

State of Florida



Public Service Commission

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-M-E-M-O-R-A-N-D-U-M-

DATE: July 2, 2008

TO: Office of Commission Clerk (Cole)

FROM: Division of Economic Regulation (Graves, Bulecza-Banks, Clemence, Colson, Garl, Hewitt, Kyle, Lester, Maurey, McNulty, Springer, Stallcup, Wu)
Office of the General Counsel (Fleming, Klancke, Young)

RE: Docket No. 080148-EI – Petition for determination of need for Levy Units 1 and 2 nuclear power plants, by Progress Energy Florida, Inc.

AGENDA: 07/15/08 – Regular Agenda – Posthearing Decision – Participation is Limited to Commissioners and Staff

COMMISSIONERS ASSIGNED: All Commissioners

PREHEARING OFFICER: McMurrian

CRITICAL DATES: 07/24/08 (135 day deadline for final decision per statute)

SPECIAL INSTRUCTIONS: None

FILE NAME AND LOCATION: S:\PSC\ECR\WP\080148.RCM.DOC

Case Background

On March 11, 2008, Progress Energy Florida, Inc. (PEF) filed a petition for a determination of need for the proposed Levy Nuclear Units 1 and 2 (Levy Units 1 and 2), pursuant to Section 403.519, Florida Statutes (F.S.), and Rule 25-22.080, Florida Administrative Code (F.A.C.). PEF's proposal consists of two Westinghouse AP1000 nuclear-fueled generating units with in-service dates of 2016 and 2017. The Westinghouse AP1000 design has a nominal output of approximately 1,100 mega-watts (MW) per unit. The proposed unit additions will contribute 2,200 MW to PEF's system.

Pursuant to Section 403.519(4), F.S., the Commission is the sole forum for the determination of need for new nuclear power plants. In making its determination, the Commission must take into account the need for electric system reliability and integrity, the need for fuel diversity and supply reliability, the need for base-load generating capacity, the need for adequate electricity at a reasonable cost, and whether the proposed plant is the most cost-effective alternative available. The Commission must also expressly consider whether renewable energy sources or conservation measures taken by or reasonably available to the utility might mitigate the need for the proposed plant.

Intervention in this docket was granted to the following parties: (1) Office of Public Counsel (OPC),¹ (2) White Springs Agricultural Chemicals, Inc. d/b/a PCS Phosphate – White Springs (PCS),² and (3) Southern Alliance for Clean Energy (SACE).³

Public Testimony: In addition to the pre-filed testimony submitted by the applicants, the Commission received mailed comments and heard live testimony from public witnesses. Thirty-five citizens testified at a service hearing in Crystal River, Florida, on April 23, 2008. In addition, four citizens provided public testimony at the formal administrative hearing in Tallahassee on May 21, 2008. Below is a list of the topics of interest expressed during the public testimony portion of the hearing and a reference to where they will be addressed within staff's recommendation:

System Reliability and Integrity – Issue 1

Fuel Diversity – Issue 2

Reasonable Costs for Electricity – Issue 4

Environmental Compliance Costs – Issues 4 and 6

Conservation/Demand Side Management/Renewables – Issue 5

Cost-Effectiveness – Issue 6

Other areas of interest that were discussed during the public testimony phase of the hearing focused on subjects beyond the scope of this proceeding established under Section 403.519, F.S., or this Commission's jurisdiction under its authorizing statutes. Those interests are listed below:

Environmental Concerns: Citizens voiced concerns about greenhouse gas emissions, radioactive wastes, water supply, and concerns of overall health resulting from potential exposure to radiation.⁴

¹ Order No. PSC-08-0174-PCO-EI, issued March 21, 2008.

² Order No. PSC-08-0245-PCO-EI, issued April 18, 2008.

³ Order No. PSC-08-0253-PCO-EI, issued April 23, 2008.

⁴ Witnesses Hopkins, Harvey, Brinkman, Jones, Leven, Eno, Berger, Locke, Eppes, Price, Keith, Peters, Casey, and Elias.

Safety Concerns: Citizens expressed concerns regarding plant security and the threat of terrorist acts.⁵

Economic Development: One citizen questioned how the surrounding area would be able to cope with the sudden population increase that would come with the construction of the plants.⁶ Proponents of the plant testified about economic benefits the plant would provide resulting in a boost to the economy of Levy County.⁷

Routing of Associated Transmission Lines: Citizens also expressed concerns regarding the placement of new transmission lines.⁸ Transmission siting falls under the Department of Environmental Protection's (DEP) jurisdiction.

Section 403.519, F.S., authorizes the Commission to examine PEF's projected costs for environmental controls necessary to meet current state and federal environmental requirements (See Issue 6). While staff believes the Commission's ability to address all issues raised in the public testimony is limited by the scope of Section 403.519, F.S., and other statutes which establish the Commission's jurisdiction, these other concerns may be relevant in the certification proceedings before DEP, the Division of Administrative Hearings, and the Governor and Cabinet, sitting as the Siting Board.

A formal administrative hearing was held on May 21-22, 2008. On June 6, 2008, post-hearing briefs were filed by PEF and PCS. On June 10, 2008, SACE filed its post-hearing brief.⁹ A post-hearing brief was not filed by OPC.

The Commission has jurisdiction over this subject matter of this proceeding pursuant to Sections 366.04(2)(c) and (5), 403.507, and 403.519, F.S.

⁵ Witnesses Eppes, Price, Keith, Peters, and Jones.

⁶ Witness Diamond.

⁷ Witnesses Douglas, McQueen, King, Cannon, Welker, Hollins, and Kirk.

⁸ Witnesses Harvey, Eno, Vibbert, Berger, Renfro, Masaoy, Pickering, Peterson, Cook, Simpson, Lott, and Jones.

⁹ None of the parties objected to SACE filing its brief on June 10, 2008; accordingly, staff has addressed SACE's arguments in this recommendation.

Executive Summary

Pursuant to Section 403.519(4), F.S., the Commission is the sole forum for the determination of need for new nuclear power plants. In making its determination, the Commission must take into account the need for electric system reliability and integrity, the need for fuel diversity and supply reliability, the need for base-load generating capacity, the need for adequate electricity at a reasonable cost, and whether the proposed plant is the most cost-effective alternative available. The Commission must also expressly consider whether renewable energy sources or conservation measures taken by or reasonably available to the utility might mitigate the need for the proposed plant.

Since the construction of St. Lucie 2 in 1983 by Florida Power & Light Company (FPL), no nuclear power plants have been constructed in Florida. Rather, the state as a whole relied on the construction and purchase of coal-fired generation through the 1980s and turned to low-cost natural gas-fired generation throughout the 1990s up until the present. On March 18, 2008, the Commission approved the need for FPL's Turkey Point Nuclear Units 6 and 7 in order to meet a portion of FPL's identified generation needs in the 2018 through 2020 time period.¹⁰ PEF, in the instant case, proposes to build two nuclear units, Levy Units 1 and 2, with in-service dates of 2016 and 2017. The addition of Levy Units 1 and 2 would satisfy PEF's generation needs through 2023 and would result in approximately 36 percent of PEF's projected generation coming from natural gas by the year 2018.

There have been actions taken at both the federal and state level to promote the development of new nuclear generation. For example, the licensing process at the Nuclear Regulatory Commission (NRC) has been streamlined to consider standardized designs and has combined the approval of a construction and operating license. PEF expects to file their combined construction and operating license application (COLA) with the NRC later this year in order to insure receipt of the license by 2011. Also, the Energy Policy Act of 2005 (EPACT) provided three programs to benefit new nuclear plant development. If the nuclear project meets specific development and construction milestones, the utility may be eligible for a form of "risk insurance" to cover some construction delays, a loan guarantee program to reduce lending costs, and production tax credits that would become effective upon commercial operation. PEF may be eligible for some of these programs which would result in additional benefits to PEF's ratepayers.

In addition, during the 2006 legislative session, the Florida Legislature enacted Sections 366.93 and 403.519(4), F.S., which effectively mitigate the economic risks associated with the long lead time and high capital costs associated with nuclear power plants. Section 366.93(2), F.S., requires the Commission to establish alternative cost recovery mechanisms for the recovery of costs incurred in the siting, design, licensing, and construction of a nuclear power plant. Such mechanisms shall be designed to promote utility investment in nuclear power plants and allow for the recovery in rates of all prudently incurred costs. Sections 366.93(3) and (5), F.S., allow a utility to request recovery of costs after a need determination has been granted and require

¹⁰ See, page 7, Order No. PSC-08-0237-FOF-EI, issued April 11, 2008, in Docket No. 070650-EI, In re: Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

annual cost information to be filed with the Commission. Finally, if a utility elects not to continue with the construction of a new nuclear plant, Section 366.93(6), F.S., allows the utility to recover costs prudently incurred up to the date of termination. The recent legislation, which recognizes the unique nature of nuclear power plants, provides the Commission an opportunity to review the costs and benefits of a proposed nuclear power plant after a need determination is granted. The annual nuclear cost recovery proceedings will provide a forum for the Commission to continue to gather and review additional cost and benefit information as it becomes available during construction.

Recommendation Summary

Staff recommends that the Commission approve the need for Levy Units 1 and 2. Staff believes the proposed units will maintain PEF's fuel diversity, provide additional base load generation with zero greenhouse gas emissions, and are the most cost-effective alternative to satisfy PEF's long-term generation requirements. As with any nuclear power plant project that is capital intensive and has a long lead time, uncertainty remains with regard to future capital costs and fuel prices. However, the Commission will review the continued feasibility of PEF's Levy Units 1 and 2 project during its annual nuclear cost recovery proceedings. Thus, providing the appropriate checks and balances to ensure that construction of the nuclear units continues to be in the best interest of PEF's ratepayers. As stated previously, the initial rate impact of such a large capital addition will have a significant impact on PEF's customers. Therefore, PEF should continue to pursue joint ownership arrangements with other Florida utilities to mitigate the near-term rate impacts and financial risk associated with the permitting and construction of new nuclear generation. PEF should provide status reports of the joint ownership negotiations as part of its annual Nuclear Cost Recovery Clause filings.

Below is a brief summary of staff's analysis of the following issues.

Need for Power

PEF projects a need for approximately 500 MW of additional generation by the year 2016 in order to maintain a 20 percent reserve margin.¹¹ Much of this need is driven by continued customer growth and the expiration of some existing purchased power agreements. Assuming a continued reliance on a 20 percent reserve margin criterion, the addition of Levy Unit 1 would satisfy PEF's generation needs until 2019. The addition of Levy Unit 2 in 2017 would satisfy PEF's generation needs through 2023. The table below summarizes the projected reserve margins for each of these scenarios:

¹¹ The 20 percent reserve margin criterion is the result of a stipulation approved by the Commission in Order No. PSC-99-2507-S-EU, issued on December 22, 1999, in Docket No. 981890-EI.

