

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 130009-EI
FLORIDA POWER & LIGHT COMPANY

MARCH 1, 2013

IN RE: NUCLEAR POWER PLANT COST RECOVERY
FOR THE YEAR ENDING
DECEMBER 2012

TESTIMONY OF:

ALBERT M. FERRER

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DOCUMENT NUMBER-DATE

01110 MAR-1 2013

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FLORIDA POWER & LIGHT COMPANY

DIRECT TESTIMONY OF ALBERT M. FERRER

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MARCH 1, 2013

Q. Please state your name and business address.

A. My name is Albert M. Ferrer. My business address is 800 Kinderkamack Road, Oradell, New Jersey 07649.

Q. By whom are you employed and what is your position?

A. I am employed by Burns and Roe Enterprises, Inc. (BREI) as Vice President.

Q. Please describe your educational background and professional experience.

A. I hold an M.S. in Nuclear Engineering from New York University and a B.S. in Mechanical Engineering from Manhattan College, with honors. I have been a Vice President of BREI since 2005 providing management, executive leadership, and oversight for engineering consulting services performed by BREI.

Q. Please describe BREI.

A. BREI is an engineering, procurement, construction, operations, and maintenance company that provides services to private and governmental power industry clients worldwide.

1 The Power Consulting Division provides consulting services to the nuclear,
2 renewable and fossil power industry. Services provided by the division
3 include owner's engineer, independent engineering, due diligence, acquisition
4 services, uprate analyses, life extension studies, engineering, procurement and
5 construction (EPC) oversight, contract evaluation and EPC project
6 management.

7

8 BREI's nuclear experience includes both some of the earliest U.S. commercial
9 nuclear power plants and some of the most recent and innovative nuclear
10 power projects. BREI has been involved in the design of eight commercial
11 nuclear power plants. More recently, BREI provided a conceptual design of
12 the Traveling Wave Reactor (TerraPower) – a 3,000 megawatt sodium-cooled
13 reactor using a revolutionary core design funded by the Gates Foundation.
14 The Babcock & Wilcox Company used BREI to develop conceptual designs
15 for their mPowerTM reactor – a passively safe, small modular reactor with a
16 below-ground containment structure. BREI evaluated General Electric's
17 Economic Simplified Boiling Water Reactor for compliance with the Electric
18 Power Research Institute's Utility Requirements Document. For the use of the
19 U.S. Department of Energy (DOE), BREI performed independent due
20 diligence investigations for four new U.S. nuclear plants in support of the
21 DOE's utility loan guarantee project applications. BREI also participated in
22 the development of three combined Construction and Operating License
23 Applications for new nuclear power plants in the southeast U.S.

1 **Q. What was your professional experience prior to BREI?**

2 A. Prior to my employment at BREI, I was Senior Vice President and Managing
3 Director for Stone and Webster, with responsibility for the firm's Strategic
4 Management, Markets and Regulatory, and Project Finance Services practices.
5 During my career at Stone and Webster, I held positions ranging from project
6 engineer to manager of major EPC power plant projects involving site
7 feasibility, environmental impact evaluations, conceptual engineering, detailed
8 design, procurement, cost and estimating, construction engineering,
9 construction management, and start up and testing of a variety of technologies
10 including coal plants, simple cycle and combined cycle gas plants, nuclear
11 plants, geothermal plants, and small hydro facilities. As a project engineer or
12 project manager, I was responsible for cost and scope control, planning,
13 coordinating, scheduling and supervising engineering activities for various
14 nuclear projects, as well as managing major subcontractors with large work
15 forces. I also provided expert testimony at hearings before the Nuclear
16 Regulatory Commission's (NRC) Advisory Committee on Reactor Safeguards
17 involving the construction permit process for nuclear plants.

18 **Q. What is the purpose of your testimony?**

19 A. The purpose of my testimony is to summarize an independent review
20 conducted by myself and other BREI senior nuclear power professionals under
21 my direction regarding Florida Power & Light Company's (FPL) execution of
22 the Extended Power Uprate (EPU) related activities at the St. Lucie (PSL) and
23 Turkey Point (PTN) power plants during 2012. The purpose of this

1 independent due diligence review was to determine whether FPL's execution
2 of project activities in 2012 was reasonable and prudent. In conducting the
3 review, we applied the prudence standard that has been used by the Florida
4 Public Service Commission, which is whether FPL's management actions and
5 decisions are within the range of what a reasonable utility manager would
6 have done, in light of the conditions and circumstances which were known, or
7 should have been known, at the time the decisions were made.

