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**BEFORE THE  
FLORIDA PUBLIC SERVICE COMMISSION**

**In re: Petition for Determination of )  
Need for Levy Units 1 and 2 Nuclear )  
Power Plants )  
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**Docket No. 080148-EI  
Filed: June 6, 2008**

**POST-HEARING BRIEF  
OF WHITE SPRINGS AGRICULTURAL CHEMICALS, INC.  
d/b/a PCS PHOSPHATE WHITE SPRINGS**

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**Docket No. 080148-EI  
Filed: June 6, 2008**

**POST-HEARING BRIEF  
OF WHITE SPRINGS AGRICULTURAL CHEMICALS, INC.  
d/b/a PCS PHOSPHATE WHITE SPRINGS**

Pursuant to the *Order Establishing Procedure* in this docket, Order No. PSC-08-0151-PCO-EI, issued March 12, 2008, White Springs Agricultural Chemicals, Inc. d/b/a PCS Phosphate White Springs (“PCS Phosphate”) hereby files its Post-hearing Brief in this matter.

**A. INTRODUCTION**

By petition dated March 11, 2008, Progress Energy Florida (“PEF” or “Progress”) seeks a Commission determination of need for two proposed nuclear power plants to be located in Levy County, Florida (Levy Units 1 and 2). Petition, p. 1. These units would be the first new nuclear plants that PEF has attempted to build and operate since its Crystal River 3 unit entered commercial service in 1977. Progress describes the proposed units as two Westinghouse “AP1000” advanced passive light water reactors, each rated at 1,092 MWs of electric generating capacity (summer rating). These pressurized water reactors will be designed and constructed by a consortium that includes Toshiba/Westinghouse (the reactor designer and supplier) and the architect, engineering and construction firm of Shaw, Stone and Webster (“SSW”). TR 174. PEF plans to place Levy Unit 1 in commercial service in June 2016, and Unit 2 in service by June of 2017. Petition, p. 1. As

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part of its Need Study filed in support of its application (Exhibit 44), Progress estimates the in-service cost of the units to be approximately \$14 billion, plus an additional investment of roughly \$3 billion for required transmission upgrades. Exh. 44, p. 19, Table 3; and 23. The Commission is reviewing this application pursuant to Section 403.519, Florida Statutes.

## **B. STATEMENT OF FACTS**

### **1. Historical Perspective: Construction Cost Overruns of First Generation Plants Cause Nuclear Power to be Abandoned as a New Capacity Resource**

The United States has 104 operating commercial nuclear power plants today. These units generally were constructed between the years 1966 and 1986. Five units have been constructed in Florida, with the last of those units, St. Lucie 2, entering commercial service in 1983. For the most part, these units have operated as reliable base-load capacity, the facilities emit no regulated pollutants or greenhouse gas emissions during normal operation, the cost of uranium-based nuclear fuel has remained low and predictable, and the units contribute significantly to the fuel diversity of Florida's electric generation fleet. Given these desired features, which also are the focus of Florida's 2006 energy legislation that aims to promote new nuclear plant development, the circumstances surrounding the thirty-year gap between the completion of Crystal River 3 and the announcement of the Levy Units is a central consideration in this docket.

In the late 1960s and 1970s, utility interest in commercial nuclear power was driven by a combination of factors that included strong federal government support,<sup>1</sup>

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<sup>1</sup> Chief among these were the Price-Anderson Act limitation on utility liability for nuclear accidents, 42 U.S.C.A. § 2210, and federal assumption of responsibility for the disposal of high level radioactive wastes, Nuclear Waste Policy Act, 42 U.S.C. A. 10101.

enactment of the National Environmental Policy Act in 1968,<sup>2</sup> and spikes in oil prices associated with the embargoes of the early 1970s. The enthusiasm for nuclear power, however, began to wane once it became apparent that constructing nuclear plants proved to be more challenging than originally expected and a distressing number of projects experienced substantial construction cost overruns and delays. The Congressional Budget Office recently reported that “[f]or the 75 nuclear power plants built in the United States between 1966 and 1986, the average actual cost of construction exceeded the initial estimates by over 200 percent.”<sup>3</sup> As PCS Phosphate witness Peter Bradford relayed in his testimony, most areas of the country experienced hits and misses in terms of nuclear plants brought into commercial service reasonably close to the expected cost and schedule (TR 605-07), but interest in nuclear as a viable source of commercial power ground to a halt in the face of projects that experienced dramatic cost overruns and schedule delays.

The following projects were among the more notable economic millstones:

**Shoreham:** The New York Public Service Commission noted that the estimated cost of the Shoreham Nuclear Generating Facility increased from an original projection of \$70 million to \$4.2 billion, and that the unit was nearly a decade behind the original in-service date. *See Case 27563, Long Island Lighting Company – Phase II – Proceeding on Motion of the Commission to Investigate the Cost of Construction of the Shoreham Nuclear Generating Facility, Opinion No. 85-23, 71 Pub. Util. Rep. 4th (PUR) 262 (1985).*

**Grand Gulf:** Middle South Energy originally estimated the construction costs for Grand Gulf Nuclear Station at \$875 million, but the final cost of construction at completion was \$3.6 billion. *See New Orleans Pub. Serv., Inc. v. Council of the City of New Orleans, 850 F.2d 1069, 1071 (5th Cir. 1985).*

**South Texas Project:** The initial cost estimate for the South Texas Nuclear Project was less than one billion dollars and the final construction cost was nearly \$6 billion. *See Inquiry of the Public Utility Commission of Texas into the Prudence and Efficiency of the Planning and Management of the South*

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<sup>2</sup> 42 U.S.C.A. § 4321 (requiring detailed environmental review of major federal actions that included licensing of nuclear power plants and permits for coal-fired facilities).

<sup>3</sup> “Nuclear Power’s Role in Generating Electricity,” U.S. Congressional Budget Office, May 2008, p. 16.

*Texas Nuclear Project, Docket Nos. 6668 and 6753, 16 Texas Pub. Util. Comm'n Bull. 183 (1990).*

**Diablo Canyon:** Originally estimated at a total cost for two units of roughly \$319 million, the final construction cost of the two units at completion was \$5.518 billion. The California Commission also noted that the units were both completed approximately twelve years after their original estimated date of completion. *See Application of Pacific Gas and Electric Company, for Authorization to Establish a Rate Adjustment Procedure for Its Diablo Canyon Nuclear Power Plant, 99 Pub. Util. Rep. 4th (PUR) 141 (1988).*

**Nine Mile Point Unit 2:** In approving a construction cost cap of \$4.45 billion prior to completion of the unit, the New York Public Service Commission referred to the lengthy delays and extensive cost overruns of the Nine Mile Point 2 Generating Facility. *See Proceeding on Motion of the Commission to Investigate the Prudence of Costs Incurred for the Construction of the Nine Mile Point 2 Nuclear Generating Facility, 78 Pub. Util. Rep. 4th (PUR) 23 (1986).*

**Midland:** The Michigan Public Service Commission noted that the original Consumers Power Company construction plans for Midland Nuclear Power Plant anticipated that the project would be completed by early 1975 at a cost of less than \$350 million. The Commission compared this original estimate to the more than \$4 billion that the utility had invested in 1984 when construction of the plant was abandoned. *See In the matter of the Application of Consumers Power Company for Authority to Increase its Rates for the Sale of Electricity, 1991 Mich. PSC LEXIS 119 (May 7, 1991).*

As delays and overruns continued to mount, the nuclear industry recognized that individually customized plant designs that necessitated on-going regulatory reviews and engineering re-design was a key cause.<sup>4</sup> The industry sought to address this problem through development of a standardized nuclear power plant system ("SNUPPS"). TR 680. The standardized design was a Westinghouse 4 loop reactor that was a precursor to the AP1000 design that PEF now proposes for Levy Units 1 and 2. TR 681.