Estimated Impact on Summer Reserve Margin (%)			
Year	Reserve Margin w/o Levy 1 and 2	Reserve Margin w/Levy 1 only	Reserve Margin w/ Levy 1 and 2
2015	23.0	23.0	23.0
2016	15.4	25.3	25.3
2017	13.4	23.2	33.0
2018	11.5	21.2	30.8
2019	9.7	19.1	28.6
2020	7.9	17.2	26.5
2021	6.2	15.4	24.6

The addition of the Levy Units 1 and 2 in 2016 and 2017 would satisfy all of PEF's generation needs through 2023, which indicates that the addition of a second unit is driven by long-term economics as well as reliability needs.

Renewable Generation and Demand Side Management (DSM)

PEF's need for additional capacity to meet rising electricity demands cannot be satisfied with additional purchased power from renewable generation. Included in PEF's reserve margin forecasts discussed above was the assumption that approximately 439 MW of renewable generation would be added to PEF's supply mix by the year 2016. However, some of the renewable projects currently under contract have experienced permitting or siting delays and may not meet their contracted in-service dates.

Likewise, additional DSM programs are not capable of replacing PEF's need for additional capacity. PEF assumed that approximately 512 MW, a 32 percent increase from 2007 levels, of new DSM would be added to PEF's system by the year 2016. No intervenor identified additional renewable generation or DSM programs that could cost-effectively mitigate the need for the Levy Units 1 and 2. For example, if 400,000 solar water heaters (approximately 40 percent of PEF customers) were installed in PEF's territory, the water heaters would reduce peak demand by approximately 72 MW and, thus, would be physically unable to meet PEF's projected capacity needs. Also, solar water heaters were shown to be eight times more costly than Levy Units 1 and 2 on a \$/kw basis.

Need for Base-Load Capacity

By 2015, PEF will have approximately 3,070 MW of existing or certified generation capacity which operates at a capacity factor of 80 percent or greater which is typical for a base-load generation unit. PEF's base-load needs are projected to increase to approximately 5,000 MW by the year 2015. The addition of Levy Units 1 and 2, both projected to operate at a 90 percent capacity factor, will satisfy this projected growth ($3,070+2,200=5,270$ MW). While natural gas-fired generation may still be needed in the future, the addition of nuclear power provides a non-carbon emitting source of base-load power to satisfy the continued growth of PEF's energy needs.

Need to Maintain Fuel Diversity

The price and supply of liquid fuels (natural gas and oil) have become more volatile than solid fuels (nuclear and coal). Staff believes that a balanced fuel supply would depend on all fuel types in order to provide customers with less volatile total fuel costs over time. In 2006, PEF generated approximately 30 percent of its power from natural gas and approximately 14 percent from nuclear and 43 percent from coal. The addition of 2,200 MW of capacity associated with Levy Units 1 and 2 would maintain PEF’s current energy mix at approximately 36 percent from natural gas, 38 percent from nuclear, and 20 percent from coal by the year 2018, the first full year of operation for both units. The reduction in generation from coal is due mostly to the expiration of over 500 MW of coal-based purchased power contracts over the same time period. In essence, pursuing nuclear generation will help PEF maintain a balanced fuel supply, which is expected to result in less volatile total fuel costs over time. Also, the addition of 2,200 MW of nuclear power provides PEF and the state as a whole with a significant block of non-carbon emitting base load generation.

Cost-effectiveness

PEF calculated a revenue requirement stream with the proposed nuclear units assuming a \$5,144/kw capacity cost for Levy Unit 1 and a \$3,376/kw cost for Levy Unit 2. These cost estimates were provided from Westinghouse (vendor) and anticipate cost savings from shared infrastructure and labor costs associated with building two nuclear units at the Levy site. PEF then compared this revenue stream to a revenue stream which included capital and system fuel costs for combined cycle units as a replacement for the nuclear units. As with prior need determination filings, PEF performed these analyses for a range of scenarios which combined two fuel forecasts and four environmental compliance cost projections. A review of the eight scenarios shown below indicates that the nuclear expansion plan, as proposed, is projected to yield net benefits in seven of the eight scenarios.

Net Benefits of Levy 1 and 2 vs. Gas Expansion (\$2007 in Millions) 2007-2066 (60 Year Life)			
		Fuel Reference	
		Mid	High
Environmental Scenarios	Bingaman Specter	(\$343)	\$5,212
	EPA No CCS	\$793	\$6,318
	MIT Mid Range	\$3,614	\$9,077
	Lieberman Warner	\$6,380	\$11,892

Rate Impact

Nuclear operating costs are relatively low. However, the capital costs for a nuclear plant are substantial; thus, resulting in an initial increase in total costs until the lower operating costs can offset the higher capital costs. The table below illustrates the expected monthly bill impact for the period from 2009 through 2017.

Residential Monthly Bill Impact								
2009	2010	2011	2012	2013	2014	2015	2016 Unit 1 In- Service Date	2017 Unit 2 In- Service Date
\$7.53	\$10.71	\$16.77	\$15.32	\$22.14	\$27.63	\$36.60	\$44.86	\$21.70

Joint Ownership

One dilemma facing PEF is how to mitigate the near-term rate impacts and the financial risks of the high capital costs associated with nuclear generation, while preserving the long-term net benefits associated with low nuclear fuel costs. The customer base of PEF is such that the initial rate impact of such large capital additions has a significant impact on PEF's customers. Toward this end, PEF is currently conducting detailed negotiations with several potential joint-owners and has committed to continuing discussions in a effort to fairly share the costs of the proposed nuclear units.

As part of the need filing, PEF performed a sensitivity analysis assuming an 80 percent ownership of the Levy Units 1 and 2. This analysis continues to show the project is cost-effective in seven of the eight scenarios, as addressed in Issue 6, although the overall magnitude of the long term net benefits are proportionally lower than full ownership. The results of these analyses are illustrated in the table below.

Net Benefits of Levy 1 and 2 vs. Gas Expansion (\$2007 in Millions) 80% Ownership 2007-2066 (60 Year Life)			
		Fuel Reference	
		Mid	High
Environmental Scenarios	Bingaman Specter	(\$733)	\$3,756
	EPA No CCS	\$171	\$4,631
	MIT Mid Range	\$2,403	\$6,790
	Lieberman Warner	\$4,594	\$9,018

Using PEF's projected monthly rate impact for Levy Units 1 and 2,¹² if one assumes a hypothetical scenario whereby the costs of Levy Units 1 and 2 are shared on an 80/20% prorata basis in a joint-ownership agreement, the following table estimates the effects on PEF's customers monthly bills.

¹² EXH 13.

Residential Monthly Bill Impact – 80/20% Joint Ownership								
2009	2010	2011	2012	2013	2014	2015	2016 Unit 1 In- Service Date	2017 Unit 2 In- Service Date
\$6.02	\$8.57	\$13.42	\$12.26	\$17.71	\$22.10	\$29.28	\$35.89	\$17.36

PEF also explored building only one nuclear unit and not making a decision regarding a second nuclear unit at this time. As anticipated initial costs and long-term savings were reduced; however, such a plan proved to be cost-effective in only five of the eight fuel and environmental scenarios as shown in the table below.

Net Benefits of Levy 1 vs. Gas Expansion (\$2007 in Millions) 2007-2066 (60 Year Life)			
		Fuel Reference	
		Mid	High
Environmental Scenarios	Bingaman Specter	(\$2,569)	\$254
	EPA No CCS	(\$2,058)	\$781
	MIT Mid Range	(\$851)	\$2,109
	Lieberman Warner	\$343	\$3,431

Conclusion

As stated previously, much has been done at both the federal and state level to promote the development of new nuclear generation. The Florida Legislature enacted Sections 366.93 and 403.519(4), F.S., to promote utility investment in nuclear power plants and allow for the early recovery of all prudently incurred pre-construction costs. However, the recent legislation did not change the basic responsibility for investor-owned utilities to continue to prudently manage their assets for the benefit of their ratepayers. It is prudent for a utility to analyze whether it is in the best interests of its ratepayers to participate in a proposed power plant before, during, and after construction of a generating unit. If conditions change from what was presented at the need determination proceeding, then a utility would be expected to act prudently. The annual nuclear cost recovery proceedings will provide a forum for the Commission to continue to gather and review additional information as it becomes available.

Staff recommends approval of Levy Units 1 and 2. The proposed addition of Levy Units 1 and 2 in 2016 and 2017 would satisfy PEF's generation needs through 2023 which indicates that the addition of a second unit is driven by long-term economics as well as reliability needs. The addition of Levy Units 1 and 2 would result in approximately 36 percent of PEF's projected generation coming from natural gas, which indicates that the addition of nuclear generation would maintain PEF's fuel mix at close to existing levels. However, the customer base of PEF is such that the initial rate impact of such a large capital addition has a much larger impact on PEF's customers. PEF has unique reliability, fuel diversity, and financing needs, thus, PEF should continue to explore joint ownership opportunities with other Florida utilities as a means to

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mitigate the near term rate impacts associated with the permitting and construction of new nuclear generation.

Discussion of Issues

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?

Recommendation: Yes. PEF has demonstrated a capacity need by 2016 in order to maintain system reliability and integrity based on a 20 percent reserve margin criteria. The addition of Levy Units 1 and 2 is projected to satisfy PEF's capacity needs through 2023. (Graves, Garl)

Positions of Parties (Taken Directly from Briefs):

PEF: Yes, PEF needs Levy Units 1 and 2 to meet its 20 percent Reserve Margin planning criterion for the period 2016 to 2019 and beyond. There is also an economic need for the units, based on the fact that the units provide economic, fuel diversity, fuel independence, and environmental benefits.

OPC: No position.

PCS: 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.

SACE: No.

Staff Analysis: PEF argues that there is a need for Levy Units 1 and 2 because there is an expected growth of over 20 percent in the demand for electricity in its service area over the next ten years. (PEF BR 6) Furthermore, PEF contends that Levy Units 1 and 2 are necessary to meet its reliability needs in the 2016 to 2019 time period and beyond. (PEF BR 6) PEF also asserts that without Levy Units 1 and 2, it will not be able to meet its 20 percent minimum reserve margin planning criterion beginning in 2016. (PEF BR 6) Moreover, PEF asserts that Levy Units 1 and 2 will provide customers with at least \$930 million in annual fuel savings and even greater economic benefits. (PEF BR 9) Finally, PEF argues that the economic benefits, in conjunction with the customer savings from constructing back-to-back nuclear units, overshadow the mere fact that there will be additional reserves for several years after the second unit is added. (PEF BR 9) Thus, PEF contends that the economic benefits and savings justify the decision to add Levy Units 1 and 2 in 2016 and 2017.

