Docket No. 090007-EI
Progress Energy Florida
Witness: Patricia Q. West
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Progress Energy Florida

Review of Integrated Clean Air Compliance Plan

Submitted to the
Florida Public Service Commission

April 1, 2009

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Executive Summary

In the 2007 Environmental Cost Recovery Clause (ECRC) Docket (No. 070007-EI) and as reaffirmed in the 2008 ECRC Docket (No. 080007-EI), the Public Service Commission approved Progress Energy Florida's (PEF's) updated Integrated Clean Air Compliance Plan (Plan D) as a reasonable and prudent means to comply with the requirements of the Clean Air Interstate Rule (CAIR), the Clean Air Mercury Rule (CAMR), the Clean Air Visibility Rule (CAVR) and related regulatory requirements. In its final order, the Commission also directed PEF to file as part of its ECRC true-up testimony "a yearly review of the efficacy of its Plan D and the cost-effectiveness of PEF's retrofit options for each generating unit in relation to expected changes in environmental regulations." This report provides the required review for 2009.

The primary components of PEF's Compliance Plan "D" are summarized as follows:

Sulfur Dioxide (SO_2):

- Installation of wet scrubbers, flue gas desulphurization system, (FGD) on Crystal River Units 4 and 5
- Fuel switching at Crystal River Units 1 and 2 to burn low sulfur coal
- Fuel switching at Anclote Units 1 and 2 to burn low sulfur oil
- Purchases of SO_2 allowances

Nitrogen Oxides (NOx):

- Installation of low NOx burners (LNBs) and selective catalytic reduction (SCR) on Crystal River Units 4 and 5
- Installation of LNBs and separated over-fire air (LNB/SOFA) or alternative NOx controls at Anclote Units 1 and 2
- Purchase of annual and ozone season NOx allowances

Mercury:

- Co-benefit of wet scrubbers and SCRs at Crystal River Units 4 and 5
- Installation of powdered activated carbon (PAC) injection on Crystal River Unit 2
- Purchase of mercury (Hg) allowances

As detailed in PEF's 2007 ECRC filing, PEF decided upon Plan D based on a quantitative and qualitative evaluation of the ability of alternative plans to meet environmental requirements, while managing risks and controlling costs. That evaluation demonstrated that Plan D is PEF's most cost-effective alternative to meet the applicable regulatory requirements. The Plan is expected to meet environmental requirements by striking a balance between reducing emissions, primarily through the installation of controls on PEF's largest and newest coal units (Crystal River Units 4 and 5), and making strategic use of emission allowance markets.

In accordance with the Commission's final order in the 2007 ECRC docket, PEF has reviewed the efficacy of Plan D and the cost-effectiveness of retrofit options in relation to expected changes in environmental regulations. With regard to Plan D's efficacy, PEF remains confident that Plan D will have the desired effect of achieving timely compliance with the applicable regulations in a cost-effective manner. PEF has achieved several project milestones, including:

- Completion of the access road in May, 2008;
- Completion of the vehicle barrier system in May, 2008;
- Completion of the flue gas chimney shell in June, 2008;
- Completion of the Crystal River Unit 5 FGD absorber tower in September, 2008; and
- Completion of the Crystal River Unit 4 LNB/AH in December, 2008

Although there are uncertainties associated with all major construction projects of this type, the Crystal River projects currently are on-schedule to achieve compliance with the applicable regulations.

As a result of a 2008 federal appeals court decision vacating the federal CAMR regulations, the U.S. Environmental Protection Agency (EPA) is proceeding with adoption of new standards for utility mercury emissions. This development does not immediately impact PEF's implementation of Plan D because the plan does not contemplate installation of mercury-specific controls until 2017 if necessary. Thus, Plan D provides PEF flexibility to respond when EPA adopts any new mercury standards.