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<sup>4</sup> *See TR 662-63.*

Two SNUPPS units, Wolf Creek and Callaway, actually were built.<sup>5</sup> The Callaway SNUPPS unit incurred approximately \$2 billion in construction costs over the original estimate and was completed three years after the original estimated completion date.<sup>6</sup> The Wolf Creek SNUPPS unit began with a cost estimate of \$525 million in 1973 and rose to a final cost of approximately \$3 billion in 1984.<sup>7</sup>

As is reflected in the above cited decisions, the entry of the over-budget nuclear units into commercial service spawned a wave of retrospective prudence reviews to determine the level of capital costs that would be included in retail rates. Cost disallowances founded on imprudent practices shattered investor confidence, prompted at least one utility bankruptcy,<sup>8</sup> a public take-over of an investor-owned utility,<sup>9</sup> and a default on nuclear linked bonds.<sup>10</sup>

PCS Phosphate witness Bradford explained that, in many cases involving nuclear plant construction, the critical areas of inquiry in the prudence dockets involved matters revealed years after the causative imprudent events or mistakes occurred. These included

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<sup>5</sup> Wolf Creek is located in Burlington, Kansas, and Callaway is located in Fulton, Missouri (*see* Nuclear Regulatory Commission list of operating reactors at <http://www.nrc.gov/reactors/operating/list-power-reactor-units.html>.)

<sup>6</sup> *See Re Union Electric Company, Case No. EO-85-17, ER-85-160*, 66 Pub. Util. Rep. 4th (PUR) 202 (1985).

<sup>7</sup> *See Re Wolf Creek Nuclear Generating Facility*, 70 Pub. Util. Rep. 4th (PUR) 475 (1986).

<sup>8</sup> *See, e.g., In re: Public Service of New Hampshire, et al.*, 848 F. Supp. 318, 322 (D. R.I. 1994) (noting in factual background that “[w]hen delays were encountered in obtaining regulatory approvals, mounting interest expenses and escalating construction costs [for the Seabrook nuclear plant] caused PSNH to seek protection under Chapter 11 of the Bankruptcy Act.”).

<sup>9</sup> *See* N.Y. Pub. Auth. Law § 1020-A (setting forth legislative intent to replace the investor-owned Long Island Lighting Company with the public-owned Long Island Power Authority because of concerns regarding the Shoreham nuclear plant).

<sup>10</sup> *See Haberman v. Washington Publ. Power Supply System*, 744 P.2d 1032 (Wash. S.Ct. 1987) (setting forth history of how termination of construction of two nuclear plants led to default on over \$2.25 billion in revenue bonds).

erroneous design (Diablo Canyon), improper construction (Midland's sinking emergency diesel generators), and inadequate quality and documentation control (Zimmer). TR 599.

In sum, by the mid-1980s, it had become universally accepted (i.e., by utilities, reactor designers, the investment community, regulators and consumers) that nuclear power was not an economically viable resource for new capacity. The economic risks associated with any new nuclear construction project were altogether unacceptable for every stakeholder sector.<sup>11</sup>

## **2. The Framework for New Nuclear Construction**

In response to industry complaints that the NRC process for issuing separate construction and operating licenses needlessly delayed projects, the NRC adopted a modified process in which it will now issue combined construction and operating licenses for new facilities. TR 663; Exh. 57, p. 1 of 3. Also, the National Energy Policy Act of 2005<sup>12</sup> ("EPAAct 2005") enacted several provisions to promote interest in new nuclear construction by reducing investor risk. Chief among these are Production Tax Credits ("PTCs"), federal loan guarantees, and "standby support agreements" (limited reimbursement for construction delays). TR 157-58.

On the state level, Florida enacted the Florida Renewable Energy Technologies and Energy Efficiency Act in 2006. This legislation included the provisions contained in Section 403.519(4), F.S. that establish the additional considerations applicable to need determinations for new nuclear and integrated coal gasification power plants that are

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<sup>11</sup> PEF witness Roderick asserted that nuclear plant construction continued worldwide after it stopped in the United States in the 1980s. TR 192. Mr. Roderick, however, undertook no particular study of nuclear construction in recent years, and did not know whether Canada, Italy, Germany, the United Kingdom and other countries similarly abandoned nuclear as a resource in the 1980s. TR 679-80. He also did not dispute that after 423 reactors were constructed world-wide through 1989, only 17 have been built since. TR 678.

<sup>12</sup> Pub. L. No. 109-58, 119 Stat. 594 (2005).

discussed below. The 2006 Energy Act also created the provisions of Section 366.93, F.S. that authorize early recovery of nuclear pre-construction and carrying costs, give certain specific direction for recovery of nuclear costs in base rates, and authorize recovery of prudent pre-construction and construction costs in the event that a project is cancelled. The purpose of Section 366.93 is to provide certainty of cost recovery for a utility undertaking a new nuclear investment by shifting all risk of project costs incurred, other than imprudence, to utility ratepayers.

Finally, as required by Section 366.93, the Commission promulgated a rule providing for Nuclear Power Plant Cost Recovery. Rule 25-6.0423, F.A.C. Consistent with the cost recovery statute, the rule provides for recovery of eligible pre-construction and project carrying costs through the Capacity Cost Recovery Clause (“CCRC”). Once the Commission has authorized recovery of pre-construction and carrying charges in setting the annual CCRC factor, those costs are not subject to subsequent prudence review. Rule 25-6.0423(5)(a)(2), F.A.C. The Commission also will conduct annual proceedings to review prior year actual and forecasted annual construction costs, and all costs reviewed in this fashion are not subject to further prudence review. Rule 25-6.0423(5)(c)(3), F.A.C. The rule thus ensures certainty of utility cost recovery by precluding further Commission reviews if areas of possible imprudence subsequently are revealed. The combined effect of the nuclear cost recovery statute and rule is to dramatically shift cost risks, including the risk of imprudence that is not apparent or detected during the annual cost recovery proceedings, to PEF’s ratepayers.

### **3. Background on the Westinghouse AP1000 Reactor Proposed for Levy Units 1 and 2**

The Westinghouse AP1000 is a four loop advanced pressurized water reactor design. The NRC pre-approved this reactor design in a Design Certification Rule issued January 27, 2006. TR 166-67. Westinghouse subsequently has filed for various amendments to the design certification, which have been docketed for further NRC review that is scheduled to continue through 2010.<sup>13</sup>

Progress maintains that the reactor changes that distinguish the AP1000's "advanced design" from previously constructed Westinghouse nuclear units primarily apply to the systems relating to safe shutdown during an emergency. TR 668. For example, the AP1000 places a suppression pool at the top of the reactor building rather than in the historic placement at or below the reactor level. This pool contains water/coolant that would be released and flow by virtue of gravity to cool reactor components in the event of an emergency. This is thought to be a more simple and safe system that will require fewer pumps, pipes and motors. While this hopefully will be the case, the fact remains that this model requires a materially different reactor building design and internal component configuration from prior models. *See* Exh. 58. From a construction and design perspective, it is a considerably different plant.