OPC did not file a brief with respect to this issue. PCS argues that PEF has not demonstrated a need for the addition of 2,200 MWs of nuclear generation by 2017. (PCS BR 21) PCS further asserts that the addition of Levy Unit 1 in 2016 will create a capacity reserve margin of 25.3 percent and the addition of Levy Unit 2 in 2017 will create a reserve margin of 33 percent, which is above the utility's 20 percent reserve planning target. (PCS BR 21-22) Thus, PCS contends that all of the output of Levy Unit 2 would be excess capacity. (PCS BR 22) Finally, PCS argues that 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. (PCS BR 22)

SACE contends that the testimony indicates that there is not a clear need based on reliability or integrity in PEF’s network for the capacity from either of the Levy Units in 2016. (SACE BR 9) As such, SACE argues that the need for Levy Units 1 and 2 has not been demonstrated in this case. (SACE BR 8)

Staff has reviewed PEF’s forecast assumptions, regression models, and the projected system peak demands and believes they are appropriate for use in this docket. The forecast assumptions were drawn from independent sources, which the Commission has relied upon in prior cases. The regression models used to calculate the projected peak demands conform to accepted economic and statistical practices. Finally, although slower customer growth could reduce peak demand, staff believes that the projected peak demands produced by the models used by PEF appear to be a reasonable extension of historical trends. Additionally, witness Crisp testified that PEF’s forecast accounted for recent trends of decreasing population growth. (TR 539) No party took issue with PEF’s load forecast.

PEF’s forecast indicates that by the summer of 2016, system firm load is projected to grow to 10,961 MW. (TR 445) This projection indicates a capacity need of 509 MW in order to adhere to PEF’s minimum reserve margin criteria of 20 percent. (TR 520) The table below indicates that the addition of the 1,092 MW associated with Levy Unit 1 will satisfy PEF’s minimum reserve margin requirement until 2019. (EXH 46) The table below also indicates that the addition of Levy Unit 2 in 2017 is projected to cause PEF’s reserve margin to increase to 33 percent. (EXH 44) Witness Crisp testified that following the addition of Levy Units 1 and 2 PEF would again fall below the 20 percent reserve margin in about 2023. (TR 527)

	PEF		
	w/o Levy 1 and 2	w/ Levy 1	w/ Levy 1 and 2
2015	23.0	23.0	23.0
2016	15.4	25.3	25.3
2017	13.4	23.2	33.0
2018	11.5	21.2	30.8
2019	9.7	19.1	28.6
2020	7.9	17.2	26.5
2021	6.2	15.4	24.6

Witness Crisp testified that faced with a need for additional resources within this short period of time (2016-2019), moving forward with Levy Unit 2 in the summer of 2017 is certainly reasonable. (TR 457) He further testified that proceeding with both Levy Units 1 and 2 at this time is necessary to reasonably meet customer reliability needs in the time period from 2016 to 2019 and beyond. Additionally, Witness Crisp asserted that substantial cost savings are expected if Levy Unit 2 is constructed within 12 to 18 months of Levy Unit 1. (TR 457-458) The results of these savings are discussed in greater detail in Issue 6.

PEF contends that additional capacity, above the 20 percent reserve margin, may be necessary due to the uncertainty regarding capacity accounted for in planning. (PEF BR 6) For example, witness Crisp testified that more than 250 MW of renewable generation may not provide the expected capacity when that capacity is needed. (TR 458) Witness Crisp also testified that there are ongoing discussions regarding the potential impacts of pending carbon

legislation on the viability of Crystal River Units 1 and 2, which currently provide more than 850 MW of summer capacity. (TR 527; EXH 44) The total capacity of the discussed renewable contracts and Crystal River Units 1 and 2 is equal to the total capacity of Levy Unit 2 (1,100 MW).

The table above also illustrates that if PEF were to return to the minimum 15 percent reserve margin criteria, which it employed prior to 2004, the need for Levy Unit 1 would only be delayed one year. (EXH 44) Although a minimum reserve margin of 15 percent would reduce reliability it is paramount that, in an era of rising rates, utilities explore all options available to mitigate price increases, including modifying current planning criterion. Witness Crisp testified that a 15 percent reserve margin would lead to a scenario in which a majority of the reserves would be from DSM, energy efficiency, and load control components. Witness Crisp further testified that in the past, PEF has proven that having an excessive amount of direct load control and demand-side management products in the reserve margin creates a non-reliable system. (EXH 13)

Witness Crisp testified that PEF does not have a written policy with regard to what percentage of its reserve margin is load management/interruptible load and how much is generation. (EXH 13) Witness Crisp, however, testified that PEF has an operational philosophy, which was developed when PEF became so dependent on DSM, to ensure the reliable operation of the fleet. He further testified that when PEF had a forced outage event and leaned heavily on DSM, customers began to bail out of the program. PEF realized at that point that a certain level of physical concrete and steel reserves were needed to handle forced outages. Witness Crisp testified that DSM was close to 100 percent of PEF's reserve margin at the time of these events. (EXH 13)

Staff's analysis indicates that supply side generation currently provides 60 percent of PEF's summer reserve margin capacity and 40 percent of PEF's winter reserve margin. In 2018, the year after the addition of Levy Units 1 and 2, these values will increase to 75 percent and 60 percent respectively. (EXH 13) While an excess of supply side generation will improve reliability, it can also burden ratepayers with potentially unnecessary expenses as discussed in Issue 6.

Witness Lyash testified that joint ownership could smooth out the "lumpiness" of the large units when they come on line. (Lyash TR 86) He also testified that joint ownership would help in spreading some of the capital risk to help mitigate some of the projects price impact on PEF's customers. (TR 93) The economic impacts of joint ownership are discussed in Issue 6.

In conclusion, PEF has demonstrated a capacity need by 2016 in order to maintain system reliability and integrity based on a 20 percent reserve margin criteria. Therefore, the addition of Levy Units 1 and 2 is projected to satisfy PEF's capacity needs through 2023.

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?

Recommendation: Yes. If natural gas generation alternatives were to be added to PEF's system, as opposed to Levy Units 1 and 2, PEF would rely on natural gas and fuel oil for more than 50 percent of its energy generation. The addition of Levy Units 1 and 2 would allow PEF to maintain a diverse fuel mix and reduce Florida's dependence on natural gas and fuel oil, thus shielding ratepayers from price volatility and enhancing its system reliability. The addition of Levy Units 1 and 2 would also provide a significant source of non-carbon emitting base load generation. (Graves, Garl)

Positions of Parties (Taken Directly from Briefs):

PEF: Yes, the proposed Levy Units 1 and 2 will increase fuel diversity. With the addition of Levy Units 1 and 2, by 2018, nuclear generation will represent 38 percent of the total energy generation on PEF's system. Without these nuclear units, however, fossil fuel generation will account for 85 percent.

OPC: No position.

PCS: No position. The intervention of PCS in this matter does not contest the fuel diversity benefits of the Levy Units.

SACE: No.

Staff Analysis: PEF argues that Levy Units 1 and 2 are needed to improve PEF's fuel diversity and will diversify PEF's fuel portfolio. (PEF BR 34) PEF further asserts that if Levy Units 1 and 2 are not added, the nuclear generation on PEF's system will only be 12 percent in 2018. (PEF BR 34) PEF suggests that the addition of Levy Units 1 and 2 will increase the percentage of total nuclear generation on PEF's system, which will give PEF's customers a more diversified, price stable fuel portfolio. (PEF BR 35) PEF further suggests that without Levy Units 1 and 2, PEF will rely on more volatile-priced fossil fuels for 85 percent of its energy generation. (PEF BR 35) Moreover, gas and oil will contribute over 60 percent of the total energy generated including some around-the-clock base-load energy generation. (PEF BR 35-36)

OPC did not file a brief with respect to this issue. PCS does not contest the fuel diversity benefits of the Levy Units. (PCS BR 23) SACE argues that there is not a need for Levy Units 1 and 2 taking into account the need for fuel diversity (SACE BR 5) Furthermore, SACE argues that the serious uncertainty in capital costs and in current market conditions or regulatory requirements may not, as a rule, be mitigated by purported benefits to fuel diversity. (SACE BR 13)

The Commission has considered the need for fuel diversity in its evaluation of utility generation expansion plans as part of its annual Ten-Year Site Plan review process. In 2006, the Florida Legislature amended Section 403.519, F.S., to require the Commission to specifically consider the need for fuel diversity on a utility's system when evaluating a petition for need. Additionally, Section 403.519(4)(b), F.S., directs the Commission to take into account not only

the need for fuel diversity, but also the reduction of Florida’s dependence on natural gas and fuel oil.

Witness Weintraub testified that fuel diversity is important because it improves overall system reliability and reduces the exposure the customer has to the price behavior of any one fuel type. (TR 350) In 2006, natural gas accounted for roughly 30 percent of PEF’s energy generation. (EXH 44) If a natural gas-fueled generation alternative is added to PEF’s system, as opposed to the proposed Levy Units 1 and 2, natural gas energy generation is projected to rise to an estimated 56 percent by 2018. (EXH 44) The addition of Levy Units 1 and 2 will serve to reduce PEF’s future dependence on natural gas and fuel oil. (EXH 44)

As illustrated in the table below, PEF is currently less reliant on natural gas because of its use of coal and nuclear generation. Nevertheless, pursuing additional nuclear generation will help PEF maintain a balanced fuel supply, which will result in less volatile total fuel costs over time.

PEF Fuel Projections: % Generation by Fuel Type¹³			
	2006	2018 w/Levy 1 and 2	2018 w/o Levy 1 and 2
Nuclear	14	38	12
Coal	43	20	24
Natural Gas	30	36	56

Two main components of retail rates are base rates and fuel costs. Base rates are relatively stable. Fuel costs are passed through to retail customers through PEF’s fuel adjustment clause. Since fuel costs are more volatile, they are adjusted annually to reflect actual costs. Evidence indicates that as PEF’s system has become more reliant on natural gas for energy generation, retail rates have increased and fuel costs have become a greater portion of rates. (EXH 13) If PEF continues becoming more reliant on natural gas, PEF’s ratepayers may experience higher rates in the future with the majority of costs to be recovered through PEF’s fuel adjustment charge. Consequently, having a diverse fuel mix could serve as a hedge against fuel price volatility.