Since last year's filing, a federal appellate court also issued a decision remanding CAIR to the EPA to correct several flaws identified by the court. Although the court originally vacated the rule, in response to EPA's petition for rehearing, the court subsequently decided to remand CAIR without vacating it, thereby leaving the rule and its compliance obligations in place.

No new or revised environmental regulations have been adopted that have a direct bearing on PEF's compliance plan. In 2008, the Florida Legislature adopted legislation authorizing the Florida Department of Environmental Protection (FDEP) to adopt rules establishing a cap-and-trade program to regulate emissions of greenhouse gases, such as carbon dioxide (CO_2). To date, FDEP has not adopted any cap-and-trade rules and, under the legislation, any such rules must be ratified by the Legislature, however, the FDEP has begun the rulemaking process and held a public workshop on March 11, 2009. Nevertheless, PEF is taking steps to reduce CO_2 emissions consistent with the state's goals. Among other things, the Company has agreed to retire Crystal River Units 1 and 2 as coal-fired units after the second of two new, advanced design nuclear units in Levy County completes its first fuel cycle. This will reduce PEF's CO_2 emissions by approximately 5 million tons per year.

There currently are no demonstrated retrofit options to reduce CO_2 emissions from fossil fuel-fired electric generating units such as Crystal River Units 4 and 5, which are the primary focus of PEF's compliance plan. Likewise, replacement of coal-fired generation from Crystal River Units 4 and 5 with natural-gas fired generation is not a feasible or cost-effective option because it cannot be implemented in time to meet the 2009 and 2010 CAIR deadlines and it would put PEF in the vulnerable position of relying solely on SO_2 and NOx allowance purchases to achieve compliance during the five to six year interim period it would take to construct a new generating facility. Furthermore, replacing coal-fired generation with gas-fired generation would decrease PEF's fuel diversity and potentially increase fuel price volatility.

I. Introduction

In its final order in the 2007 ECRC Docket (No. 070007-EI) and as reaffirmed in the 2008 ECRC Docket (No. 080007-EI), the Public Service Commission approved PEF's updated Integrated Clean Air Compliance Plan (Plan D) as a reasonable and prudent means to comply with the requirements of CAIR, CAMR, CAVR and related regulatory requirements. *In re*

Environmental Cost Recovery Clause, Order No. PSC-07-0922-FOF-EI, p. 8 (Nov. 16, 2007) the Commission specifically found that "PEF's updated Integrated Clean Air Compliance Plan represents the most cost-effective alternative for achieving and maintaining compliance with CAIR, CAMR, and CAVR, and related regulatory requirements, and it is reasonable and prudent for PEF to recover prudently incurred costs to implement the plan." *Id.* In its final order, the Commission also directed PEF to file as part of its ECRC true-up testimony "a yearly review of the efficacy of its Plan D and the cost-effectiveness of PEF's retrofit options for each generating unit in relation to expected changes in environmental regulations." *Id.* The purpose of this report is to provide the required review for 2009.

II. PEF's Integrated Clean Air Compliance Plan

A. Background

The CAIR and CAVR programs require PEF and other utilities to significantly reduce emissions of sulfur dioxide (SO_2) and nitrogen oxides (NOx). Under CAIR, these reductions must be met in incremental phases. Phase I begins in 2009 for NOx and in 2010 for SO_2. Phase II begins in 2015 for both NOx and SO_2.

In March 2006, PEF submitted a report and supporting testimony presenting its integrated plan for complying with the new rules, as well as the process PEF utilized in evaluating alternative plans. The analysis included an examination of the projected emissions associated with several alternative plans and a comparison of economic impacts, in terms of cumulative present value of revenue requirements. PEF's Integrated Clean Air Compliance Plan, designated in the report as Plan D, was found to be the most cost-effective compliance plan for CAIR, CAMR, and CAVR from among five alternative plans.