Arguing both sides of this issue, PEF also asserts that in many other respects the AP1000 is just an evolutionary design from Westinghouse four loop PWR models previously constructed. TR 668 (stating that the AP1000 design "is similar to the design" of existing Westinghouse reactors). As noted above, however, Westinghouse previously worked with several utilities to develop the Standardized Nuclear Power Plant system that, like the AP1000, was a 4 loop Westinghouse pressurized water reactor. Both of the two

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<sup>13</sup> *See* <http://www.nrc.gov/reactors/new-licensing/design-cert/amended-ap1000.html>.

SNUPPS plants constructed, Callaway and Wolf Creek, experienced cost overruns of at least 100 percent over initial estimates.

Ultimately, because an AP1000 unit has yet to be built, there is no actual construction or operating experience for this newly approved reactor design. PEF has indicated that it hopes to learn from the construction of three AP1000 units to be built in China. TR 169-70. At this point, however, only site clearing activities have begun in China, so there are no relevant “lessons learned” that can be gleaned from the China project and applied in Florida. TR 686. Also, given the lead times required for component procurement and construction staging, it is not clear what lessons PEF hopes to learn from the China project that it will be able to apply to the Levy Units’ construction.

#### **4. The Non-Binding Construction Cost Estimate for the Levy Units, On-Going Negotiations, and Construction Costs Risks and Uncertainties**

In its Petition and supporting Need Study, Progress estimates the current cost of the Levy Units at \$14.089 billion, plus an additional amount of approximately \$3 billion for transmission system upgrades that PEF maintains are required to accommodate 2,200 MWs of additional nuclear base-load capacity in Levy County. Exh. 44, p. 19, Table 3; TR 225. This estimate presumes that Levy Unit 1 will enter commercial service as scheduled in mid-2016 and that Levy Unit 2 will enter commercial service within 12-18 months of the in-service date for Unit 1. TR 155-56. Progress projects the per unit capacity cost of Levy Unit 1 will be \$7,615/kw (summer rating) and estimates that a capital cost savings of approximately 30% (i.e., \$5,287/kw Unit 2 total cost) would be achieved if Unit 2 can be completed within 18 months of Unit 1. Exh. 44, p. 19, Table 3; *see also*, Petition, p. 32; and TR 440.

The above non-binding construction cost estimates reflect the current, preliminary state of Progress’s development of the project, and Progress cautions that costs may

increase “perhaps significantly” as the project progresses and more accurate information becomes available concerning its EPC (“engineering, procurement and construction”) contract, major equipment purchases, licensing milestone and other factors.<sup>14</sup> As PEF witness Crisp put it, “Potentially higher costs, of course, are an inherent risk with nuclear generation development, especially when you consider the unique nature of this project, which will require the construction of the first nuclear power plants on a Greenfield site in more than thirty years in the country.” TR 447.

PEF concedes that there are “significant risks and challenges to completing this project.”<sup>15</sup> These include (but are not limited to) the following:

- Permitting and licensing delays at the state level;
- Permitting and licensing delays at the federal level;
- Potential litigation delays at both the state and federal level;
- Labor availability;
- Equipment availability;
- Vendor ability to meet schedules;
- Cost escalations;
- Imposition of new regulatory requirements;
- PEF’s ability to acquire necessary rights-of-way in a timely manner for all associated facilities, including the new transmission lines;
- Significant inflation;
- Significant increases in the cost of capital; and
- PEF’s ability to obtain and maintain project financing at reasonable terms.<sup>16</sup>

Some of these risk factors are already having an effect on the breathtaking increases in new nuclear plant cost estimates. As recently as five years ago, vendors and studies were estimating costs for new nuclear units in the range of \$1,500 to \$2,000 per kW. TR 602. Last June, an impartial Keystone Center fact-finding effort found expected

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<sup>14</sup> Petition at p. 4-5, 15, 17; *see also* TR 85, 87 (Lyash); TR 168-69 (Roderick); TR 477-78 (Crisp); Exh. 44, pp. 95-96.

<sup>15</sup> Petition at p. 17.

<sup>16</sup> *Id.*; and TR 478.

costs to be in the \$3,600-\$4,000 per kW range. Four months later, Moody's Investor Services estimated \$5,000-6,000 per kW as a likely cost for a new nuclear unit. *Id.*

With an initial construction cost estimate exceeding \$7,600/kw for Unit 1, the current Progress estimates for Levy County are substantially higher than the Moody's generic estimate. The Progress estimate of \$17 billion, including transmission upgrades, for two 1,100 MW plants also represents a tripling of its estimate of just two years ago, according to the St. Petersburg Times of March 11, 2008. *Id.*

Further, notwithstanding efforts to streamline and simplify new reactors designs, new nuclear units are no less susceptible to delays and cost overruns than first generation plants. The Olikuoto project in Finland (an Areva design) is roughly 2 years behind schedule and more than \$1 billion over its original cost estimate. TR 580.

All materials and components associated with a nuclear reactor's steam supply system (i.e, the reactor, pipes, motors, steam generators, instrumentation, etc.) must be fabricated using NRC-approved materials by NRC-licensed vendors, and installed by NRC-qualified and supervised contractors. TR 181-82. Every segment of fabrication, shipping, installation and testing must be properly documented. TR 182. The NRC takes a very dim view of any use of fake or unauthorized materials. TR 187-89; Exh. 66.

There is mounting concern that bottlenecks in production of required components and equipment and increases in basic materials costs (e.g., concrete and steel) will lead to further cost increases and delays.<sup>17</sup> It is regularly reported that Japan Steel is the world's only manufacturer of ultra-large forgings required for reactor vessels,<sup>18</sup> and, therefore, is

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<sup>17</sup> See "New Wave of Nuclear Plants Faces High Costs," Wall Street Journal, May 12, 2008.

<sup>18</sup> See TR 594. The Commission also referenced the critical nature of Japan Steel in its determination of need for Florida Power and Light's proposed Turkey Point Units 6 and 7. *In re: Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical*

an immediate project bottleneck. More significantly, the entire NRC-compliant chain of vendors and contractors needs to be re-established for production and construction schedules to be met. TR 594. The likelihood of difficulties with these permitting approvals is a significant risk factor. TR 168-69.

### **5. Current Project Status**

Progress has explained that it continues to negotiate with the consortium (Westinghouse and SSW) regarding the Engineering, Procurement and Construction (“EPC”) contract as well as major equipment purchases for the Levy Units. TR 168, 199. PEF opines that it hopes to arrange for fixed price terms on some elements or components,<sup>19</sup> but today cannot point to any defined limits, performance requirements or other provisions that would either limit PEF ratepayer exposure or provide incentives for vendors to control costs or adhere to production schedules. TR 677.

