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Progress Energy Florida

Review of Integrated Clean Air Compliance Plan

Submitted to the
Florida Public Service Commission

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Executive Summary

In the 2007 Environmental Cost Recovery Clause (ECRC) Docket (No. 070007-EI) and as reaffirmed in the 2008 and 2009 ECRC Dockets (Nos. 080007-EI and 090007-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 2007 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 2010.

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

Sulfur Dioxide (SO₂):

- 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 SO₂ allowances

Nitrogen Oxides (NO_x):

- Installation of low NO_x 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 NO_x controls at Anclote Units 1 and 2
- Purchase of annual and ozone season NO_x 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;
- Completion of the Crystal River Unit 4 LNB/AH in December, 2008;
- Crystal River Unit 5 SCR in service in June 2009;
- Completion of the SCR Common project in July 2009; and;
- Crystal River Unit 5 FGD in service in December 2009

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.

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 (CO₂). To date, FDEP has not adopted any cap-and-trade rules and, under the legislation, any such rules must be ratified by the Legislature.

There currently are no demonstrated retrofit options to reduce CO₂ 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 viable option because it cannot be implemented in time to meet the CAIR compliance deadlines. PEF continues to carefully evaluate future compliance options in light of EPA's ongoing development of MACT standards for coal and oil-fired electric generating units,

I. Introduction

In its final order in the 2007 ECRC Docket (No. 070007-EI) and as reaffirmed in the 2008 and 2009 ECRC Dockets (Nos. 080007-EI and 090007-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 (SO₂) and nitrogen oxides (NO_x). Under CAIR, these reductions must be met in incremental phases. Phase I begins in 2009 for NO_x and in 2010 for SO₂. Phase II begins in 2015 for both NO_x and SO₂.

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. Most recently, in 2009, the Commission approved PEF's annual Review of Integrated Clean Air Compliance Plan. Order No. PSC-09-0759-FOF-EI.

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 SO₂ 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 SO₂ requirements. PEF also plans to purchase limited SO₂ allowances. The plan also includes switching Crystal River Units 1 and 2 to burn low-sulfur (1.2 lbs SO₂/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 SO₂ 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. 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 provides PEF additional flexibility in determining the most cost-effective compliance option. PEF is continuing to evaluate potential options in light of EPA's ongoing development of MACT standards for electric generating units (discussed below).

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 2009 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

FGD building steel delivery complete - Crystal River Unit 4 FGD	Mar 09
FGD DCS turnover to start-up - Crystal River Unit 5 FGD	Apr 09
Crystal River Unit 5 SCR in service	Jun 09
Limestone handling complete - Common	Jul 09
Damper/expansion joint delivery complete - Crystal River Unit 4 SCR	Dec 09
SCR Steel erection work complete - Crystal River Unit 4 SCR	Dec 09
Crystal River Unit 5 FGD in service	Dec 09

PEF expects to achieve the following project milestones in 2010:

UPCOMING CAIR COMPLIANCE MILESTONES

	Jan 10
FGD Settling Pond – Main pond complete	█
Chimney installation complete	█
Unit 4 Absorber complete	█
Unit 4 FGD Duct work Tie-in complete	█
Unit 4 SCR Duct work Tie-in complete	█
Unit 4 FGD mechanical completion	█
Unit 4 SCR mechanical completion	█
Crystal River Unit 4 SCR in service	█
Crystal River Unit 4 FGD in service	█

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B. Projects Costs

During 2009, PEF had incurred approximately \$285 million in capital costs for the Crystal River projects. The 2009 figure includes approximately \$206 million in contract billings, \$8 million of owner’s costs, and \$71 million of AFUDC. As of December 2009, the life-to-date capital costs were approximately \$1,186 million. This figure includes approximately \$1,027 million in contract billings, \$38 million of owner’s costs, and \$121 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 \$1.13 billion. Currently, the costs are on track to be completed within the overall budget.

C. Uncertainties

While a significant amount of study, engineering, and construction have been completed 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:

- **Timely completion of System Turnover Packages:** PEF is working with the primary contractor to expedite completion of final system turnover packages in a sequence that will support the current outage schedule. This will include incorporating lessons learned from the prior outages where we identified opportunities to improve communication and coordination.
- **Disruptions due to severe weather:** Significant rainfall and wind can hamper field production and crane utilization during the outage. There is also risk of a major storm impacting this project considering the location is directly on the Gulf Coast. PEF has purchased a Builder's All Risk insurance policy to mitigate this risk and the final outage should be complete prior to the start of the 2010 hurricane season. .
- **Equipment Failure During Start-up:** Major equipment failure during start-up, could cause the spring outage to be extended. PEF has incorporated lessons learned from past scrubber projects to mitigate this risk. Periodic testing is performed on the equipment, and equipment vendor representatives are available to trouble shoot issues that may arise.
- **Additional Technical Field Advisors (TFA):** Technical Field Advisors (TFA) is the group of field advisors for the primary equipment suppliers. All parties have reviewed the Spring 2010 outage schedule and incorporated additional lessons learned from the Fall 2009 Outage start up into the schedule. To mitigate unforeseen complexities during the outage additional field oversight from the primary equipment suppliers (TFAs) will be required.
- **Security-Related Safety Concerns:** Security and safety incidents can occur and halt work. Increased security staff, additional background and drug checks for new hires, have been put in place to mitigate this risk.

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 2009 ECRC docket, no new or revised environmental regulations have been adopted that have a direct bearing on Plan D. The following discussion addresses three regulatory developments that have been the topic of discussion since PEF's 2009 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. Vacatur of CAMR & Development of MACT Standards

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. In light of the vacatur of CAMR, EPA has announced its intention to proceed with rulemaking to establish MACT standards for certain coal and oil-fired electric generating units, including Crystal River Units 1, 2, 4 and 5; Anclote Units 1 and 2; and Suwannee Steam Units 1, 2, and 3. According to a draft consent decree, EPA will

promulgate a proposed EGU MACT no later than March 16, 2011, and a final rule no later than November 16, 2011. *See 74 Fed. Reg. 55547* (Oct. 28, 2009). To that end, EPA recently issued an Information Collection Request (ICR) to PEF and other utilities in order to collect data for use in the development of the EGU MACT. At this time, it is impossible to predict what the EGU MACT standards will be. However, in light of EPA's aggressive rulemaking schedule, PEF is carefully evaluating potential compliance options based on several possible regulatory scenarios.

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 (CO₂) 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. To date, FDEP has not adopted any cap-and-trade rules. Until such regulations are adopted and ratified, or legislation is enacted at the federal level, the potential impact of CO₂ regulation will remain uncertain. In any event, at this time, there are still no retrofit options commercially available to reduce CO₂ 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 CO₂ regulatory regime. Likewise, replacing coal-fired generation from Crystal River Units 4 and 5 with lower CO₂-emitting natural gas-fired combined cycle generation¹ is not a viable option at this late date. PEF has already incurred over 94% of the costs, excluding AFUDC, of Plan D and the remaining major components of the Plan are due to be placed in service in 2010.

¹ The CO₂ 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 CO₂ regulatory regime.

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 CO₂ emissions, no regulations have been adopted to date and there currently are no demonstrated retrofit options to reduce CO₂ 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 CAIR compliance deadlines. 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. PEF will continue to evaluate future compliance options in light of EPA's ongoing development of MACT standards for coal and oil-fired generating units.