Witness Weintraub testified that in reviewing the current generation mix and the projected generation mix for the State of Florida in 2016, the State is becoming extremely dependent on natural gas to meet its growing needs. (Weintraub TR 350) Such a trend exposes the customers to the greater price uncertainty and volatility associated with natural gas. (TR 350-351) He also testified that the nuclear fuel has historically been the most stable and lowest-cost fuel to the customer. (TR 351)

Witness Weintraub testified that PEF’s natural gas supply, which is transported into the State, is vulnerable to supply disruptions caused by extreme weather conditions. (TR 364) Witness Weintraub testified that during and following the hurricane seasons of 2004 and 2005, natural gas production was shut down, facilities were damaged, and production was limited until conditions improved. The reduced supply availability of natural gas caused upward pressure on natural gas prices. (TR 364) Witness Weintraub noted, however, that nuclear fuel does not face

¹³ EXH 44, 88-90.

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the same supply disruptions as fossil fuels, because, nuclear fuel is added to the units during refueling outages which typically take place once every 18 to 24 months. (TR 363-365)

In conclusion, staff believes that PEF has demonstrated that the addition of Levy Units 1 and 2 is needed to maintain PEF's diverse fuel supply as well as reduce the State's dependence on natural gas and fuel oil. The addition of Levy Units 1 and 2 would also provide a significant source of non-carbon emitting base load generation.

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

Recommendation: Yes. Levy Units 1 and 2 are intended to help meet PEF's growing need for additional base-load capacity. By 2015, PEF will have approximately 3,070 MW of existing or certified generation capacity which operates at a capacity factor of 80 percent or greater which is typical for a base-load generation unit. PEF's base-load needs are projected to increase to approximately 5,000 MW by the year 2015. The addition 2,200 MW from Levy Units 1 and 2, both projected to operate at a 90 percent capacity factor, will satisfy this projected growth (3,070+2,200=5,270 MW). (Graves, Garl)

Positions of Parties (Taken Directly from Briefs):

PEF: Yes, PEF needs new base-load generation based on the current and expected load growth. Levy Units 1 and 2 will add the first new base-load generation to PEF's system in over thirty years, providing newer vintage generation to complement the older vintage base-load units on PEF's system.

OPC: No position.

PCS: No. Taking into account the criteria used in Section 413.509 (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.

SACE: No.

Staff Analysis: PEF argues that Levy Units 1 and 2 are needed because the Company needs over 2,000 MW of base load generation capacity beginning in 2016. (PEF BR 12) PEF also asserts that without the addition of Levy Units 1 and 2, PEF will have to operate its more expensive natural gas units as base load generation rather than intermediate generation, exposing PEF's customers to higher and much more volatile fuel costs. (PEF BR 13) Furthermore, by the time Levy Units 1 and 2 are added, PEF's existing base load generation fleet will be nearly 40 to 50 years old; thus, the addition of Levy Units 1 and 2 to PEF's system is important to change the vintage of its existing base load generation. (PEF BR 14, TR 464) With the addition of Levy Units 1 and 2, PEF argues that it will be able to provide its customers with more reliable, efficient, and less costly base load generation. (PEF BR 14)

OPC did not file a brief with respect to this issue. PCS contends that PEF has not established a need for Levy Unit 2. (PCS BR 23) Additionally, PCS asserts that the addition of Levy Unit 1 will provide more base-load generating capacity than PEF needs to satisfy its reserve margin planning needs. PCS argues that while Levy Unit 2 would be operated as base-load capacity, none of that capacity is required by 2017. Furthermore, PCS contends that the record does not support the early retirement of other existing base-load or peaking generation. As such, PCS argues that Levy Unit 2 would add unnecessary excess base-load capacity to PEF's system and thus is not needed. (PCS BR 23)

SACE argues that there is not a need for Levy Units 1 and 2 taking into account the need for base-load generating capacity. (SACE BR 14) SACE asserts that the Commission must balance its analysis with concerns over overbuilding by the industry. Furthermore, SACE contends that the Commission has consistently held that the need should not be certified for a generic statewide need, rather than a specific utility need. (SACE BR 14)

Staff's analysis indicates that PEF will have a 1,000 MW need for base-load capacity in 2009. Staff's analysis also indicates that PEF's base-load is incrementally increasing at the same pace as their peak load. (EXH 13) This results in the projected 2,000 MW that PEF has indicated. (PEF BR 12)

PEF currently projects to operate, at the most, five units at a capacity factor exceeding 80 percent in 2015, the last year before additional generation is proposed to be added. (EXH 13) Of the five units, Crystal River Units 1, 2, 4, and 5 are coal units and Unit 3 is a nuclear plant. These units total approximately 3,070 MW of summer capacity. (EXH 44) If Levy Units 1 and 2 operate at PEF's projected 90 percent capacity rating, they would add 2,200 MW of needed base-load capacity on PEF's system.

Additionally, witness Crisp testified that in 2007, the Governor of Florida issued a series of Executive Orders that impacted PEF's Resource Planning process. Executive Order No. 07-127 set greenhouse gas (GHG) emission reduction targets for the utility sector. These GHG emission reduction targets are extremely aggressive, representing some of the deepest GHG emission reductions proposed for electric utilities in the country. The emission reduction targets include that by 2025, utility sector emissions shall not be greater than year 1990 utility sector emissions. (EXH 44) Witness Crisp further testified that nuclear power is the only mature technology with significant potential to supply large amounts of power without emissions of pollutants or carbon dioxide and other GHGs. (EXH 44)

Staff's analysis indicates that the addition of Levy Units 1 and 2 will allow PEF to meet its base-load needs almost entirely with coal and nuclear generation, thus deferring the use of natural gas as base-load generation. Such a scenario would provide benefits, which are discussed in Issue 2, to PEF's system and ratepayers.

The evidence reflects that the proposed high availability rate of Levy Units 1 and 2 means that these units would represent a substantial amount of base-load capacity on its system. The record indicates that renewable generation and DSM available today or in the foreseeable future cannot provide enough base-load capacity to avoid the need or mitigate the need that would be met by the addition of Levy Units 1 and 2. (TR 510)

In conclusion, staff believes based on analysis, that PEF has a need for Levy Units 1 and 2 to provide needed base-load capacity in the years 2016 and 2017. Staff additionally believes that the projected 90 percent capacity factor associated with Levy Units 1 and 2 will adequately supply PEF's need.

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?

Recommendation: Yes. The cost estimates presented for capital costs, fuel costs, emission costs, water, and waste disposal appear reasonable at this time. PEF's projected performance specifications also appear to be reasonable. The effect of these cost assumptions on the overall economics and rate impacts of the proposed Levy Units 1 and 2 are discussed in greater detail in Issue 6. As the environmental price forecasts are based upon on-going federal CO₂ legislation, PEF should provide updated cost information as part of its annual feasibility report. (Graves, Garl, Lester, Springer, Wu)

Positions of Parties (Taken Directly from Briefs):

PEF: Yes, Levy Units 1 and 2 will enable PEF to meet its reliability need and continue to provide and increase adequate electrical generation from nuclear fuel at a reasonable cost. Nuclear power uses the lowest cost and least price volatile fuel source available to the Company.

OPC: No position.

PCS: 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.

SACE: No.

Staff Analysis: PEF contends that it demonstrated that Levy Units 1 and 2 will provide its customers with adequate electricity at a reasonable cost. (PEF BR 14) In particular, PEF argues that the fuel for Levy Units 1 and 2, processed uranium, is both low in cost and stable in price. (PEF BR 14) PEF further contends that its nuclear fuel forecasts show that, relative to fossil fuels, nuclear fuel will continue to be the most stable in price and lowest cost fuel available to PEF throughout the life of the nuclear units. (PEF BR 14) It asserts that the nuclear fuel forecasts used to form the basis of its fuel price projections are undisputed, and were developed using recognized expert utility industry sources that are both consistent with PEF forecasting practices as well as utility industry standards. (PEF BR 14-15)

OPC did not file a brief with respect to this issue. PCS argues that given the history of nuclear plant construction cost overruns, 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 Levy Units 1 and 2 are likely to provide electricity at a reasonable cost. (PCS BR 25) PCS further contends that in order to effectively mitigate the economic risks to consumers associated with capital cost overruns, the Commission should establish reasonable bounds and undertake an on-going assessment of the project risks to consumers. (PCS BR 28)

SACE contends that the glaring absence of finality in the projected costs, the uncertainty in the comparison analyses, and ancillary issues such as transmission reliability, represent fatal flaws in the Commission's ability to make findings of fact to support a decision. (SACE BR 4) SACE argues that given the uncertainty in capital costs, the Commission should ensure that the Levy Units are built only if the full, long-term costs are planned for, and shown to be cost effective against other competing resources. (SACE BR 13-14)

The construction of Levy Units 1 and 2 would add approximately \$17 billion dollars in generation assets to PEF's rate base. (EXH 44) As discussed in Issue 6, the analyses indicate that Levy Units 1 and 2 have a high likelihood of providing long-term net benefits to PEF's customers over a variety of fuel and environmental cost scenarios.

To evaluate the cost-effectiveness of the proposed units, PEF developed a non-binding cost estimate range based on the latest pricing obtained from the vendor, Westinghouse and its joint venture partner Shaw Stone & Webster (the Consortium). (TR 155) PEF also estimated transmission costs, as well as future costs relating to fuel (natural gas), spent fuel storage (nuclear), water usage, and emission related costs. Staff's analysis of PEF's economic assumptions as well as the prior mentioned cost estimates are discussed below.

Economic Assumptions

PEF's analysis assumed a weighted average cost of capital of 9.118 percent for purposes of this project. (EXH 13) This rate of return is based on a capital structure consisting of 55 percent equity at a cost rate of 11.75 percent, and 45 percent debt at a cost rate of 5.9 percent. (EXH 13) PEF utilized a 2.25 percent escalation rate and an allowance for funds used during construction (AFUDC) rate of 8.848 percent. (EXH 13) PEF's treasury department is monitoring the requirements and availability of Department of Energy (DOE) loan guarantees, DOE standby support agreements, and federal production tax credit timetables to ensure these options are open when PEF determines if these programs are beneficial. (TR 126-130) PEF witness Lyash testified that the preconstruction stages of the project will be financed with debt and equity, but PEF cannot provide specifics at this time regarding the financing plan for the Levy project. (TR 134-135) There was no evidence presented in the record that disputes the reasonableness of PEF's financial assumptions. Based on this review, staff believes that the financial assumptions used for this evaluation are reasonable.