### **6. Progress’ Experience in Constructing New Nuclear Capacity**

PEF has been operating the Crystal River 3 nuclear unit (a Babcock and Wilcox designed pressurized reactor) since 1977. TR 489. While the utility has considerable experience in operating a nuclear plant, PEF has little experience in managing the construction of a new nuclear unit. This is not surprising since anyone with senior level project management experience from the construction of the country’s first generation of nuclear units would be well past retirement age today.

At its peak, the Levy project will have 3,000 workers on-site and dozens of vendors, equipment manufacturers and contractors whose work must be managed,

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*power plant, by Florida Power & Light Company, Order No. PSC-08-0237-FOF-EI at 29 (April 11, 2008) (“FP&L”) (“Japan Steel Works holds an effective monopoly for such forgings.”).*

<sup>19</sup> TR 168.

scheduled, coordinated and documented. TR 155. Maintaining control of this complex undertaking is Progress' responsibility. Progress asserts that it is implementing a recognized project management guide as a tool to "assure the aggressive and efficient oversight of the project and our key contractors." TR 169. PEF also maintains that it will employ new, "modular" construction techniques in the project to allow certain component assembly and installation to be performed in parallel. TR 175. Progress concedes that it has no actual experience in managing projects that have applied such techniques. TR 638.

Progress also is in the process of organizing and staffing a Nuclear Projects and Construction organization that will be dedicated to managing large nuclear construction projects. TR 169, 176. To staff this organization, PEF is seeking to hire the same qualified licensing, project management and construction management personnel that are being sought not just by FP&L, the Southern Company, Exelon, NRG, Constellation and every other utility that is now planning to construct and operate a nuclear unit, but also by the engineering and construction firms that will design and build the projects. The ability of PEF to secure qualified personnel in a timely manner is among the many uncertainties and challenges associated with the project. TR 478.

#### **7. PEF's Cost-effectiveness Assessment**

Progress concedes that, in a traditional analysis, the construction of the Levy Units does not compare favorably to construction of additional generating capacity using natural gas. TR 505. That traditional analysis would compare the cumulative present value revenue requirements of the respective nuclear and natural gas alternatives over a thirty year study period. TR 475. In this instance, however, PEF submits that a sixty year assessment is appropriate in order to reflect 1) the long lead time to completion of the units and 2) most of the expected extended (60 year ) license life of the units. TR 475-76.

Further, in order to “account for these additional legislative considerations” (i.e., the additional cost-effectiveness factors listed in Section 403.519(4) F.S.), Progress expanded its economic analysis to incorporate a series of presumed compliance costs for controlling CO2 emissions that may be required assuming eventual national regulation of major greenhouse gas emissions. Exh. 44; pp. 84-85.

Using extrapolations to develop sixty year low, mid, and high cost estimates for natural gas, and five scenarios that PEF deemed reasonable for presumed CO2 emission compliance costs, PEF developed a matrix of cumulative present value revenue requirement comparisons of the Levy project to an all natural gas capacity expansion scenario. Exh. 44, pp. 85, Table 10. Using a proprietary optimization program, PEF calculated that the Levy project showed a positive (i.e., “more beneficial for customers on a CPVRR basis”) result in ten of the fifteen possible scenarios that the utility studied.<sup>20</sup>

In each scenario studied, recovering the high capital cost of the Levy Units in retail rates initially produces a negative (from a customer perspective) CPVRR comparison relative to the “all gas” scenario. *See* Exh. 13, tab 19 (staff composite exhibit). For the five comparisons on Table 10 in the Need Study that show negative values, the comparison remains negative throughout the entire sixty year period. TR 495-96. For the scenarios that show positive CPVRR values, at some point each comparison turns positive for consumers based on the level of assumed natural gas prices and CO2 compliance costs. For example, for the “MIT Mid Range/ Low Fuel case, the crossover to positive occurs in 2066, the last year studied. TR 499. The table below shows the cross-over years for all scenarios showing positive values.

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<sup>20</sup> Exh. 44, p. 85.

CPVRR of PEF Expansion Plan

Positive Benefit Crossover

Year of accumulated present value utility cost crossover\*

<b>Base Capital</b>	<b>Low Fuel</b>	<b>Mid Fuel</b>	<b>High Fuel</b>
<b>Reference Case</b>	<b>Reference</b>	<b>Reference</b>	<b>reference</b>
<b>No CO2</b>	none	none	2042
<b>Bingaman Spector</b>	none	none	2034
<b>EPA No CCS</b>	none	2058	2032
<b>MIT Mid Range</b>	2066	2042	2027
<b>Lieberman Warner</b>	2049	2035	2025

\* Source: Exh. 13, tab 19.

The average crossover year for all positive scenarios is 2040.

It bears noting that a 60 year cumulative present value revenue requirement comparison requires a spectacular level of speculation. Over such a time period, even subtle changes in discount rates employed could materially alter the comparison results. Moreover, PEF's economic benefits assessment rests on the following significant assumptions:

- There is no slippage in the in-service date for Levy Unit 1
- Levy Unit 2 enters commercial service within 18 months of the completion of Unit 1
- Both units achieve a consistent 90 percent capacity factor
- Natural gas prices escalate at a constant 2.25% annually beginning in 2026
- CO2 compliance costs reasonably approximate the scenarios that PEF modeled.

There are serious concerns regarding each of these key assumptions, as is discussed below.

Recognizing that construction cost increases are probable, PEF's Need Study includes a sensitivity assessment that assumes 5, 15, and 25 percent increases in the project's overall capital cost. Exh. 44, p. 97, Table 11. That table, however, assumed no change in the in-service dates of either Levy Unit for the purposes of comparing CPVRR. TR 502.

#### **8. PEF's Claimed Need for Base-load Capacity**

PEF claims to need additional base-load capacity by 2016. Based on Progress' Ten Year Site Plan estimates of planned capacity additions, retirements and power purchases, adding Levy Unit 1 will establish a capacity reserve margin of 25.3% in 2016. Exh. 44, p. 76, Table 8. This is 583 MWs higher than its planning reserve margin of 20 percent. *Id.* Adding Levy Unit 2 in the summer of 2017 will establish a reserve margin of 33%, or 1,448 MWs higher than the target 20% reserve margin. Exh. 44, p. 77, table 9. PEF states that it is exploring potential joint ownership possibilities with other Florida utilities, but no conclusive arrangements have been announced. TR 85-86.

PEF maintains that it has and will be implementing all economically justified demand side management measures. TR 273-74. However, PEF concedes that its estimates do not reflect any utility action regarding smart metering. TR 278. Neither has the utility implemented, nor indicated it plans to implement, hourly pricing programs for large residential, commercial or industrial weather-sensitive loads that drive its system peak. TR 277-78.

#### **C. STATUTORY BACKGROUND**

Section 403.519(4), F.S. directs the Commission to act expeditiously with respect to an application for a determination of need for a new nuclear power plant. Subsection (4) provides that, in making its determination, the Commission shall consider "the need for

electric system reliability and integrity, including fuel diversity, the need for base-load generating capacity, the need for adequate electricity at a reasonable cost, and whether renewable energy sources and technologies, as well as conservation measures, are utilized to the extent reasonably available.”