In June 2007, PEF submitted an updated report and supporting testimony summarizing the status of the Plan and an updated economic analysis incorporating certain plan revisions necessitated by changed circumstances. Consistent with the approach utilized in 2006, PEF performed a quantitative evaluation to compare the ability of the modified alternative plans to meet environmental requirements, while managing risks and controlling costs. That evaluation demonstrated that Plan D, as revised, is PEF's most cost-effective alternative to meet the applicable regulatory requirements. Based on that analysis, the Commission approved PEF's

Plan D as reasonable and prudent and held that PEF should recover the prudently incurred costs of implementing the plan.

B. PEF's Plan "D"

PEF's compliance plan (Plan D) meets the applicable environmental requirements by striking a good balance between reducing emissions, primarily through installation of controls on PEF's largest and newest coal units (Crystal River Units 4 and 5), and making strategic use of the allowance markets to comply with CAIR requirements. Specific components of the Plan are summarized below.

1. CAIR SO_2 Plan

The most significant component of PEF's Integrated Clean Air Compliance Plan is the installation of flue gas desulfurization (FGD) systems, also known as wet scrubbers, on Crystal River Units 4 and 5 to comply with CAIR's SO_2 requirements. PEF also plans to purchase limited SO_2 allowances. The plan also includes switching Crystal River Units 1 and 2 to burn low-sulfur (1.2 lbs SO_2/mmBtu) "compliance" coal, and burning low sulfur oil at Anclote Units 1 and 2. However, the final decision to switch fuels will be made closer to implementation time. The fuel to be burned by PEF at these units will be that which has the lowest overall cost when the cost of allowances is factored into the overall cost along with other relevant fuel selection considerations.

2. CAIR NOx Plan

The primary component of PEF's NOx compliance plan is the installation of low NOx burners (LNBs) and selective catalytic reduction (SCR) systems on Crystal River Units 4 and 5. Currently, the Plan also includes installation of LNB/SOFA controls to reduce NOx emissions from the Anclote units. However, additional study of this option is required. These control options are among the lowest incremental cost options available, and provide most, but not all, of the NOx reductions required by CAIR. Alternative technology trials and studies for alternative NOx controls are being evaluated to more thoroughly quantify costs, effectiveness, benefits, and risks. Technologies being evaluated for studies and trials include, but are not limited to, selective non-catalytic reduction (SNCR), fuel oil additives, and burner tip modifications. To

achieve compliance with CAIR, PEF plans to take strategic advantage of CAIR's cap-and-trade feature by purchasing some annual and ozone season NOx allowances.

3. Mercury Plan

As discussed more fully below, a federal appeals court vacated the federal CAMR regulations in 2008. With CAMR vacated, PEF is not required at this time to install mercury controls to meet the CAMR emission limits. This development does not have any immediate, significant impact on PEF's implementation of Plan D because installation of NOx and SO_2 controls on Crystal River Units 4 and 5 is expected to reduce mercury emissions by at least 80% and the plan did not contemplate installation of any mercury-specific controls until 2017. PEF will continue to monitor the regulatory developments related to utility mercury emissions as well as research and development of mercury control technologies to ensure that the most reliable and cost-effective control technology is used when the time arrives for compliance.

4. CAVR Visibility Plan

PEF operates four units that are potentially subject to Best Available Retrofit Technology (BART) under CAVR, including Anclote Units 1 and 2 and Crystal River Units 1 and 2. As indicated above, PEF's Compliance Plan includes switching to low-sulfur oil and the installation of LNBs at Anclote Units 1 and 2 or other alternative NOx controls such as selective non-catalytic reduction, fuel oil additives, combustion control technologies, and burner tip modifications. Per the FDEP's BART requirements, Rule 62-296.340, F.A.C., a BART determination is not required for SO_2 and NOx for any BART-eligible source that is subject to CAIR. Therefore, visibility impacts from particulate matter emissions are only evaluated for the BART determination. Based on modeled impact of particulate matter on visibility Anclote Units 1 and 2 were determined to be exempt from BART in April 2008. Because the results of the modeling for Crystal River Units 1 and 2 showed visibility impacts at or above regulatory threshold levels, PEF applied for a BART permit for those units. This permit was issued on February 26, 2009 and it establishes a combined BART emission standard for Crystal River Units 1 and 2. By establishing a combined emission standard, the permit enables PEF to cost-effectively satisfy BART requirements by maintaining the existing Unit 1 electrostatic precipitator (ESP) and upgrading the Unit 2 ESP if necessary,