Generation Cost Estimates

At this time, PEF estimates that Levy Units 1 and 2 will have an in-service cost of approximately \$14.1 billion. (EXH 44) This value includes \$3.245 billion for AFUDC. (EXH 44) PEF bases this estimate on the latest pricing obtained from the vendor, Westinghouse and its joint venture partner Shaw Stone & Webster. (EXH 44) These cost estimates assume that cost savings will be realized on Levy Unit 2, as long as it is constructed within approximately 12 to 18 months of Levy Unit 1. (EXH 44) PEF projects Levy Unit 2 to cost \$5.8 billion, which is more than \$2 billion less than Levy Unit 1 (\$8.3 billion). (EXH 44) The \$14.1 billion cost estimate total translates to an estimated overnight cost of 5,144 \$/kW for Unit 1 and 3,376 \$/kW for Levy Unit 2, based on summer capacity ratings. (EXH 44) These estimates are based on the best information available to PEF at the time of its filing. (TR 156) PEF intends to execute an

Engineering Procurement Contract (EPC) with the Consortium by the end of 2008. (TR 171) PEF's current estimates appear to be consistent with those of FPL, which did not have a vendor, for Turkey Point Units 6 and 7, which was recently approved by this Commission.¹⁴ Unlike the FPL need determination case where the utility developed a range of costs based on a variety of designs, PEF has performed a more traditional revenue requirement analysis since PEF expects to sign a contract with its chosen vendor, Westinghouse, by the summer of 2008. Therefore, more is known about the costs associated with Levy Units 1 and 2 than was known about FPL Turkey Point Units 6 and 7 at the time of each need determination proceeding. Staff believes PEF's capital cost estimates are reasonable at this time. Concerns regarding the risk of price increases are discussed in Issue 6.

Transmission Costs

PEF's initial transmission cost estimates range from a low of \$1.85 billion to at least \$2.5 billion, excluding AFUDC. (Oliver TR 233) Witness Oliver testified that PEF developed its estimates based on the most recent costs to construct new 230 kV transmission facilities, including the cost of land acquisition, materials, equipment, and labor, and their best estimate of where possible routes may be sited. (TR 233) Engineering consultants and internal engineering and right of way personnel worked together to create the cost estimates for the likely transmission and substation projects. (TR 233) Costs estimates were created using the latest available costs for similar transmission work performed by PEF and in the industry. Transmission line estimates were based on the latest average industry per mile costs (labor and materials) exclusive of right-of-way costs. (TR 233) Right-of-way costs were based on the average per acre cost of property for the existing land use category (urban, rural, agricultural) in the applicable county. (TR 233-234) Projected transmission costs also included estimated legal costs associated with eminent domain. PEF estimated substation costs based on the latest costs for similar facilities on PEF's system and in the industry. These estimates were adjusted to reflect the amount of major equipment (such as transformers and breakers) associated with the particular substation. Current year costs were escalated for the year of the expected expenditure. PEF notes that this is consistent with how others in the industry develop estimates for similar projects. (TR 234) No evidence was presented that challenged PEF's transmission cost estimates.

In addition, witness Oliver testified that PEF's preferred corridors have changed since the filing of this need determination application. He further testified that several corridors that were studied but not selected included crossings over the Rainbow River, the expansion of facilities in PEF's existing right-of-way in the Brooker Creek Preserve, and the addition of a 500-kV line from the Brookridge Substation south to Lake Tarpon. Witness Oliver asserts that PEF no longer plans to use these corridors in the Levy project. (TR 238-239) Based on the evidence in the record, staff believes PEF's transmission cost estimates are reasonable at this time.

¹⁴ Order No. PSC-08-0237-FOF-EI, issued April 11, 2008, in Docket No. 070650-EI, In re: Petition to determine need for Turkey Point Nuclear Units 6 and 7 electrical power plant, by Florida Power & Light Company.

Fuel Forecasts

As part of the economic evaluation of Levy Units 1 and 2, PEF witness Weintraub forecasted the prices of natural gas, residual fuel oil, coal, and distillate fuel oil. These forecasts, along with the nuclear fuel price forecast, appear in Appendix I of Exhibit 44. The forecast period extends out to the year 2066. (TR 354; EXH 44; EXH 29) Witness Weintraub testified that the differential between forecasted natural gas and nuclear fuel prices is a key driver in the selection of PEF's future generation options. (TR 358; EXH 13)

PEF's basic fossil fuel forecasts are its medium price forecasts. PEF relied upon two economic and energy forecasting firms, PIRA Energy Group and Global Insight to provide the basic price forecast. The natural gas and oil price forecasts period is through 2020 for PIRA and 2026 for Global Insight. Beyond these periods, PEF employed a price escalator for the forecasts. (TR 356-357; EXH 13)

For residual oil, natural gas, and coal, PEF developed high and low price forecasts based on the 90th percentile above and below the basic, mid-reference fuel price forecast. (TR 358) The high and low price forecasts specify a range that allows for possible price outcomes and the uncertainty of price forecasts, in the economic analysis. Although PEF provided high and low price forecasts in this filing, witness Weintraub testified that the high price forecast is more likely than the low price forecast, because of the potential impacts of changes in environmental policy. (TR 358) However, for economic evaluation purposes, witness Weintraub contends that the mid-reference forecast is the most likely scenario. (TR 358; 348; EXH 13)

Staff believes PEF's fuel price forecasts are reasonable for purposes of evaluating its expansion plans. PEF's fossil fuel price forecast relies upon two recognized consultants. Further, PEF compared the forecast to the forecast in the Annual Energy Outlook published by the Energy Information Administration. PEF states that its fossil fuel price forecast is conservative in comparison with various third party forecasts. (EXH 13) Higher forecasted gas prices cause the planned nuclear units to be more cost-effective in the economic analysis. (EXH 13)

The nuclear fuel price forecast provided by PEF witness Siphers is based on projections by market consultants who study nuclear fuel supply and demand worldwide. (TR 376) The forecast covers the four steps needed to make nuclear fuel: uranium mining, conversion, enrichment, and fabrication. (TR 376) Witness Siphers testified that nuclear fuel prices are less volatile than fossil fuel prices and expects this trend to continue. (TR 376-377) He notes that uranium supply is currently tight but that the supply will be adequate since the development of new mines take less time than the construction of nuclear power plants. (TR 372; EXH 13)

PEF asserts that it compared its nuclear fuel price forecast to an independent forecast to ensure reasonableness. (EXH 13) For its nuclear fuel price forecast, PEF relied upon the Ux Consulting Company and NAC International, two widely-recognized firms in the area of nuclear fuel. (EXH 13)

Spent Nuclear Fuel Disposal

In the nuclear fuel price forecast, witness Siphers included a 1 mill per kWh spent fuel disposal fee. (TR 377) Witness Siphers notes that disposal of spent nuclear fuel from Levy Units 1 and 2 will be stored in a spent fuel pool until sufficient cooling has occurred. After that, the spent fuel will either be stored on site in dry cask storage, or disposed or reprocessed by the DOE. (TR 375-376) The cost of dry cask storage has not been included for economic evaluation purposes. Witness Siphers asserts that, while PEF does not yet have a contract with DOE for spent nuclear fuel disposal, the Nuclear Waste Policy Act of 1983 establishes the responsibility for disposal with the Federal Government. (TR 376-377; EXH 13)

Environmental Costs

In assessing the environmental compliance costs associated with PEF's petition for need, staff considered whether PEF included a reasonable level of environmental compliance costs associated with the proposed Levy Units 1 and 2. The major air emission effluents considered for a power generating unit are sulfur dioxide (SO₂), nitrogen oxides (NO_x), mercury (Hg), and carbon dioxide (CO₂). In its need filing, PEF included the compliance costs of all four major air emissions in its economic analysis. (EXH 13)

For the SO₂ and NO_x forecasts, PEF utilized the most recent forecasts from JD Energy through the first 20 years of the study period. (EXH 13) Once these forecasts were projected up through the 20-year study period, the allowance forecasts remained static for the remainder of the study period. (EXH 13) The Hg forecast included in PEF's resource planning scenarios is based on preliminary EPA estimates. (EXH 13) PEF derived its Hg compliance cost by loading the EPA's estimate into its resource planning computer model and escalating the estimates throughout the life cycle of the study period based on a cumulative average growth. (EXH 13)

PEF derived its CO₂ emission costs by reviewing a broad spectrum of information regarding the potential economic impacts of climate change legislation being proposed at the state and national level. (EXH 13) The available study information, which predicted the potential cost of CO₂ emissions in the future, was then assembled. PEF only used those studies that already had their values estimated out to 2050 for the compilation of the information for its analysis. (EXH 13) Apart from normalizing those figures that were presented in 2005 or 2007 dollars by converting them all into nominal dollars, PEF tried to avoid further manipulation of the data. (EXH 13) These processes resulted in nine CO₂ cost scenarios which were presented in Exhibit JMK-3, Estimated CO₂ Emission Cost Graph. (EXH 42) PEF then further selected four CO₂ cost scenarios to cover a representative range of potential future cost impacts of CO₂ emissions. (EXH 13; EXH 42) The four CO₂ cost scenarios, include the Bingaman-Specter, the EPA No CCS Tech, the MIT Study-Mid, and the CRA Study Lieberman-Warner. (EXH 42) In performing the economic benefit analysis, each of these CO₂ cost scenario sensitivities was included in PEF's economic and production cost models to develop the corresponding system performance and revenue requirements cost estimates reported in the Need Study. The environmental compliance cost estimates were used to form each scenario by establishing the system emissions of air effluent and applying the forecast allowance price to the total emission. When the economic results for the scenarios were compared, the differential production costs,

including fuel and environmental compliance costs, were calculated to establish the appropriate economic benefits of all of the scenarios analyzed. (EXH 13; EXH 44)

Staff's analysis revealed that PEF's CO₂ emission price projections, used for deriving the economic benefits of Levy Units 1 and 2, were much higher than those projections used by FPL in its Turkey Point 6 and 7 Nuclear Units Need Determination filing that the Commission recently approved. The difference can be seen in witness Kennedy's exhibit JMK-3 as well as Exhibit 13. (EXH 13; EXH 42) PEF witness Kennedy, who prepared the CO₂ price forecasts, testified that PEF selected four CO₂ price scenarios that were higher than FPL's selected corresponding CO₂ price scenarios. (EXH 13) Witness Kennedy also testified that in analyzing the trends of CO₂ forecasts over the entire forecast horizon for the period 2030 through 2050, the differences between PEF's CO₂ price forecast and FPL's CO₂ price forecasts increased in disparity. (EXH 13) In particular, the rate of increase of PEF's CO₂ forecasts were much higher than the forecasts FPL had used in its need case. (EXH 13) Witness Kennedy testified that higher CO₂ costs could result in higher overall environmental compliance costs. (EXH 13) Staff believes that since nuclear generation is a non-carbon emitting generation source, an increase of future environmental compliance costs associated with CO₂ would also increase the overall cost-effectiveness of Levy Units 1 and 2.