Subsection (b) of the Section 403.519(4) further elaborates as follows:

In making its determination, the commission shall take into account matters within its jurisdiction, which it deems relevant, including whether the nuclear or integrated gasification combined cycle power plant will:

1. Provide needed base-load capacity.
2. Enhance the reliability of electric power production within the state by improving the balance of power plant fuel diversity and reducing Florida’s dependence on fuel oil and natural gas.
3. Provide the most cost-effective source of power, taking into account the need to improve the balance of fuel diversity, reduce Florida’s dependence on fuel oil and natural gas, reduce air emission compliance costs, and contribute to the long-term stability and reliability of the electric grid.

Once a determination of need has been granted, Progress may seek recovery of Levy County costs in accordance with the nuclear cost recovery rule. Rule 25-6.0423 F.A.C. As noted above, this includes the annual CCRC factor prudence reviews that serve to preclude any subsequent prudence review or disallowances.

#### **D. SUMMARY OF ARGUMENT**

The reason it has been 30 years since anyone in Florida, or anywhere else in the U.S., attempted to build a new nuclear unit is that the costs to build such a plant were too high and uncertain. No one would willingly accept those financial risks. Not reactor suppliers. Not utilities. Not the investment community.

In the current attempt to re-establish nuclear power, all of those industry segments have learned from the circumstances that compelled the rejection of nuclear as a

commercially viable capacity resource in the 1980s. Taking into account all of the considerations listed in Section 403.519(4) F.S. and the requirements of the nuclear cost recovery rule, the Commission similarly must apply the lessons learned from the first generation nuclear experience to its determination of need in this docket. As Mr. Bradford observed:

The new statutory framework [in Florida] twines three themes: Encouragement of nuclear energy, cost recovery and criteria that include reasonable costs and cost-effectiveness. A fundamental lesson from the cost overrun experience of the 1970s and '80s is that for the regulation to be effective, it has to focus more on shaping a least cost future rather than on allocating an expensive past.

TR 582-83.

PCS Phosphate supports the timely addition of reliable base-load generating capacity that possesses low and stable fuel and operating costs as well as minimal or zero greenhouse gas emissions during normal operations. These characteristics have always been features of commercial nuclear power, but they did not prevent its demise as a resource twenty years ago. PCS Phosphate is mindful of the delays, cost overruns and severe rate impacts indelibly linked to prior nuclear construction. The plain fact of the matter is that the changes implemented by Congress, the NRC and the Florida Legislature to promote new nuclear power development all aim to mitigate investor risk associated with these projects. The risks of project delays, cost overruns, vendor failure to meet schedules, poor operating performance, softening power demand, and the potential that emerging technologies will render the proposed plant uneconomic (to name a few), all remain. TR 601. These risks simply are shifted to consumers' backs once a determination of need is granted. This is the reason why the Commission's determination of need must confront these risks.

For the proposed new units at Levy County, the cost risks and uncertainties associated with the project construction are all too apparent. Considering as well that there

is neither a construction nor operating history for the AP1000 reactor system, and that the entire nuclear supply chain must be re-created in a hurry to keep any of the new wave of projects on schedule, these risks, if anything, have been heightened. PEF's repeated recitation of those risk factors does not indicate a work-in-progress that should be regularly updated. It signals a serious consumer risk for a project that is already remarkably expensive.

Finally, the key governing documents that might allocate the assumption of risk among PEF, Westinghouse, SSW, and major equipment vendors and contractors are not available in this record because they are being negotiated, or work has not even begun in those areas. Given this early stage in the project, and absent that critical information, the Commission must presume that Progress and its customers will bear the risk of all delays and cost overruns.

Considering the history of nuclear construction costs, the acknowledged risk factors that apply to the proposed Levy Units, the absence of governing contractual arrangements that might re-allocate some of those risks among the project participants (where it belongs), and the restriction on retrospective prudence reviews established by the nuclear cost recovery rule, the Commission must come to grips with the risks imposed on consumers in this docket.

The point is not to re-cast or update PEF's more problematic assumptions and re-calculate the likely rate impacts and economic benefits. Rather, it is absolutely essential that the Commission realistically appraise the project cost estimates, the fragility (and gaping holes) in those estimates, and the risks to consumers. Such an appraisal cannot conclude that a determination of need for the Levy Units can be granted without concretely addressing those risks. Based on the record in this docket, the Commission needs to take certain measures to protect consumers.

PCS Phosphate witness Peter Bradford has extensive and unique experience both in licensing new nuclear facilities as a commissioner at the Nuclear Regulatory Commission and as the Chairman of two state commissions (Maine and New York) that have been forced to deal with nuclear construction cost overruns in the past. He has addressed, as a decision-maker, the issues the Commission faces in this docket as well as the rate ramifications it will confront down the line. The recommendations in his testimony reflect lessons learned from a regulatory perspective that are particularly apt here. His recommendations would establish necessary safeguards for Florida consumers and provide clear and appropriate incentives for PEF to manage the project with the zeal and purpose required for there to be any prospect that consumers will eventually benefit from their construction. These recommended actions include the following measures:

1. The Commission should not grant a determination of need for Levy Unit 2 absent a demonstration that PEF has parties that are willing to share the cost of the excess generating capacity that results from the addition of that unit. If it grants a finding of need for the unit, the Commission should impute joint ownership wholesale sales revenues for that excess capacity in a manner similar to the Commission's 1985 *TECO* decision in Docket No. 850050-EI.<sup>21</sup>
2. The Commission should set clear limits on the amounts that can be charged to the customers absent further justification by PEF, and those limits should not exceed the costs of the next best alternatives. By setting and enforcing such limits, the Commission will be benefiting both customers and utility investors as well as the Florida economy.
3. Because of the strong likelihood that energy efficiency is available at lower cost than the proposed nuclear station, the Commission should require a showing that programs are in place to capture all cost-effective energy efficiency before it accepts as prudent any decision to build a nuclear unit. In particular, Progress should be required to address the peak load management potential of smart metering and dynamic pricing in its service territory.
4. The Commission should confine the scope of any need determination that it makes as narrowly as possible under the statute. In particular, the Commission should not accept the proposition that payments to secure the long lead time items are "project

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<sup>21</sup> *In re: Petition of Tampa Electric Company*, Docket No. 850050-EI, Order No. 15451, 85 FPSC 95, 1985 Fla. PUC Lexis 60 (Dec. 1985) ("*TECO*") (imputing wholesale sales revenues associated with excess capacity for *TECO*'s Big Bend Unit 4).

development costs.” Such payments are very much part of the construction process. Their prudence requires detailed separate review of evidence not presented in this proceeding.

5. The Commission should indicate in any decision under the new Florida statute that it recognizes the reduced risk that will flow from the decision and intends to adjust the allowed return on equity accordingly.

In May 2008, John Rowe, the CEO of Exelon, the utility owning the most nuclear generation in the country and a leading advocate for new nuclear generating plants, observed at a Nuclear Energy Institute meeting,

“Disciplined project execution is critical for the success of new nuclear plant construction. Nothing will chill the rebirth of nuclear power more quickly than finding ourselves 18 months into construction on a project and 18 months behind schedule.”<sup>22</sup>

Every utility contemplating building a new nuclear unit must have a sense of urgency about cost and schedule. Progress seems to recognize that the Levy project requires “aggressive and efficient oversight.” TR 169. The Commission must share that perspective and reflect it in its determinations in this docket.

