estimate this amount of work, nor  
16 would the hiring of in-house resources necessary to do so be reasonable or  
17 cost-effective. The cost estimate was performed for PTN Unit 3 because it  
18 was the unit that had the most modification engineering and implementation  
19 estimates prepared. This approach ensures the best value for the engineering  
20 and implementation of required modifications for the EPU Project.

21 **Q. Witness Jacobs notes that the High Bridge PTN Unit 3 estimate is based**  
22 **on most, but not all of the modifications for that unit. Does that make the**  
23 **estimate less useful?**

1 A. No. High Bridge's expertise is not limited to its modification-by-modification  
2 cost estimation techniques. It also encompasses contingency and management  
3 reserve estimation applying techniques including Monte Carlo simulations.  
4 High Bridge's PTN Unit 3 estimation is useful in that it includes both the  
5 detailed information known at the time they performed their work, plus  
6 estimates for the less-detailed scopes of work, contingency, and management  
7 reserve.

8 **Q. Has the hiring of High Bridge been beneficial to the EPU project?**

9 A. Yes. High Bridge's work has helped FPL better understand, probe and  
10 explore the EPC vendor's cost estimates and staffing proposals. For example,  
11 FPL recently used the High bridge independent estimate for PTN Unit 3 in  
12 working with the EPC vendor to reduce the vendor's proposed estimates for  
13 the PTN Unit 3 fall 2010 outage.

14 **Q. Have you revised the total project cost estimate range to reflect the High  
15 Bridge PTN 3 estimate?**

16 A. Not at this time. Since receiving High Bridge's work product, FPL has found  
17 it to be most useful in supporting near-term modification cost negotiations for  
18 upcoming outage work at PTN Unit 3. Such analyses make up the bulk of  
19 High Bridge's work product. However, FPL has not adopted some of the  
20 more probabilistic components of High Bridge's work product, such as  
21 estimates for overall contingency and management reserve. This is because  
22 from a project management perspective, FPL believes that actively managing  
23 its cost projections within its non-binding cost estimate range and seeking to

1 manage costs and risks using FPL's risk matrix approach is a more robust way  
2 to minimize project costs, and is in the best interest of its customers.

3 **Q. OPC Witness Jacobs attempts to expand the results of High Bridge's cost**  
4 **estimation for PTN Unit 3, to all four units that comprise the EPU**  
5 **project. Is that a meaningful exercise?**

6 A. No. Attempting to apply a rule-of-thumb, flat percentage increase from PTN  
7 Unit 3 to the other three nuclear units as OPC Witness Jacobs suggests is not a  
8 valid estimating methodology. The High Bridge PTN Unit 3 estimate is for  
9 known modifications required for the PTN Unit 3 uprate. There are design,  
10 constructability, and cost differences among the four units at PTN and PSL.  
11 The physical differences among the units often require unique planning to  
12 implement the modifications. Therefore, it is not appropriate to expand the  
13 PTN Unit 3 estimate to the other three units.

14 **Q. What would be the overall effect on the project if Witness Jacobs's "what**  
15 **if" cost increase to the EPU project occurred?**

16 A. Based upon currently available information, FPL does not anticipate the cost  
17 increase scenario offered by Witness Jacobs. However, even if such a  
18 scenario were to present itself, the EPU Project would continue to be cost  
19 effective for FPL's customers. FPL Witness Sim presents this analysis and its  
20 results. Further, the project would continue to provide the substantial fuel  
21 diversity and zero greenhouse gas emission benefits that this baseload nuclear  
22 capacity addition is expected to provide, as detailed in FPL Witness Sim's  
23 direct testimony.

1       **Q.     One of OPC Witness Jacobs’s recommendations is for the Commission to**  
2       **require FPL to provide “a final estimated total cost for the EPU project**  
3       **and demonstrate its feasibility” in next year’s docket (p. 10). Do you**  
4       **agree that this would be appropriate?**

5       A.    No. As described above and in my March and May testimony, the EPU  
6       project is a complex project comprised of several sequential and overlapping  
7       phases. FPL is not in a position to provide a “final” cost estimate at this time,  
8       nor will it be able to provide a final estimate in next year’s testimony, nor  
9       should this be reasonably expected under accepted nuclear engineering project  
10      management and construction practices as described in my testimony.  
11      Nonetheless, FPL will continue to refine its non-binding cost estimate range,  
12      incorporating updated information learned from the continued progress of the  
13      project, and provide annual feasibility analyses, as required by Rule 25-  
14      6.0423(5)(c)5.

15      **Q.     OPC Witness Jacobs concludes that the uncertainty surrounding the EPU**  
16      **costs supports the development of a risk-sharing mechanism. Do you**  
17      **agree?**

18      A.    No. Cost uncertainty is to be expected at this stage of such a large and  
19      complex project. Indeed, this is one of the reasons that it makes sense that  
20      Florida requires utilities adding new nuclear generation to provide a “non-  
21      binding” cost estimate. This concept is discussed further in the testimony of  
22      FPL Witness Reed. Further, it is consistent with industry standards to refine  
23      cost estimates and gain cost certainty as details are developed and the project

1 progresses. The current state of the EPU project cost estimate range therefore  
2 does not warrant the development of some new risk-sharing mechanism.

3 **Q. Would FPL be willing to adopt such a risk-sharing mechanism?**

4 A. No. Replacement of the non-binding cost estimate with a “final” cost estimate  
5 and introduction of a new cost-sharing mechanism would fundamentally  
6 change the nuclear cost recovery framework established by the Florida  
7 Legislature and the Commission. The current provisions for nuclear cost  
8 recovery are an essential factor in FPL’s willingness to take on the difficult  
9 EPU project task for the benefit of its customers.