III. Efficacy of PEF's Plan D

As noted above, in its Final Order in Docket No. 070007- EI, the Commission requested a review of the efficacy of PEF's Integrated Clean Air Compliance Plan (Plan D) and the cost-effectiveness of PEF's retrofit options for each generating unit in relation to expected changes in environmental regulations. With regard to Plan D's efficacy, PEF remains confident that Plan D will have the desired effect of achieving timely compliance with the applicable regulations in a cost-effective manner. As noted below, however, there are uncertainties that could affect the timing and costs of implementation.

A. Project Milestones

PEF remains on schedule to complete installation of controls on Crystal River Units 4 and 5 as contemplated in PEF's 2008 ECRC filing. As discussed in previous filings, PEF has executed contracts for specific project components, as well as an overall Engineering, Construction and Procurement (EPC) contract. Since the submittal of last year's annual review, PEF has achieved the following project milestones:

ACHIEVED CAIR COMPLIANCE MILESTONES

Access Road CRN – Common	Apr-08
Chimney Shell Complete – Common	May-08
Limestone Prep steel complete – Common	Jul-08
Scheduled Equipment Delivery complete – Crystal River Unit 4 LNB	Aug-08
FGD building steel complete – Crystal River Unit 5 FGD	Sep-08
SCR Steel complete – Crystal River Unit 5 SCR	Sep-08
SCR Foundation complete – Crystal River Unit 4 SCR	Sep-08
Access Road Piping delivered – Crystal River Unit 4 FGD	Oct-08
Air pre-heater baskets delivered – Crystal River Unit 5 FGD	Dec-08
LNB scheduled equipment delivery complete – Crystal River Unit 5 SCR	Dec-08
Urea equipment delivery – Common	Dec-08
Crystal River Unit 4 LNB Installation complete	Dec-08

PEF expects to achieve the following project milestones in 2009 and 2010:

UPCOMING CAIR COMPLIANCE MILESTONES

FGD building steel delivery complete - Crystal River Unit 4 FGD	Mar-09
[redacted]	[redacted] 1
[redacted]	[redacted] 2
Limestone handling complete – Common	Sep - 09
[redacted]	[redacted] 3
SCR Steel erection work complete - Crystal River Unit 4 SCR	Dec-09
[redacted]	[redacted] 4
[redacted]	[redacted] 5
[redacted]	[redacted] 6

B. Projects Costs

During 2008, PEF had incurred approximately $568 million in capital costs for the Crystal River projects. The 2008 figure includes approximately $511 million in contract billings, $13 million of owner's costs, and $44 million of AFUDC. As of December 2008, the life-to-date capital costs were approximately $897 million. This figure includes approximately $812 million in contract billings, $34 million of owner's costs, and $51 million of AFUDC. The contract billings include payments for: major construction work, design and engineering work, procurement of major equipment, and environmental permits. The overall budget, excluding AFUDC, is $1.15 billion. Currently, the costs are on track to be completed within the overall budget.

C. Uncertainties

While a significant amount of study, engineering, and analysis have been completed and construction has begun on the Crystal River projects, there are still a number of uncertainties that could affect project schedules and costs. Although most of PEF's contracts contain provisions for liquidated damages for delays, the non-performance of contractors, force majeure events, and other uncertainties could adversely impact project schedules and costs. The primary risks identified on the PEF CAIR compliance projects are as follows:

- **EPCR adherence to the outage schedules:** EPCR has finalized the schedule according to the planned outage dates. PEF personnel will monitor the schedule and identify any potential issues.