## E. ARGUMENT

**ISSUE 1: Is there a need for the proposed generating units, taking into account the need for electric system reliability and integrity, as this criterion is used in Section 403.519(4), Florida Statutes?**

\* No. Taking into account the criteria used in Section 403.519(4), F.S., Levy Unit 2 would add unnecessary excess capacity to the PEF system and thus a determination of need cannot be supported with respect to the second unit.\*

From the standpoint of electric system reliability and integrity, there is no demonstrated need for PEF’s addition of 2,200 MWs of nuclear generation by 2017. The addition of Levy Unit 1 in 2016 will create a capacity reserve margin of 25.3%, or 583

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<sup>22</sup> TR 45 (Brew opening statement, referencing speech available at [http://www.nei.org/newsandevents/speechesandtestimony/2008\\_speeches\\_and\\_testimony/rowespeech\\_050608/](http://www.nei.org/newsandevents/speechesandtestimony/2008_speeches_and_testimony/rowespeech_050608/).)

MWs above the utility's 20% reserve planning target. Exh. 44, p. 77, Table 9. Adding Levy Unit 2 in 2017 creates a reserve margin of 33%, or 1,448 MWs above the calculated reserve target. *Id.* In short, all of the output of Levy Unit 2 is, from a PEF reliability perspective, excess capacity. This excess continues at least through 2021 according to the Need Study. *Id.* There is no reliability justification for the second unit.

In a novel effort to justify the excess capacity, PEF suggests that its recent power supply contracts with renewable energy producers rely on wood-waste biomass or biomass crops technologies that are unproven and might not provide reliable capacity and energy. TR 458. This concern, of course, goes to the justification for those contracts with renewable energy producers, not the need for the Levy Units. There is no justification for an implicit increase in PEF's planning capacity reserve margin to back-up renewable energy capacity that is otherwise reflected in PEF's Ten Year Site Plans as reliable capacity.

Of greater relevance, Progress has disclosed that it is exploring potential joint ownership or related arrangements regarding Levy Units 1 and 2 with various Florida entities, although it does not report that any specific agreements are imminent. TR 85-86. Joint ownership or firm capacity sales to entities that need capacity in their own right are reasonable ways to resolve the excess Levy capacity by relieving PEF's customers of the cost burden of that excess capacity. The Commission has addressed comparable issues in the past by imputing a level of wholesale sales revenues associated with new excess generating capacity. For example, in TECO's 1985 rate case (Docket No. 850050-EI), the Commission established wholesale revenue targets associated with the entry of Big Bend Unit 4 into commercial service.<sup>23</sup> In short, the record does not support a finding of need

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<sup>23</sup> *In re: Petition of Tampa Electric Company*, Docket No. 850050-EI, Order No. 15451, 85 FPSC 95, 1985 Fla. PUC Lexis 60 (Dec. 1985)

for electric system reliability and integrity for Levy Unit 2 based on PEF's forecasted resources and load. A determination of need based on this criterion can only be justified if PEF enters into a joint ownership agreement with a utility partner, or if the Commission imputes such an arrangement for the purposes of rate recovery.

**ISSUE 2: Is there a need for the proposed generating units, taking into account the need for fuel diversity, as this criterion is used in Section 403.519(4), Florida Statutes?**

- \* No position. The intervention of PCS Phosphate in this matter does not contest the fuel diversity benefits of the Levy Units.\*

**ISSUE 3: Is there a need for the proposed generating units, taking into account the need for base-load generating capacity, as this criterion is used in Section 403.519(4), Florida Statutes?**

- \* No. Taking into account the criteria used in Section 403.519(4), F.S., Levy Unit 2 would add unnecessary excess base-load capacity to the PEF system and thus a determination of need cannot be supported with respect to the second unit. \*

As explained in response to ISSUE 1, PEF has not established a need for Levy Unit 2. The addition of Levy Unit 1 provides more base-load generating capacity than Progress requires to satisfy its reserve margin planning needs. While Levy Unit 2 undoubtedly would be operated as base-load capacity, none of that capacity is required by 2017. Further, the record in this matter does not support the early retirement of other existing PEF base-load or peaking generation. Consequently, PEF has not met the criterion for establishing that a need for base-load generating capacity, as used in Section 403.519(4), F.S. can be rendered for both Levy Units.

**ISSUE 4: Is there a need for the proposed generating units, taking into account the need for adequate electricity at a reasonable cost, as this criterion is used in Section 403.519(4), Florida Statutes?**

- \* No. PEF's filing does not demonstrate that adequate safeguards have been established to effectively manage the risks to consumers of significant project

construction delays and cost overruns. The Commission lacks an adequate basis to conclude that the proposed \$17 billion generating units will provide electricity at a reasonable cost.\*

Progress' customers need adequate electricity at a reasonable cost, but PEF's Petition, Need Study and testimony in this docket do not squarely ask and answer this basic question as applied to the proposed Levy Units. Instead, the Petition and supporting testimony maintain that base-load capacity is needed (Issues 1 and 3) and that PEF believes the units will be cost-effective, considering the additional factors described in Section 403.519(4) (i.e., the need to improve the balance of fuel diversity, reduce Florida's dependence on fuel oil and natural gas, reduce air emission compliance costs, and contribute to the long term stability and reliability of the electric grid). *See* Petition, p. 3. PEF concedes at various points that Levy Units 1 and 2 will be expensive,<sup>24</sup> that they may be "significantly more" expensive than building natural gas-fired combined cycle generation, (Petition, p. 5), and that the Levy Units could never be justified on a traditional economic analysis alone.<sup>25</sup> Thus, as Progress points it, the criterion requiring electric power at a reasonable cost could be met if PEF's cost-effectiveness analysis is acceptable (see Issue 6) and unspecified credit can be given to the other additional consideration factors listed in the statute.

The additional considerations recited in Section 403.519(4), F.S. that are applicable to a determination of need for a new nuclear plant clearly aim to support the development of new nuclear capacity, but those considerations do not negate the basic need for the utility to demonstrate that the nuclear units are likely to provide power at a reasonable cost to consumers and that they are the most cost-effective resource available. Indeed, as Mr.

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<sup>24</sup> Petition, p. 4.

<sup>25</sup> Petition, p. 4.

Bradford explained, that basic consideration is part and parcel of Section 403.519, F.S. TR 582.

The fundamental problem is that the issue cannot be answered without a realistic idea of what the cost of the project will be to consumers. At \$3,500/kw (the amount estimated in the early Levy County announcements), the answer would be clear cut and favorable. If today's \$14 billion estimate (not including transmission) doubled (an all too common occurrence in nuclear construction as described above), it would be just as clear that the units are unaffordable. The record shows that Progress considers the \$14 billion estimate to be the utility's current best guess, but, as noted above, PEF fully expects the ultimate project costs to be much higher.