PEF argued that each of the agency studies and consultant reports of the CO₂ price forecasts reviewed by PEF presented a range of potential outcomes depending on the development of emission taxes or cap-and trade mechanisms, allowance allocations and banking rules, offset and regional implementation rules, and many other factors. (EXH 13) Thus, opinions on how these CO₂ regulatory scenarios might develop differed among constituents in the utility industry. (EXH 13; TR 409-410) However, PEF witness Crisp testified that it is generally accepted within the utility industry that some form of new regulation relating to the creation of limitations on greenhouse gas emissions will be implemented. (EXH 13) Witness Crisp further asserted that the anticipated limitations on CO₂ emissions will in all likelihood create conditions favorable for technologies like nuclear generation that provide substantial, reliable, and emission-free electricity. (EXH 13)

Among the four CO₂ price projections PEF used in this need filing, the CRA Study Lieberman-Warner is the highest CO₂ cost scenario. (EXH 42) PEF selected this case because the Lieberman-Warner bill was the latest available congressional bill at the time when PEF performed the CO₂ cost study. (TR 401) At that time, CRA (Charles River Associates) was the only entity that had studied it in any detail. (TR 401) Since the time that PEF selected the CRA Study Lieberman-Warner as its highest CO₂ compliance cost scenario, CRA has released an updated CRA Study Lieberman-Warner. (TR 408) During the hearing, PCS circulated a series of slides entitled "Economic Analysis of the Lieberman-Warner Climate Security Act 2007 Using CRA's MRN-NEEM Model," dated April 8, 2008. (EXH 70) Witness Kennedy testified that the CO₂ price forecasts presented in this document were substantially lower than which were contained in CRA's previous study that PEF had used in its economic analysis of this need filing. (TR 402, 406-408) PCS pointed out that CRA's new CO₂ price forecast was significantly lower than the price forecast contained in PEF's CO₂ price projections. (TR 407-408) Witness Kennedy further testified that CRA's CO₂ price forecast had changed and was substantially lower than the CO₂ price forecast presented by PEF as the CRA Lieberman-Warner scenario.

(TR 407-408) Moreover, witness Kennedy testified that PEF has not taken the information contained within the updated CRA Study Lieberman-Warner into account within its environmental compliance cost scenarios. (TR 408) On the basis of the foregoing, staff believes that the environmental scenario developed by PEF on the basis of the 2007 CRA Study Lieberman-Warner should be given less evidentiary weight as it is not based on the most current information available to PEF.

In this proceeding PEF modeled each one of the emission compliance costs scenarios independently of the other. PEF did not prepare a relationship between CO₂ and the other emissions, SO₂, NO_x and Hg. (EXH 13) As such, PEF included four scenarios for CO₂ but only one scenario each for SO₂, NO_x and Hg; whereas, in the Turkey Point 6 and 7 Need Determination, FPL included four sets of compliance cost forecasts for SO₂, NO_x and Hg respectively, each corresponding to different CO₂ cost scenarios. (EXH 13) PEF witness Crisp testified that as PEF performed the screening model analysis, it determined that the SO₂, NO_x, and Hg impacts were so minor within the overall cost impacts of the analysis that variations around these pollutants would not affect the outcomes of the economic analysis significantly. (EXH 13) Staff concluded that the compliance allowance projections of SO₂, NO_x, and Hg used by PEF in this need filing were much lower than those projections used by FPL in its need determination filing. (EXH 42; EXH 13) Staff further determined that the variations within the actual compliance costs associated with SO₂, NO_x, and Hg result from variations within the source documents selected. Although the source documents selected by PEF and FPL in each need filing case differ from each other, staff believes that all the source documents are produced by credible consulting companies or governmental agencies. Thus, staff believes that the source documents used by PEF in this need filing are reasonable.

Staff has reviewed the environmental inputs (the SO₂, NO_x, Hg and CO₂ emission allowance price projections) to the cost-effectiveness analysis of Levy Units 1 and 2. Staff believes that the SO₂, NO_x, and Hg allowance price projections used in this filing are reasonable. Staff also believes that the CO₂ price projections used in the cost-effective analysis represent a reasonable range of forecasts based upon CO₂ compliance cost studies available to PEF at the time that the cost effective analysis was undertaken. As the price forecasts are based upon ongoing federal CO₂ legislation, therefore, PEF should provide updated cost information as part of its annual feasibility report.

Water Costs

Nuclear units require cooling water for operation. PEF estimated that Levy Units 1 and 2 would need to withdraw approximately 100 to 130 million gallons per day (MGD) of water from the Gulf of Mexico and approximately 41 MGD is expected to be consumed (evaporated) with the remainder returned to the Gulf. (EXH 13) PEF also estimated that less than 1.5 MGD would be drawn from the aquifer for potable water uses. (EXH 13)

PEF witness Crisp testified that the Gulf of Mexico is nearly an infinite source of reliable water. (EXH 13) The water drawn from the Gulf of Mexico will be transmitted to the plant through the federally maintained Cross-Florida Barge Canal. (Roderick TR 207; EXH 13) A significant design criterion for the plan has been set by PEF, such as piping the cooling water over the Withlacoochee River and under Highway 40 to the site, in order to provide the least

amount of impact to the environment. (TR 207) The labor, material, and equipment for the intake structure, makeup pumps, and associated system piping and electrical are included in the capital cost estimate of this need determination filing. (EXH 13) The O&M costs are also included in the filing. Regarding the concerns of aquatic life that may be affected by the marine water intake, PEF has been consulting the DEP and Marine & Fisheries Wildlife and PEF is developing design features for protecting endangered species, manatees, turtles, etc. (EXH 13) These design features will be incorporated into plans for the proposed plant. (EXH 13) PEF has included the related aquatic life protection costs in the economic analysis of this need filing. (EXH 13)

PEF claimed that only a limited amount of fresh water (less than 1.5 MGD) will be drawn from the aquifer. (EXH 13) Florida's aquifers are a proven reliable source of fresh water for PEF's limited fresh water needs for Levy Units 1 and 2. (EXH 13) Staff notes that PEF has conducted studies and consulted experts with regard to the potential impact that PEF's additional per day fresh water consumption stemming from Levy Units 1 and 2 might have on the Crystal River area or the aquifer. (EXH 13) PEF witness Roderick testified that PEF had done extensive work with environmental and biology companies and companies engaging in water studies. (EXH 13) In addition, witness Roderick specified that PEF had worked with Levy County and the City of Inglis to develop an understanding of PEF's water needs associated with the aquifer. (EXH 13) Witness Roderick also testified that PEF explained to the local people in Levy that the proposed units would not have any adverse impact on the aquifer. (EXH 13)

Staff has reviewed whether the costs of the water supply needed for Levy Units 1 and 2 are reasonable and whether the resources of the water required are reliable. Staff believes that PEF's estimated costs associated with the cooling water supply have been appropriately included in the economic analyses of Levy Units 1 and 2. The water supply options available to PEF are reliably available for the life of the proposed units. Staff also believes that PEF is conducting a study regarding the impacts of both marine and fresh water consumptions of the proposed nuclear units and is planning corresponding measures for mitigating such impacts. (EXH 13)

Projected Performance Specifications

Also critical in PEF's evaluation of generation alternatives was technology selection and projected performance specifications. Witness Lyash testified that no AP1000 units have been constructed; however, the design has been vetted through the NRC process and the AP1000 design has been approved by the NRC. (TR 107) Witness Roderick testified that although the AP1000 is not a new design, it is an enhanced design built on the experience of the last 30 years. (TR 212)

PEF is projecting Levy Units 1 and 2 to operate as base-load units with 90 percent capacity factors over time. (TR 439) If the units fail to generate at or above the proposed capacity factors, long-term benefits will be reduced. Although PCS contends that PEF's projected capacity factors are not reasonable, it did not offer a more reasonable value that should be used. Additionally, as illustrated in the table below, since 1998 the performance of Crystal River Unit 3 has been comparable or has exceeded PEF's projections for Levy Units 1 and 2. (EXH 13) Staff believes that PEF's projected performance specifications are reasonable at this time.

Crystal River Unit 3: Generation Data¹⁵	
Year	Capacity Factor
1998	90.5%
1999	88.9%
2000	98.3%
2001	89.2%
2002	99.9%
2003	90.1%
2004	99.2%
2005	86.5%
2006	94.7%
2007	90.9%

Staff believes the cost estimate information presented in the record is reasonable. PEF's reliability need for electricity is discussed in greater detail in Issue 1. PEF's cost estimates are further discussed in Issue 6.

¹⁵ EXH 13.

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?

Recommendation: No. Since 1981, PEF's demand side management (DSM) programs have reduced total demand over 1,500 MW. PEF has over 173 MW of renewable power from purchased power contracts. Even after considering all existing and additional DSM and renewable resources available for the foreseeable future, PEF still has a need for Levy Units 1 and 2. No additional cost-effective DSM or renewable resources have been identified that would mitigate the need for the proposed generating units. (Clemence)

Positions of Parties (Taken Directly from Briefs):

PEF: No, there are no additional conservation measures or renewable energy sources reasonably available to PEF which might mitigate the need for the proposed units. PEF's DSM program has captured all cost-effective demand-side potential available. PEF cannot provide DSM options in quantities needed to offset the need for additional generation.

OPC: No position.

PCS: No position.

SACE: Yes.

Staff Analysis: PEF argues that it has demonstrated via undisputed evidence that PEF has used all reasonably available renewable energy sources and PEF still needs Levy Units 1 and 2. (PEF BR 16) PEF asserts that, in accordance with Commission rules, it has engaged in an extensive evaluation of all available renewable generation resources and entered into contracts with five renewable energy providers as well as three biomass facilities. (PEF BR 16-17) Moreover, PEF contends that it continues to monitor for additional renewable energy projects. (PEF BR 17) However, PEF asserts that despite its extensive efforts to develop additional renewable generation resources in Florida, no additional renewable generation resources exist, and Levy Units 1 and 2 are still needed to meet future customer capacity and energy needs. (PEF BR 19)

PCS and OPC did not take a position with respect to this issue. SACE contends that PEF has failed to offer sufficient incentives to its customers to engage in PEF programs designed to maximize energy efficiency. (SACE BR 16-17) SACE argues that PEF's failure to adequately incent customer participation in energy efficiency programs contravenes PEF's assertion that it has taken all reasonable energy efficiency measures that could mitigate the need for Levy Units 1 and 2. (SACE BR 17-18) SACE did not show how an increase in incentives would increase participation within any DSM measures.