- **Force Majeure:** There is a risk of a major storm impacting this project considering the location is directly on the Gulf Coast.

- **Scope Modifications:** There are risks of design errors, quantity changes, site conditions, site interferences, change requests or other items which would require additional scope. A project contingency has been developed to cover these unknowns. A process is in place to track these contingencies on a monthly basis in order to trend and project future costs.

- **Condition of Certification (COC) Modification delay:** A lengthy delay in the FDEP's approval of the Gypsum Storage Pad design could create a delay in receiving the necessary modifications to the existing Conditions of Certification for Crystal River Units 4 and 5. This approval is now expected by the end of April 2009.

Primary risks to date are discussed above; however, emergent risks could still occur. Project contingency has been developed to cover these project unknowns, and PEF project staff members are actively engaged to minimize or avoid any project schedule impacts.

IV. Retrofit Options in Relation to Expected Changes in Environmental Regulations

Since PEF's filing in the 2008 ECRC docket, no new or revised environmental regulations have been adopted that have a direct bearing on Plan D. Furthermore, at this time, it is not possible to predict the timing or requirements of any environmental regulations that may be adopted in the future. The following discussion addresses three regulatory developments that have been the topic of discussion since PEF's 2008 filing.

A. Status of CAIR

In July 2008, the U.S. Circuit Court of Appeals for the District of Columbia issued a decision vacating CAIR in its entirety. *North Carolina v. EPA*, 531 F.3d 896 (D.C. Cir. 2008). However, in response to EPA's petition for rehearing, the court requested briefs from the parties regarding whether CAIR should be remanded to EPA without vacatur of CAIR. On December 23, the court decided to remand CAIR without vacatur, thereby leaving the rule and its compliance obligations in place. *North Carolina v. EPA*, 550 F.3d 1176 (D.C. Cir. 2008). Thus, PEF must continue to move forward with its Integrated Clean Air Compliance Plan in order to meet the impending CAIR compliance deadlines.

B. Status of CAMR

In February 2008, the U.S. Court of Appeals for the District of Columbia (D.C.) Circuit vacated the federal CAMR regulations. *See, New Jersey v. EPA*, 517 F. 3d 574 (D.C. Cir. 2008). EPA originally promulgated CAMR under Section 111 of the Clean Air Act (CAA), rather than CAA Section 112, which requires EPA to establish Maximum Achievable Control Technology (MACT) standards for hazardous air pollutants. EPA's decision to proceed under CAA Section 111 was based on its rescission of a prior finding in 2000 that emissions of mercury and other hazardous pollutants from electric generating units should be regulated under CAA Section 112. In its decision, the D.C. Circuit court vacated EPA's rescission of its 2000 finding, holding that the CAA required EPA, prior to making such a rescission, to determine that no utility-unit's mercury emissions exceeded a level that would "protect public health with an ample margin of safety and [have] no adverse environmental effect." Based on this threshold conclusion, the court then vacated CAMR because it was based on EPA's rescission. Since last year's filing, the U.S. Supreme Court has denied review of the D.C. Circuit's vacatur of CAMR and EPA has announced its intention to proceed with a MACT rulemaking.

It is impossible to predict when EPA will complete the MACT rulemaking process or what the emissions standards will be. In any event, because PEF's Plan D relies on the co-benefit of SCR/scrubbers rather than mercury-specific controls until 2017, the Plan provides flexibility to respond to any rules EPA may adopt in response to the D.C. Circuit's decision.