8 **Q. Please describe the major areas of your review.**

9 A. BREI reviewed the following areas:

- 10 • Project Plans, Outage Execution Plans, Schedules and Organization;
- 11 • Engineering and the Engineering Work Control Process; and
- 12 • Outage Execution.

13 **Q. Please summarize your testimony.**

14 A. Based on the review conducted by the team I lead, FPL's execution of project
15 activities in 2012 were reasonable and prudent. During 2012, FPL's EPU
16 project management exhibited reasonable and prudent oversight of the EPU
17 project, including oversight of its contractors. FPL applied consistent
18 management and contractor oversight approaches across the four units that
19 make up its EPU project, and project management actively looked for ways to
20 shorten schedules and reduce costs. FPL's performance was comparable to, or
21 better than, other large construction projects. Planned EPU work was
22 completed on or close to schedule, and power output increases exceeded
23 engineering estimates.

1 **Q. What is the basis for your conclusions regarding FPL's oversight of the**
2 **EPU project?**

3 A. My conclusions are based on my personal experience gained over the course
4 of my career managing major construction projects and large contracted work
5 forces, as well as my and my team's extensive review of EPU project
6 documentation and personnel interviews. My team was comprised of senior
7 level personnel with experience in nuclear power plant engineering, nuclear
8 plant licensing, nuclear power plant operations, power plant construction, and
9 project controls. We reviewed project plans, technical reports, letters,
10 drawings, procedures, schedules, descriptions of organization roles and
11 responsibilities, qualifications of EPU team personnel, and correspondence
12 with the NRC. We also reviewed contract change orders, performance metrics
13 (such as key performance indicators), quality assurance records, industrial
14 safety reports, corrective action reports, periodic and special reports to FPL
15 management, and license amendment documents. In addition, BREI
16 interviewed key EPU project personnel.

17 **Q. Please describe the characteristics of good project management and**
18 **oversight.**

19 A. During 2012, the EPU project was well into the implementation phase with
20 planning, scheduling and engineering essentially complete and plant
21 modifications well under way. During the implementation phase, good
22 managers focus on the data pertaining to the actual performance of work.
23 Indicators of good project management include: creation of a system of

1 performance monitoring indicators based on project objectives; routine review
2 by management of these indicators to identify leading indicators or
3 performance trends, and the prompt implementation of effective corrective
4 actions and lessons learned.

5 **Q. Please summarize examples of FPL's contractor oversight.**

6 A. There are several examples of prudent implementation and oversight by FPL
7 management of its contractors, the thousands of contracted workers, and the
8 tens of thousands of individually planned work activities.

- 9 • FPL identified a risk that the primary EPU constructor (Bechtel) would be
10 challenged to execute all the uprate modifications and tasks effectively and
11 efficiently. FPL prudently developed plans for reallocating specific work
12 tasks to other competent contractors such as Shaw, PCI and WeldTech.
13 BREI considers this to be a significant contributor to the project's
14 successful schedule performance.
- 15 • FPL has an effective program for identifying and applying lessons learned
16 and implementing them through its own employees and the contractors
17 that it manages. The benefits of executing identical (or very similar)
18 modifications on two units were realized by FPL. The second unit at PSL
19 was completed in less time and at reduced cost as compared to the first
20 unit, and similar results were expected at PTN as of December 31, 2012.
- 21 • Special attention was appropriately paid to the execution of tasks that were
22 unique, first of a kind, high-risk, and/or infrequently performed. FPL
23 worked with contractor teams to practice selected tasks using mock-ups of

1 the equipment, tools and procedures to gain familiarity and experience
2 before executing the actual task. During these practice sessions potential
3 problems could be identified, and improved methods developed and tested.
4 • To reduce costs and improve schedule adherence, FPL used a “First Time
5 Quality” program. While programs like this are not unique, they
6 effectively re-focus the labor force and are particularly appropriate for
7 projects such as the EPU project, where the labor force is made up of
8 contractors. Initiatives like this can be particularly effective during long
9 outages, such as those in 2012. FPL employed a variety of indicators to
10 track and trend costs, safety, efficiency, efficacy or effectiveness and
11 potential risks.