PEF evaluates its DSM cost-effectiveness programs using an integrated resource planning model called Strategist. (TR 250) This model is specifically designed to compare the measures against a base resource plan and to compute the cost-benefit ratios for each of the Commission based cost effectiveness tests. The model can also be built to include multiple DSM bundles that are large enough to be evaluated against multiple generation units. (TR 251)

In determining programs to offer its customers, PEF determines which measure will provide the most benefits to all rate payers. PEF reviews the potential for each of PEF's customer segments, then analyzes the tests against the three Commission-approved cost-effectiveness tests, then determines appropriate incentives to maximize participation. (Masiello TR 253-254) Witness Masiello testified that this method ensures that the DSM programs PEF offers will reduce the rates for all of its customers, for both DSM participants and non-participants alike. (TR 254)

PEF evaluates cost-effectiveness of renewable energy projects in accordance with Rules 25-17.200-.310, F.A.C. The cost of the energy must be at or below the avoided cost to produce the energy. Renewable attributes such as renewable energy credits (RECs) and tax credits are not included in the payments and may represent an additional revenue resource for the renewable resource. (TR 318) PEF has over 173 MW of renewable power from purchased power contracts. (EXH 23)

Witness Niekum testified that solar is not a cost-effective or reliable energy resource for large scale projects in Florida. (TR 324) He testified that small photovoltaic (PV) devices have some promise in some areas of the country. (TR 324) The witness did not specify what areas of the country have promise for small PV devices. The technology still has a long way to come before it is cost-effective on a large scale. According to Niekum, for the immediate future, PVs cannot produce cost effective or reliable energy in Florida on a large-scale basis. (TR 324) He further testified that the cost of energy from PV systems is about \$0.32 per kWh, which is about five times the cost of biomass generation. (TR 324)

During the hearing, Witness Crisp was asked if the use of solar thermal water heaters could defer the need for Levy Units 1 and 2. He testified that the use of solar water heaters would be eight times more expensive than the Levy Units. He also testified that the use of solar water heaters would have a very minimal impact on PEF's requirements. (EXH 78)

Other renewable alternatives such as solar, wind, and wave energy have not yet become cost-effective, and these technologies are highly dependent upon intermittent natural energy sources that can be a valuable energy resource but cannot be depended upon to produce firm capacity. (TR 327-328) As windmill and transmission technologies improve, these technologies may unlock the potential of wind in Florida. (TR325) In the foreseeable future, however, PEF argues that wind-powered generation is not economic or feasible in Florida. (TR 325) Florida only has marginal wind resources that are along the coastline. There may be sufficient wind resources off-shore in Florida, but transmitting energy from off-shore sources is, among other things, still very expensive and often impractical. (TR 324)

PEF continues to search for other sources of renewable energy through a cooperative process between the developer and PEF in order to bring such projects to fruition. (TR 319) PEF is looking to expand its inventory of renewables. PEF recently contracted with Florida Biomass Energy Group to provide energy from biomass, and it also purchases energy from municipal solid waste (MSW) facilities. PEF also purchases renewable energy from PCS on an as-available basis. (TR 319-320)

PEF has predicted a DSM savings of over 2,000 MW of winter demand by the year 2016. (EXH 13) PEF is currently under contract to have 439 MW of renewable energy available from power contracts before the in-service dates of Levy Units 1 and 2. Since these facilities have not yet been built and these facilities rely on unproven technology or fuels, there is a risk that over 250 MW of generation from renewable resources will not be available when needed. (TR 458) PEF is looking to bring on additional renewable energy from MSW before 2017. (EXH 23) PEF has identified a need for power that is greater than these two resources. Based on the record, staff believes that there are no renewable energy sources and technologies or conservation measures reasonably available to PEF that might mitigate the need for Levy Units 1 and 2.

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?

Recommendation: Yes. Despite high capital costs, the relatively low fuel costs associated with Levy Units 1 and 2 provide an economic advantage when compared to a natural gas generation alternative. When potential environmental compliance costs are considered, nuclear generation becomes even more cost-effective. In order to satisfy its obligation to prudently manage its resources, PEF should continue to negotiate with other utilities regarding joint ownership. PEF should be required to provide updates regarding discussions pertaining to joint ownership during its annual nuclear cost recovery proceedings. (Graves, Garl)

Positions of Parties (Taken Directly from Briefs):

PEF: Yes, Levy Units 1 and 2 are the most cost-effective alternative sources of power to meet PEF's need when fuel diversity and fuel supply reliability, the reduced reliance on fossil fuels, existing and future emission compliance costs, and long-term electric grid reliability factors are considered.

OPC: No position.

PCS: 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.

SACE: No.

Staff Analysis: PEF contends that, after undertaking an exhaustive internal review of both its demand-side and supply-side options, Levy Units 1 and 2 are the most cost-effective option available to PEF to meet its reliability needs. (PEF BR 20)

OPC did not file a brief with respect to this issue. PCS contends that many of the assumptions used in PEF's cost-effectiveness analysis are not correct, and thus render the analysis unreliable. (PCS BR 28-29) PCS further argues that a 60-year CPVRR comparison is inherently unreliable, particularly in the instant case, where PEF's analysis is premised on a national system for regulating carbon emissions that does not currently exist. (PCS BR 32) PCS asserts that given PEF's speculative cost-effectiveness analysis, the Commission should adopt consumer protections to effectively mitigate the risks posed by potential cost overruns. (PCS BR 32-33)

SACE argues that considerable uncertainties exist within PEF's estimates of costs. (SACE BR 9-10) In particular, SACE contends that PEF's cost-effectiveness analysis is flawed because it relies upon assumptions with regard to construction and operation costs, the contracts for which have as yet to be finalized. (SACE BR 10) Moreover, SACE argues that the lack of comparison with a renewable alternative renders the cost-effectiveness tests incomplete. (SACE BR 10)

Witness Crisp testified that supply-side resources are typically evaluated in the Strategist model over a ten-year planning period and a thirty-year study period. (TR 475) With the evaluation of new nuclear generation beginning in 2016, however, the use of a typical thirty-year study period accounts for the costs and benefits of only the first twenty years of commercial operation of the nuclear generation units because there are ten years in the model before commercial operation of the nuclear units is planned. (TR 475) The economic benefits from the commercial operation of Levy Units 1 and 2, however, will continue over the 60-year expected life of the units. (TR 475) The 60-year expected life of Levy Units 1 and 2, includes a 40-year initial license period plus the accepted convention based on experience that the license for such units can be extended an additional 20 years. (TR 475) Staff believes such a study period is reasonable.

There are two primary drivers for the economic analysis of Levy Units 1 and 2. One driver is the differential in fuel price and the other is the cost of carbon. (EXH 13) The economic impacts of environmental costs and fuel costs are about equal in this proceeding. (EXH 13) In contrast, fuel was the primary driver in the FPL Turkey Point 6 and 7 proceeding. As with similar need determination filings, PEF performed its cost-effective analysis under a wide range of scenarios that combined three fuel forecasts (low, medium, and high) and five CO₂ compliance cost projections, one of which did not include CO₂ compliance costs. (TR 476) The proposed nuclear expansion plan and an all natural gas expansion plan were analyzed giving consideration to fifteen different fuel/environmental scenarios. (TR 476) The reasonableness of the cost projections with each fuel and environmental scenario is discussed in Issue 4. Based on the CO₂ cost-related discussions presented in Issue 4, staff recommends that when evaluating the economic benefits of the proposed nuclear units, the Commission should focus on the analysis outcomes derived from three CO₂ cases: Bingaman Specter CO₂ case, EPA No CCS CO₂ case, and MIT Mid CO₂ case.

Witness Crisp testified that scenarios which included low fuel costs are less likely than other fuel scenarios. Witness Crisp also testified that any scenario, which did not include CO₂ compliance costs was not likely. As a result witness Crisp excluded the seven scenarios that included either low fuel costs or no CO₂ compliance costs scenarios. (EXH 13) The elimination of the seven scenarios left the eight scenarios which PEF considered most likely. No parties argued against the elimination of the seven discussed scenarios.

Staff's review of the eight remaining scenarios showed that the nuclear expansion plan, as proposed, proved to be cost-effective in seven of the eight scenarios. (EXH 44) Negative numbers in the table below represent a scenario in which the addition of Levy Units 1 and 2 is not cost-effective. Positive numbers, consequently, represent scenarios in which the addition of Levy Units 1 and 2 is cost-effective.

Levy 1 and 2 vs. Gas Expansion (\$2007 in Millions) 2007-2066 (60 Year Life)¹⁶			
		Fuel Reference	
		Mid	High
Environmental Scenarios	Bingaman Specter	(\$343)	\$5,212
	EPA No CCS	\$793	\$6,318
	MIT Mid Range	\$3,614	\$9,077
	Lieberman Warner	\$6,380	\$11,892

Witness Crisp testified that when both Levy Units 1 and 2 are on-line, fuel savings are estimated to be at least \$930 million annually. (TR 490) Witness Crisp further testified that the additions of Levy Units 1 and 2, as opposed to a natural gas fleet, will result in \$92 billion in cumulative present value revenue requirement (CPVRR) savings to the customer. (TR 506)

Additional expected savings are realized when PEF's projected environmental compliance costs are taken in to consideration. PEF projects compliance costs to range from \$18 - \$72/ton of CO₂ in 2018. PEF further projects these compliance costs to range from \$526 - \$1,217/ton of CO₂ in 2066. (EXH 13) Over the 60-year expected life of the units, PEF estimated that Levy Units 1 and 2 would avoid approximately 384 million tons of CO₂ compared to a natural gas-fired, combined-cycle facility. (TR 388)

Currently major air quality regulations at the state and the federal levels include the Clean Air Interstate Rule (CAIR), which requires significant reductions in SO₂ and NO_x emissions and the Clean Air Mercury Rule (CAMR), which requires reductions in Hg emissions from fossil fuel-fired power plants nation-wide. (TR 390) The Clean Air Visibility Rule (CAVR) may require additional reductions in SO₂ and NO_x in order to improve and protect visibility in national parks and wilderness areas. (TR 390-391) All of these regulations significantly affect PEF's existing generation fleet. (TR 391) Thus, when planning a new generation unit, the associated air emission costs and the costs of installation of the compliance technologies should be taken into consideration; otherwise, pollution control technologies could still be required to be added after the planned unit is placed in service. Witness Kennedy testified that PEF is currently implementing its compliance plan to meet the new regulatory requirements, which will include its investing more than \$1.2 billion in pollution control installations at some existing fossil fuel-fired facilities. (TR 391)

Staff also analyzed the proposed expansion plan over a 40-year period. This analysis indicated that given a traditional 40-year CPVRR the proposed Levy Units 1 and 2 would still prove to be cost-effective in six of the eight scenarios. These results are tabulated in the table below. Comparison of the 40-year study and the 60-year study indicate that, because of the discussed potential fuel and environmental savings associated with the nuclear generation expansion plan, the benefits of Levy Units 1 and 2 increase over time. (EXH 13)

¹⁶ EXHs 44 and 85.