10  
11 The continuance of the EPU Project, pursuant to the cost recovery framework  
12 established by law and rule, will result in safely, efficiently, and cost  
13 effectively increasing the electrical output from FPL’s nuclear units. The  
14 EPU project is cost-effective, will reduce greenhouse gas emissions by 33  
15 million tons over the life of the project, will reduce reliance on fossil fuels,  
16 reduce fossil fuel price volatility for customers, and provide estimated fuel  
17 cost savings for customers of approximately \$6 billion over the life of the  
18 plant. In addition, the EPU project makes it more feasible for FPL to consider  
19 pursuing a second license extension which would result in even greater  
20 benefits to FPL customers. All of these benefits are discussed in detail by  
21 FPL Witness Sim.

22 **Q. Are you also responding to Staff’s testimony?**

1 A. Yes. I am responding to the conclusions and recommendations of Mr. Fisher  
2 and Mr. Rich regarding the EPU project, found on the bottom of page 4 and  
3 top of page 5 of their joint testimony.

4 **Q. What are Mr. Fisher and Mr. Rich's conclusions and recommendations?**

5 A. They conclude that (i) EPU management personnel changes resulted in part  
6 from performance concerns; (ii) additional or unnecessary costs may have  
7 resulted from actions taken before and after the management transition; and  
8 (iii) the Commission should investigate the possibility of unnecessary costs in  
9 a separate docket or defer a decision on these costs to a future nuclear cost  
10 recovery proceeding.

11 **Q. What is your response to Staff's conclusions and recommendations?**

12 A. I do not agree with the inference that EPU management changes were the  
13 result of inadequate performance. It is important to understand that personnel  
14 changes, including management, are not unusual over the course of a long  
15 term, complex construction project. The changes to the EPU leadership  
16 positions were made to enhance FPL's ability to bring the EPU projects to  
17 successful completion, promote effective succession planning and talent  
18 utilization, and improve the quality and timeliness of forecasted project costs,  
19 not due to inadequate performance. There were no additional or unnecessary  
20 costs that resulted from the management transition. The prior management  
21 team incurred no unreasonable or imprudent costs, and the current  
22 management team is not currently incurring costs that would not have been  
23 incurred absent the management changes. Accordingly, FPL believes that the



1 Commission should find that all of FPL's 2009 costs are prudent and 2010-  
2 2011 costs are reasonable as supported by FPL's testimony and exhibits in this  
3 proceeding.

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

5 A. Yes.

## **Examples of EPU Scope Changes**

(July 2010)

### **Nuclear Regulatory Commission (NRC) and other regulatory requirements:**

- Installation of a Containment Mini Purge System
- Fast Acting Feed Water Isolation Valves Addition
- Spent Fuel Pool Cooling Heat Exchanger Addition, Electrical and Piping Tie-ins
- Control Room High Efficiency Particulate Air Filter Upgrade
- Control Room Ventilation Intake Relocation Modification
- Containment Aluminum Reduction
- Auxiliary Building Cables for Equipment Qualification
- Structural Steel Evaluations for the Closed Cooling Water and Main Steam Systems Loads
- Technical Specification Task Force on Standardized Technical Specifications, TSTF-493, Implementation Reactor Protection System/ Engineered Safety Feature Actuation System (RPS/ESFAS)
- Containment Sump Issues Expanded Evaluation Requirements, pH, lowest sump temperature
- Spent Fuel Criticality Margin Improvements
- Emergency Diesel Engines Over and Under Frequency Evaluations
- Loss of Coolant Accident Confirmatory Analysis
- Zircaloy Zr4 vs M5 Fuel Cladding Analysis Update
- Install NaTB Baskets for pH control
- Hot Leg Injection Alternate Flow Path
- Increase Inventory of the Boric Acid Storage Tank
- Closed Cooling Water System Pipe Support Modifications
- Install a Containment Spray System Pump Flow Limiting Venturi
- NRC Generic Letter GL-2008-01, Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems, Required Modifications
- Large Break Loss of Coolant Accident (LBLOCA) Assessment for Increased Containment Spray
- Low Steam Generator Level Setpoint Change Analysis
- Blowdown flow Measurement Modifications / Improvement of Calorimetric Inputs
- Pressurizer Safety Valve Setpoint Change
- Main Steam Safety Valves Setpoint Changes
- Emergency Containment Filter Removal
- Modify the Technical Support Center for Dose Reduction
- Increase Emergency Diesel Generator Fuel Oil Storage Tank Capacity
- Safety Injection Tank Requalification Analysis

## **Examples of EPU Scope Changes** (July 2010)

### **Issues that can only be revealed through the process of detailed design engineering and testing:**

- Turbine Building Structural Steel Modifications
- Jet Impingement Shields and/or Pipe Whip Restraints Installations
- Main Steam Isolation and Check Valves Replacement (identified during LAR engineering)
- Turbine Gantry Crane Upgrades
- Heater Drain Piping Modifications
- Auxiliary Feedwater Controls Upgrades
- Heater Drain Tank Alternate Drains Modification
- Replace Main Generator Stator Core

### **The need to preserve adequate plant operating margin in the uprate condition:**

- Turbine Cooling Water Heat Exchanger Replacement
- Normal Containment Cooling Modifications

### **Discovery of issues during the implementation phase**

- Inspection and upgrade of Feedwater Heaters