Given the history of nuclear plant construction overruns (both past and current), the long list of risk factors that are likely to affect construction cost and schedule, and the preliminary stage of procurement and contract negotiations, the record in this docket does not support a finding that the Levy Units are likely to provide electricity at a reasonable cost. Moreover, a finding on this critical issue cannot simply be taken as an article of faith.

Neither can an unsupported finding be remedied through the annual nuclear cost recovery proceedings. PEF did not offer any rebuttal to Mr. Bradford's observations that the cost recovery rule shifts risks to consumers,<sup>26</sup> that key issues of construction imprudence often become manifest well after the imprudent errors or omissions actually occurred,<sup>27</sup> and that the cost recovery rule precludes timely prudence reviews on those matters. TR 581, 582. As Mr. Bradford explained in his testimony, the lesson learned from past experience, taking into account both the state's interest in promoting nuclear power

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<sup>26</sup> TR 595-99.

<sup>27</sup> TR 599-600.

and the restrictions of the cost recovery rule, is that the Commission must be pro-active in its determinations in this matter to protect consumers. TR 582.

In the need determination for Florida Power and Light's proposed Turkey Point Nuclear Units 6 and 7,<sup>28</sup> the FPSC addressed some concerns regarding future cost effectiveness by imposing certain conditions on FP&L. Specifically, the Commission accepted Staff's recommendations that FP&L provide an updated cost-effectiveness evaluation as part of the annual cost recovery process. In addition, the Commission agreed to require FP&L to provide updated fuel forecasts, breakdown costs and capital cost estimates.<sup>29</sup> Updated estimates are a necessary but not sufficient requirement for safeguarding the risks PEF's ratepayers face. To address these shortcomings and thus provide greater certainty to all concerned parties, Mr. Bradford has recommended several additional conditions that would establish necessary safeguards for Florida consumers and provide clear and appropriate incentives for PEF to manage the project in the best interests of consumers.

If a determination of need is granted for the Levy Units, the Commission certainly needs better information on PEF's contractual arrangements with the Westinghouse / SSW consortium and all major project contracts and vendors once that information becomes available. The Commission should evaluate the allocation of performance risks in those arrangements and revisit the economic feasibility of the project from a ratepayer perspective before site clearing begins.

As Mr. Bradford explained in his testimony, others in the industry recognize that a new approach to project risk allocation is required for nuclear construction to be successful. As Exelon Chief Operating Officer Christopher Crane observed: "Engineers

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<sup>28</sup> *FP&L*, Order No. PSC-08-0237-FOF-EI.

<sup>29</sup> *Id.* at 28.

and construction contractors for new nuclear plant builds must be prepared to share risks by guaranteeing timely, on-budget performance in their contracts.” TR 604. The Commission should expect to see such assurances for the Levy project. Alternatively, as Mr. Bradford suggests, the Commission should establish a cost cap for recovery of project costs. The cap should be tied to either the current estimate or the cost of available alternatives and would not be immutable, but Progress would have the burden of justifying further investment in the project.

It bears noting that, based on PEF’s estimates on this record, Florida consumers will be charged approximately \$6.1 billion in Levy County costs prior to the units’ commercial operation through the nuclear cost recovery clause,<sup>30</sup> while projected fuel and emissions costs savings will not fully offset the high capital cost of the units recovered in base rates for at least another twenty years. This means that the Levy Units will be an economic burden for PEF’s ratepayers for nearly a generation.

PEF maintains that on-going recovery permitted through the CCRC and the eventual removal of certain Levy costs from the CCRC will mitigate the base rate impacts once the units enter commercial service. TR 566. This has the same tortured appeal as telling a couple that they can lower their monthly mortgage payments on a house if they make payments on the mortgage for ten years prior to moving in. Ultimately, the intergenerational equity dilemma created by the nuclear cost recovery rule does nothing to establish that the Levy Units will provide electricity at a reasonable cost. The only factors that matter on that ultimate question are

- 1) can Progress complete the units reasonably close to the estimated cost and schedule? and

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<sup>30</sup> TR 564.

- 2) can Progress operate the units to achieve the performance levels that the utility has forecast?

These questions directly call in to play the risk factors discussed above and the need for the Commission's determination to establish reasonable bounds and perform subsequent assessments of the project risks to consumers.

**ISSUE 5: Are there any renewable energy sources and technologies or conservation measures taken by or reasonably available to Progress Energy Florida, Inc. which might mitigate the need for the proposed generating units?**

\* No position.\*

**ISSUE 6: Will the proposed generating units provide the most cost-effective source of power, as this criterion is used in Section 403.519(4), Florida Statutes?**

\* No. PEF's nuclear economics benefits assessment is flawed and speculative, and the utility's filing does not demonstrate that adequate safeguards have been established to effectively manage the risks to consumers of significant project construction delays and cost overruns.\*

PEF's cost-effectiveness showing for the Levy Units is predicated on the nuclear economic benefits assessment shown on Table 10 of the Need Study. Exh. 44, p. 85. Apart from the obvious reliability concerns associated with a 60 year cumulative present value revenue requirements comparison, the Progress analysis rests on several core assumptions:

- There is no slippage in the in-service date for Levy Unit 1
- Levy Unit 2 enters commercial service within 18 months of the completion of Unit 1
- Both units achieve a consistent 90 percent capacity factor
- Natural gas prices escalate at a constant 2.25% annually beginning in 2026
- CO2 compliance costs reasonably approximate the scenarios that PEF modeled.

There is cause to question the underpinnings for each of these assumptions. First, as noted above, the Progress Petition, Need Study, and several PEF witnesses openly caution the Commission that increases, probably substantial, in the cost of the Levy Units are likely. The history of nuclear power plant construction demonstrates that schedule delays are the rule rather than the exception. This is seen not only in the historic U.S. experience, but in current projects underway abroad today.<sup>31</sup> Also, as has been commonly reported, the revived interest in nuclear construction requires re-establishing a vendor chain of NRC-qualified equipment and component producers that has long been dormant.<sup>32</sup> Slippage of the in-service dates of both Levy Units must be considered highly probable.

Next, Progress assumes a \$2.3 billion (30%) savings in the capital cost of Levy Unit 2 if the unit is completed within 18 months of Unit 1. *See* Exh. 44, p. 19, Table 3. PEF performed no sensitivities of the economic benefits assessment if it is not able to achieve completion of the second unit as planned, although many of the risk factors that PEF cites could lead to substantial delays in the second unit.

Next, Mr. Bradford explained that it is unrealistic to assume a lifetime capacity factor of 90% for the Levy Units. U.S. reactors have not achieved lifetime factors above 90% even with improved performance in recent years. TR 607. He also explained that such an assumption is particularly improbable for new units, which tend to have substantially lower capacity factors in their early years as the plants are broken in. *Id.*

On rebuttal, Mr. Roderick attempted to dispute Mr. Bradford's assessment by pointing to the "operating factors" achieved by six selected plants that have entered service in recent years in other countries. TR 687-89; Exh. 60. Mr. Roderick offered no particular criteria for the plants he selected but claimed to focus on units with similar processes that

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<sup>31</sup> TR 580 (Finland's Olikuoto project is at least two years behind schedule).

<sup>32</sup> *New Wave of Nuclear Plants Faces High Costs*, WALL ST. J., May 12, 2008.