Levy 1 and 2 vs. Gas Expansion (\$2007 in Millions) 2007-2046 (40 Year Life)¹⁷			
		Fuel Reference	
		Mid	High
Environmental Scenarios	Bingaman Specter	(\$2,366)	\$2,226
	EPA No CCS	(\$1,506)	\$3,078
	MIT Mid Range	\$629	\$5,163
	Lieberman Warner	\$2,355	\$6,925

While the operating costs associated with a nuclear plant are very low and produce significant savings, the capital costs for a nuclear plant are substantial. This situation results in an initial increase in total costs until the lower operating costs can offset the higher capital costs. Subsequently customers' rates reflect this trend and initial rate increases can be considerable.

During the 2006 legislative session, the Florida Legislature enacted Sections 366.93 and 403.519(4), F.S., which effectively mitigate the economic risks associated with the long lead time and high capital costs associated with nuclear power plants. Section 366.93(2), F.S., requires the Commission to establish alternative cost recovery mechanisms for the recovery of costs incurred in the siting, design, licensing, and construction of a nuclear power plant. Such mechanisms shall be designed to promote utility investment in nuclear power plants and allow for the recovery in rates of all prudently incurred costs. Sections 366.93(3) and (5), F.S., allow a utility to request recovery of costs after a need determination has been granted and require annual cost information to be filed with the Commission. Finally, if a utility elects not to continue with the construction of a new nuclear plant, Section 366.93(6), F.S., allows the utility to recover costs prudently incurred up to the date of termination. Such measures are unique to nuclear and integrated gasification combined cycle power plants. The Commission will review the continued feasibility of Levy Units 1 and 2 during its annual nuclear cost recovery proceedings; thus, providing the appropriate checks and balances to ensure that the construction of the nuclear units continues to be in the best interest of PEF's ratepayers.

The table below illustrates the expected monthly bill impact for the period from 2009 through 2017, the year the proposed project is completed. (EXH 13)

Residential Monthly Bill Impact								
2009	2010	2011	2012	2013	2014	2015	2016 Unit 1 In- Service Date	2017 Unit 2 In- Service Date
\$7.53	\$10.71	\$16.77	\$15.32	\$22.14	\$27.63	\$36.60	\$44.86	\$21.70

Witness Lyash testified that depending upon the terms and conditions of any joint ownership agreement, a joint ownership arrangement might provide benefits to PEF's customers

¹⁷ EXH 13.

by, among other things, spreading the capital risks associated with a project of this magnitude. (TR 93) In addition, witness Crisp testified that PEF ran a sensitivity analysis on potential joint ownership up to 20 percent. (EXH 44) Staff's analysis of the cumulative present value revenue requirements for an 80 percent ownership expansion plan showed reduced initial costs, however, long-term savings were also reduced. The results of these analyses, illustrated in the table below, also proved to be cost-effective in seven of the eight fuel and environmental scenarios.

Levy 1 and 2 vs. Gas Expansion (\$2007 in Millions)			
80% Ownership 2007-2066 (60 Year Life)¹⁸			
		Fuel Reference	
		Mid	High
Environmental Scenarios	Bingaman Specter	(\$733)	\$3,756
	EPA No CCS	\$171	\$4,631
	MIT Mid Range	\$2,403	\$6,790
	Lieberman Warner	\$4,594	\$9,018

PEF also performed a cost-effectiveness analysis assuming only one nuclear unit. As anticipated initial costs and long-term savings were reduced, however, such a plan proved to be cost-effective in only five of the eight fuel and environmental scenarios. (EXH 13) During the hearing, witness Crisp testified that the construction of only one unit is not a viable option. (TR 536) The dilemma facing PEF, therefore, becomes assessing the trade-offs between short-term costs and long-term benefits.

Levy 1 vs. Gas Expansion (\$2007 in Millions)			
2007-2066 (60 Year Life)¹⁹			
		Fuel Reference	
		Mid	High
Environmental Scenarios	Bingaman Specter	(\$2,569)	\$254
	EPA No CCS	(\$2,058)	\$781
	MIT Mid Range	(\$851)	\$2,109
	Lieberman Warner	\$343	\$3,431

Witness Crisp asserted that circumstances are likely to change as cost estimates are refined and costs are incurred over the next decade as PEF proceeds toward commercial operation of Levy Units 1 and 2. (EXH 44) Witness Crisp further testified that to account for the inherent uncertainty surrounding the cost of Levy Units 1 and 2, PEF also evaluated the units in the Strategist model using five, fifteen, and twenty five percent cost increase in capital costs, as well as a five percent decrease in capital costs. PEF performed this assuming a mid-level fuel forecast. (EXH 44) Based on the cost sensitivity analyses, the generation resource plan with Levy Units 1 and 2 is still the most cost-effective plan when accounting for the likely range of

¹⁸ EXH 44, 98.

¹⁹ EXH 13.

CO₂ compliance costs. Witness Crisp also testified that the cost sensitivity analyses can be used to look at any and all potential reasons for cost increases. (TR 549)

Witness Crisp testified that under EPACT, federal production tax credits were provided as an incentive for utilities to invest in nuclear power generation. (TR 480) PEF has estimated the value of the production tax credits for customers at \$88 to \$167 million if Levy Units 1 and 2 are brought on line by 2016 and 2017. (TR 480) PEF did not include the production tax credit benefits in its CPVRR evaluation. (TR 480-481) The production tax credit benefits, therefore, represent an additive potential benefit for PEF's customers.

Witness Crisp also asserted that EPACT provides utilities that develop and commence operation of new nuclear reactors DOE loan guarantees and DOE stand-by support, which is a type of risk insurance. (TR 481) Witness Crisp testified that it is unclear at this time, however, whether the DOE loan guarantees and stand-by support will be available to the Levy project. (TR 481) Staff recommends that PEF continue to review whether such programs will be available in order to maximize the net benefits to its ratepayers.

In conclusion, the results of PEF's cost-effectiveness analysis indicate that Levy Units 1 and 2 are projected to produce savings in seven of the eight most likely scenarios considered. (EXH 44) Such results indicate a high likelihood of PEF's ratepayers realizing net benefits over the life of the project. Levy Units 1 and 2 are projected to produce annual fuel savings of nearly \$1 billion dollars starting in 2018, and about \$92 billion over the life of the units when compared to a combined cycle alternative. (TR 490; TR 506) As environmental compliance costs increase, so do the benefits associated with Levy Units 1 and 2, because nuclear generation is considered a "non-emitting" technology for GHG emissions. (TR 469; EXH 44) For the foregoing reasons, staff believes that Levy Units 1 and 2 will provide the most cost-effective source of power.

Staff understands that the long lead time associated with the permitting and construction of a nuclear plant means that many details of the project may not be known at the time a utility files for a determination of need. However, recent legislation recognizing the unique nature of nuclear power plants urges the Commission to approach a determination of need from a slightly different perspective. Unlike more traditional need determination proceedings, the annual nuclear cost recovery proceedings will provide a forum for the Commission to continue to gather and review additional information as it becomes available.

Staff recognizes the significant impact that Levy Units 1 and 2 will have on its customers' rates. Staff believes that, although long term benefits may be reduced, PEF, in the best interest of its ratepayers, should continue to negotiate joint ownership opportunities in an effort to further mitigate the high initial risks associated with the proposed project. Therefore, staff believes that PEF should be required to also provide updates regarding discussions pertaining to joint ownership during its annual nuclear cost recovery proceedings.

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?

Recommendation: Yes. (Graves, Garl)

Positions of Parties (Taken Directly from Briefs):

PEF: Yes, the Commission should grant PEF's petition. Granting this need determination will provide PEF and Florida the opportunity to move towards a generation supply portfolio that is essential for the future energy needs and economic and environmental well-being of the State.

OPC: No position.

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

SACE: No.

Staff Analysis: PEF contends that for all of the foregoing reasons, and based on the preponderance of the evidence presented at the hearing, the Commission should grant PEF's Petition for Determination of Need for Levy Units 1 and 2 Nuclear Power Plants. (PEF BR 39)

PCS argues that PEF has not demonstrated that there is a reliability need for both Levy Units. (PCS BR 33) PCS additionally contends that absent the consumer safeguards that PCS recommends, the record does not support a Commission order granting a determination of need for either Levy Unit. (PCS BR 33)

SACE argues that the record does not support a conclusion that Levy Units 1 and 2 are the most cost-effective alternative to serve the need for electricity. (SACE BR 18) As such, SACE asserts that the Commission should deny this petition on the grounds that a need for the plant has not been demonstrated. (SACE BR 18)

Staff believes the evidence presented in the foregoing issues reflects that PEF has demonstrated a need for Levy Units 1 and 2. If PEF's petition for determination of need for Levy Units 1 and 2 is approved, staff recommends that the Commission require PEF to provide a long-term feasibility analysis as part of its annual cost recovery process which, in this case, should also include updated fuel forecasts, environmental forecasts, and non-binding capital cost estimates. In addition, PEF should account for sunk costs. Providing this information on an annual basis will allow the Commission to monitor the feasibility regarding the continued construction of Levy Units 1 and 2. PEF should also be required to file information regarding discussions involving joint ownership. Staff recommends that the Commission approve PEF's petition for determination of need for the proposed Levy Units 1 and 2 for the following reasons:

Staff believes PEF has demonstrated a reliability need for additional base-load capacity by 2016. Levy Units 1 and 2 will add 2,200 MW of nuclear fueled GHG emission free base-load generating capacity which is needed to keep pace with the increasing demand for reliable power and the steady population growth in the State of Florida.

Next, Issue 2 reflects that Levy Units 1 and 2 represent a critical component in PEF's efforts to maintain a diverse fuel mix and reduce the State's dependence on natural gas and fuel oil. Maintaining a balanced fuel portfolio will result in less volatile total fuel costs over time and will enhance the reliability of the electrical system.

In addition, as discussed in Issue 4, PEF's assumptions and predictions indicate that Levy Units 1 and 2 will provide adequate electricity at a reasonable cost.

The evidence in Issue 5 shows that despite PEF's proposed incremental increase of 512 MW of DSM and more than 250 MW of cost-effective renewable energy contracts, additional capacity would still be needed in 2016 to meet PEF's need for base-load generation.

Lastly, in Issue 6, PEF's analysis illustrates a high probability of customer savings during the life of the proposed Levy Units 1 and 2. Additionally, the fuel and environmental benefits of Levy Units 1 and 2 could continue beyond the analysis presented in this proceeding.

For the reasons discussed above, staff recommends that the Commission approve PEF's petition for determination of need for Levy Units 1 and 2.

Docket No. 080148-EI

Date: July 2, 2008

Issue 8: Should this docket be closed?

Recommendation: The docket should be closed after the time for filing an appeal has run.
(Fleming, Klancke, Young)

Positions of Parties (Taken Directly from Briefs):

PEF: Yes, this docket should be closed.

OPC: No position.

PCS: No position.

SACE: Yes.

Staff Analysis: The docket should be closed after the time for filing an appeal has run.