C. Potential Greenhouse Gas Regulation

When PEF committed to placing environmental controls on Crystal River Units 4 and 5, climate change issues were only beginning to be discussed. At that time, PEF had to commit to installing controls in order to meet the fast approaching 2009 and 2010 CAIR compliance deadlines. Governor Crist subsequently issued Executive Order 07-127 directing FDEP to promulgate regulations requiring reductions in utility carbon dioxide (CO_2) emissions. In addition, the 2008 Florida Legislature enacted legislation authorizing FDEP to adopt rules establishing a cap-and-trade program and requiring FDEP to submit any such rules for legislative review and ratification. At this time, however, FDEP is still in the early stages of developing cap-and-trade rules and numerous key issues remain unresolved, such as the approach to allowance distribution and whether Florida should join a regional program; a rulemaking workshop was held on March 11, 2009. Until such regulations are adopted and ratified, or legislation is enacted at the federal level, the potential impact of CO_2 regulation will remain uncertain. Nevertheless, PEF is taking steps to reduce CO_2 emissions consistent with the state's goals. In December 2008, the Company announced an agreement with FDEP to retire Crystal River Units 1 and 2 coal-fired units after the second of two new, advanced design nuclear units in Levy County completes its first fuel cycle. Retiring the coal-fired Crystal River Units 1 and 2 will reduce PEF's CO_2 emissions by 5 million tons per year.

At this time, there are still no retrofit options commercially available to reduce CO_2 emissions from fossil fuel-fired electric generating units such as Crystal River Units 4 and 5, which are the primary focus of PEF's compliance plan. To date, there have been no large-scale commercial carbon capture and sequestration technology demonstrations on electric utility units. Until numerous technological, regulatory and liability issues are resolved, it will be impossible to determine whether carbon capture and storage would be a technically feasible or cost-effective means of complying with a CO_2 regulatory regime. Likewise, replacing coal-fired generation from Crystal River Units 4 and 5 with lower CO_2-emitting natural gas-fired combined cycle generation[1] is not a viable option. PEF has already incurred over 73% of the costs, excluding

[1] The CO_2 emission rate for natural gas-fired combined cycle (NG/CC) units is approximately 50% of the emission rate for coal-fired generating units. Thus, replacing coal-fired generation with NG/CC would not eliminate costs associated with any to-be-adopted CO_2 regulatory regime.

AFUDC, of Plan D and the major components of the Plan are due to be placed in service in 2009 and 2010. Even if PEF could abandon the Crystal River projects at this late date, sufficient combined-cycle generation could not be placed on-line until the 2015-2016 timeframe. PEF would have to rely solely on allowance markets to achieve and maintain CAIR compliance for five to six years until the combined cycle generation could be placed in service. Given the uncertainty of the CAIR allowance markets, PEF cannot reasonably assume sufficient allowances would be available at reasonable price if PEF were left in the extremely vulnerable position of relying solely on allowance purchases to achieve compliance. Furthermore, replacing Crystal River Units 4 and 5 with gas-fired generation would decrease PEF's fuel diversity and potentially increase fuel price volatility.

V. Conclusion

Based on project milestones achieved to date, PEF remains confident that Plan D will have the desired effect of achieving timely compliance with the applicable regulations in a cost-effective manner. No new or revised environmental regulations have been adopted that have a direct bearing on PEF's compliance plan. Although FDEP is in the process of developing a cap-and-trade program to regulate CO_2 emissions, no regulations have been adopted to date and there currently are no demonstrated retrofit options to reduce CO_2 emissions from fossil fuel-fired electric generating units. Moreover, abandoning the Crystal River Units 4 and 5 emission control projects is not a viable option in light of the imminent 2009 and 2010 CAIR deadlines. Although EPA is proceeding with the adoption of new MACT standards for utility hazardous air pollutant emissions as a result of a federal court decision vacating the federal CAMR rules, this development does not immediately impact PEF's implementation of Plan D because the plan relies primarily on installation of NOx and SO_2 controls to reduce mercury emissions and does not contemplate installation of mercury-specific controls until 2017. For these reasons, PEF's Plan D continues to represent the most cost-effective alternative for achieving and maintaining compliance with the applicable regulatory requirements.