12 **Q. Please describe the conclusions of BREI’s review of the EPU project plan,
13 schedule, and organization.**

14 A. FPL prudently managed the EPU project planning and scheduling in 2012.
15 BREI reviewed the processes by which EPU project plans and schedules are
16 developed and revised and determined that FPL uses robust project planning
17 and scheduling tools and properly accounts for the information and new scope
18 that is almost constantly discovered during the course of this project.
19 Additionally, the EPU organization at FPL is appropriately structured to
20 manage the project in an efficient and thorough manner.

21 **Q. What are FPL’s plans for project closeout?**

22 A. FPL has developed EPU project closeout plans for both PSL and PTN. BREI
23 reviewed both plans which were similar in format and content. BREI found

1 that the plans address the critical elements of a comprehensive program. The
2 plans establish a roadmap to close the project with reasonable goals and key
3 milestone dates. They consider lessons learned from other projects and the
4 transition to non-EPU project status. FPL personnel are proceeding at both
5 stations to sell any items no longer needed and obtain value which will be
6 credited to the EPU project.

7 **Q. Does FPL have a plan for the disposal of spare or unneeded supplies and**
8 **equipment?**

9 A. Yes. An FPL initiative will sell spare or unneeded supplies or equipment.
10 BREI reviewed a list of equipment or supplies for disposal. In general, the
11 value of these supplies appears reasonable. Some equipment will be sold as
12 scrap or salvage. This is reasonable considering the unique characteristics,
13 condition and age of the equipment replaced.

14 **Q. Please summarize the conclusions of BREI's review of EPU engineering**
15 **and the engineering work control process.**

16 A. FPL performed the design and engineering very well considering the
17 congested plant work areas and magnitude of the work that was being
18 simultaneously performed. FPL followed the station modification process for
19 the Engineering Changes for the EPU project at PSL and PTN. However, the
20 distinguishing characteristic of power uprates is the number of simultaneous
21 modifications and their potential for unforeseen or unintended interactions and
22 consequences. This is especially true for older nuclear plants such as PSL and
23 PTN which are very compact and congested. While strict adherence to the

1 station modification process is a given, comprehensive project management
2 oversight and controls are requisite to controlling costs and schedules during
3 the design and implementation of the EPU modifications. The FPL EPU
4 project had the necessary organization structure and management and utilized
5 a variety of controls and activities such as human performance tools, vendor
6 oversight, risk analysis, walk-downs, constructability reviews, and integration
7 reviews during the engineering design process to ensure engineering change
8 quality and minimize deficiencies in the engineering changes. It is only after
9 the engineering change package is approved and issued to construction for
10 development of the work plans and installation, that the detailed sequence of
11 steps (*i.e.*, work plan) for installing the modification can be developed. It is
12 during the planning phase and the installation phase that the unforeseen or
13 unintended interactions can be visualized and discovered. However, FPL had
14 implemented the necessary controls to minimize these discoveries and had the
15 resources and contingencies to rapidly effect their corrective actions (*i.e.*,
16 revise the modification).

17 **Q. Please summarize the conclusions of BREI's review of the execution of**
18 **the EPU outages that were completed in 2012.**

19 **A.** FPL succeeded in completing the uprate of three nuclear power generating
20 units in 2012, as planned. Based upon our review, FPL prudently managed
21 the execution of this work. Subcontractor readiness plans were in place well
22 before the outages started, allowing FPL and Bechtel to schedule
23 subcontractors and associated staff to support the outages and to subsequently

1 demobilize in a controlled manner. Milestones were established and, if
2 challenged, recovery plans were developed and approved. FPL also continued
3 to use its risk register process. Separately, a procurement risk matrix was
4 developed and implemented well in advance of the outages to support
5 activities as scheduled. A material delivery watch list was used to track the
6 status of important components/materials.

7

8 FPL management appropriately maintained a focus on safety during the
9 execution of the EPU work. In fact, safety is almost always discussed first
10 throughout internal EPU project management presentations. Additionally, the
11 EPU project team implemented safety stand downs for employees and
12 contractors as needed in 2012 to correct worker practices and mitigate safety
13 events. In the nuclear industry, these safety practices are an expected and
14 essential part of project management because they are directed at preventing
15 both recurrence and more serious events which can have far worse
16 consequences.