“would be replicable or common to us.” TR 687. In fact, however, three of the units Mr. Roderick selected employ technologies not used in the United States. TR.688 (the Tarapur reactor in India); TR 693-94 (the Kalinin reactor in Russia); and TR 695 (the Khmelnitski reactor in Ukraine). For at least one reactor (the Qinshan unit in China), Mr. Roderick disregarded recently installed units at the same site that had lower performance values. TR 697-98. Mr. Roderick claimed that Japan pioneered the modular construction technique that PEF will be employing for the Levy Units (TR 686), but he excluded all new units entering service in Japan since 2002 from his performance comparison. TR 697.

Finally, and most significantly, Mr. Roderick acknowledged that the “operating factor” data that he obtained from the World Nuclear Association website does not measure capacity factor at all. TR 698-702.<sup>33</sup> In short, Mr. Roderick’s rebuttal reference to a self-selected set of non-comparable units does not even attempt to address expected capacity factor for a newly designed U.S. pressurized water reactor.

Third, a sixty year forecast of natural gas prices would be considered speculative under any circumstances, but applying a fixed escalation factor for most of the years studied, as assumed in PEF’s analysis, illustrates the dubious premise for PEF’s 60 year CPVRR comparison.

PEF witness Crisp explained that Progress performed an update of its Nuclear Economic Benefits Assessment in response to a discovery request. TR 500. That update did not recalculate the CPVRR comparisons or update the data employed in the

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<sup>33</sup> Capacity factor is generally defined to mean the ratio of energy produced by a facility over a defined time interval (e.g., year) compared to its maximum potential output based on its rated capacity. TR 689. The “operating factor” data taken from the international sites refers only to the ratio of time that a unit is on-line and available to produce energy. TR 691; Exh. 75. Operating factor is indifferent to the amount of energy actually produced, and Mr. Roderick agreed that it is a completely different performance metric from capacity factor. TR 698-99.

comparisons. Rather, PEF simply dropped the “low fuel” and “No CO2 regulation” scenarios from its matrix on the theory that neither was likely to occur. However, PEF retained its comparison values for the “Lieberman-Warner CO2 case” (its highest cost CO2 compliance scenario) even though the source of its data, Charles River Associates, had repudiated those estimates as preliminary and incomplete. *See* Exhs. 70 and 71.

The PEF nuclear economics benefit study incorporated CO2 compliance costs over the 60 year study period from PEF witness Kennedy. TR 399. Mr. Kennedy in turn selected data from nine recent studies on potential CO2 compliance costs that he deemed credible and further refined his analysis by selecting four of those nine cost curves. Exh. 42. The most expensive cost scenario Mr. Kennedy selected was based on November 2007 testimony of compliance costs based on a pending draft of the Lieberman-Warner Climate Security Act of 2007 (S. 2191). *See* Exh. 42. In April 2008, CRA prepared a report that superseded the November analysis to reflect the carbon emission reducing effects of the Energy Independence and Security Act of 2007 and the actual terms of the Lieberman-Warner bill passed by the Environment and Public Works Committee earlier in 2008. *See* Exhs. 70 and 71.<sup>34</sup> Mr. Kennedy conceded that the updated CRA assessment produced considerably lower estimated CO2 compliance costs over the study period. TR 408. In short, based on the CRA complete and updated forecast of CO2 compliance costs shown in Exhibits 70 and 71, the values used by PEF in its economics benefits matrix for the Lieberman-Warner scenario have no rational basis. Eliminating those values from the matrix leaves the following:

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<sup>34</sup> The approved version of S.2191 provided for allowance banking, domestic offsets and other provisions the committee deemed important to controlling the impact of CO2 compliance costs on the U.S. economy. TR 405-405.

CPVRR of PEF Expansion Plan: PEF Updated Comparison  
 Positive Benefit Crossover  
 Year of accumulated present value utility cost  
 crossover\*

<b>Base Capital</b>	<b>Low Fuel</b>	<b>Mid Fuel</b>	<b>High Fuel</b>
<b>Reference Case</b>	<b>Reference</b>	<b>Reference</b>	<b>reference</b>
<b>No CO2</b>			
<b>Bingaman Spector</b>		none	2034
<b>EPA No CCS</b>		2058	2032
<b>MIT Mid Range</b>		2042	2027
<b>Lieberman Warner</b>			

\* Source: Exh. 13, tab 19.

This further updated assessment to reflect reasonable estimates from credible sources shows that, under PEF’s most likely (“mid”) fuel scenario, the Levy Units would not show a net benefit to consumers until the year 2042 at the earliest.

From all of the above, three distinct conclusions should be drawn. The first is the inherently unreliable nature of a 60 year CPVRR comparison under any circumstance, but particularly where a key variable (CO2 compliance costs) is premised on a national system for regulating carbon emissions that does not currently exist. The second is that Progress has been required to embrace a number of dubious assumptions in order to attempt to justify the current cost estimate for the Levy Units. Any serious effort to extend that analysis to account for probable construction delays and risk factors would quickly cross any credibility bounds. Third, even taking PEF’s assessment at face value, ratepayers will not see net benefits from the project for nearly a generation.

PEF’s nuclear economics benefit assessment fails to establish that the Levy Units will be cost-effective taking into account the additional considerations described in Section 403.519(4), F.S. Instead, the assessment, and its transparent infirmities, illustrate the negative impact that the units’ high capital cost has on the likelihood of there being net

consumer benefits in our lifetimes. It further belies the significant adverse impacts that material cost overruns and schedule delays would have on the cost-benefit analysis.

In sum, to determine that the Levy Units represent a cost effective resource alternative, the rational regulatory response in this case should be to address the serious risks and uncertainties posed by the project rather than to repeatedly tweak the model. That is the premise for the PCS Phosphate recommendations.

**ISSUE 7: Based on the resolution of the foregoing issues, should the Commission grant Progress Energy Florida, Inc.'s petition to determine the need for the proposed generating units?**

\* No. The Commission should not grant a determination of need unless the consumer safeguards recommended by PCS Phosphate are adopted\*

Progress has not demonstrated that there is a reliability need for both Levy Units. PEF has not demonstrated that the cost risks and uncertainties of the project have been fairly allocated among project participants. It cannot be presumed that the Levy Units will provide electricity at a reasonable cost given the already high cost estimate, the acknowledged risk factors that likely will affect project cost and schedule, and the absence of controlling project contract and procurement documents. Absent the consumer safeguards that PCS Phosphate recommends, the record does not support a Commission order granting a determination of need for either Levy Unit.

**ISSUE 8: Should this docket be closed?**

\* No position.\*

## F. CONCLUSION

For the reasons stated herein, PCS Phosphate urges the Commission to adopt the recommendations and conditions described herein required to protect Florida consumers.

Respectfully submitted the 6<sup>th</sup> day of June, 2008.

BRICKFIELD, BURCHETTE, RITTS & STONE, P.C.

Respectfully submitted,

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**CERTIFICATE OF SERVICE**

I hereby certify that a true copy of the foregoing has been furnished by electronic mail and/or U.S. Mail this 6th day of June 2008 to the following:

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*s/ James W. Brew* \_\_\_\_\_