17

18 FPL also focused on quality and human performance. Lessons learned from
19 prior outages resulted in increased management validation and reinforcement
20 of supervisor behavior. Bechtel adopted FPL's corrective action program and
21 used it to track and trend issues and to implement corrective actions. Where
22 necessary, resources were added or activities were shifted to others to assure
23 schedules were met.

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At daily Bechtel and other vendor cost progress review meetings, Cost Performance Index (CPI) and Schedule Performance Index (SPI) indicators were presented. These presentations highlighted situations where CPI and SPI performance indicators did not meet pre-set targets and described recovery action plans. In this way, the FPL project team closely monitored Bechtel's and other vendors' progress. The CPI and SPI were used to measure progress and performance versus a budget and target schedule. Many factors can affect these performance indicators, such as changes in work scope, additional required engineering analyses, additional regulatory requirements, constructability reviews needing additional implementation considerations, and estimates based on conceptual design information. Additional FPL oversight via the Fundamental Management System Observation Program provided data and areas for focus. In this format, selected observations were presented as examples for the edification of the participants. Corresponding Bechtel and Siemens observation program data were presented as well. These types of reviews enabled thorough oversight by FPL and clear understanding of EPU project needs.

During 2012 FPL prudently managed the identification and performance of large volumes of work found to be needed as existing equipment was disassembled and new equipment was installed at each unit. Such "discovery" was a major contributor to work scope growth at each unit. One indicator of

1 the extent of such scope growth is the large volume of additional materials
2 required to install the new plant components. Of course, the installation of
3 more commodities also required corresponding increases in the necessary
4 engineering, design and labor for that work. As an illustration of the very
5 large volume of this growth in work scope necessitated by implementation
6 phase discovery, one can consider the large amounts of additional
7 commodities needed for the PTN 3 2012 implementation outage:

- 8 • Structural Steel quantities increased by 24%;
- 9 • Large Bore Pipe Welds increased by 21%;
- 10 • Large Bore Piping Structural Supports increased by 19%; and
- 11 • Conduit and Cable Tray increased by 22%.

12 The need for increased commodities and additional required labor to
13 implement the modifications at each unit was properly identified and
14 prudently managed by FPL during 2012.

15 **Q. Did BREI review FPL's incorporation of lessons learned into the second**
16 **outage at each nuclear power plant in 2012?**

17 A. Yes. FPL prudently implemented various cost and time saving lessons learned
18 from the previous outages, which have proven to be effective and appropriate.

19 Some examples of lessons learned at PTN are:

- 20 • Limited scopes of work were removed from the prime contractor and
21 awarded to other contractors improving the efficiency of the overall work
22 performance.

- 1 • FPL brought in a specialist logistics manager to help control and
2 consolidate materials and equipment, thus improving coordination efforts.
- 3 • FPL successfully completed the spent fuel pool cooling modification using
4 a separate team of contractors prior to the start of the outage.
- 5 • There was a better layout of crane positioning for easier use by the various
6 work crews.
- 7 • FPL also enhanced their quality program with an initiative called “First
8 Time Quality,” which is a project-wide campaign to raise the collective
9 awareness of the project’s large contractor workforce. The First Time
10 Quality program’s message encouraged workers to perform tasks assigned
11 to them correctly the first time, thus saving time and costs for the project.

12 **Q. Please summarize your conclusions related to FPL’s 2012 EPU project**
13 **activities.**

14 A. Overall, FPL’s management of the EPU project was as good as, or better than,
15 the management of other comparable engineering projects. FPL achieved its
16 objective of completing the uprate of three nuclear generating units in 2012 by
17 utilizing reliable project planning techniques and effectively managing various
18 separate contractors and a large workforce.

19
20 2012 EPU project activities focused on the continued installation,
21 implementation and testing of plant modifications during five planned
22 outages. In the planning of these outages, FPL considered lessons learned
23 from prior, similar EPU projects to improve contractor performance or avoid

1 issues. FPL also routinely monitored overall project performance – including
2 key performance indicators – so that trends were identified and mitigating
3 actions implemented as necessary. Risk management techniques were used to
4 prioritize the implementation of mitigating actions. FPL identified and
5 retained additional resources to facilitate quick responses should less-than-
6 expected performance be detected or unanticipated events encountered. These
7 actions, as well as those discussed above, contributed to a successful
8 execution of 2012 EPU implementation work.

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

10 A. Yes.

