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Progress Energy Florida

Review of Integrated Clean Air Compliance Plan

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Florida Public Service Commission

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Table of Contents

Executive Summary	1
I. Introduction.....	3
II. PEF’s Integrated Clean Air Compliance Plan	3
A. Background.....	3
B. PEF’s Plan “D”	4
1. CAIR SO ₂ Plan	4
2. CAIR NO _x Plan	5
3. CAMR Mercury Plan.....	5
4. CAVR Visibility Plan	6
III. Efficacy of PEF’s Plan D.....	6
A. Project Milestones.....	7
B. Projects Costs.....	8
C. Uncertainties	9
IV. Retrofit Options in Relation to Expected Changes in Environmental Regulations.....	10
A. Potential Greenhouse Gas Regulation	10
B. Recent Developments Related to CAMR	11
V. Conclusion	12

Executive Summary

In the 2007 Environmental Cost Recovery Clause (ECRC) Docket (No. 070007-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.

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

Sulfur Dioxide (SO₂):

- Installation of wet scrubbers (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 significant project milestones, including execution of all major contracts and commencement of construction activities, including installation of steel support for the Crystal River Unit 4 and 5 control projects. 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 contemplated in PEF's 2007 ECRC filings.

No new or revised environmental regulations have been adopted that have a direct bearing on PEF's compliance plan. Although discussion of potential regulation of carbon dioxide (CO₂) emissions continues, no legislation or regulations have been adopted to date. In any event, 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 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 SO₂ and NO_x 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.

As a result of a recent federal appeals court decision vacating the federal CAMR regulations, the U.S. Environmental Protection Agency (EPA) may be required to adopt 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. Thus, Plan D provides PEF flexibility to respond if and when EPA adopts any new mercury standards.

I. Introduction

In its final order in the 2007 Environmental Cost Recovery Clause (ECRC) Docket (No. 070007-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 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.

II. PEF's Integrated Clean Air Compliance Plan

A. Background

The CAIR, CAMR and CAVR programs require PEF and other utilities to significantly reduce emissions of sulfur dioxide (SO₂), nitrogen oxides (NO_x) and mercury. Under CAIR and CAMR, these reductions must be met in incremental phases. Phase I begins in 2009 for NO_x and in 2010 for both SO₂ and mercury. Phase II begins in 2015 for both NO_x and SO₂ and in 2018 for mercury.

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 use of the allowance markets to comply with CAIR and CAMR requirements. It also provides flexibility by making strategic use of allowance markets to account for a small portion of the reductions required by CAIR. Should it appear that allowance prices are going to be higher than currently projected, should PEF experience higher load growth than expected, or if plans for future baseload units change, PEF may then add controls on Crystal River Units 1 and 2, if necessary, possibly taking advantage of any technology improvements that may be made in the interim. The Plan also allows time for mercury control technologies to advance. Thus, the Integrated Clean Air Compliance Plan enables PEF to manage its risks. 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, 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. CAMR Mercury Plan

Installation of wet scrubbers and SCRs on Crystal River Units 4 and 5 will provide a co-benefit of reducing mercury emissions. PEF expects mercury emission reductions to be greater than required between 2010 and 2011 under the as-adopted CAMR program, and Plan D would rely on being able to bank the excess reductions for use in later years. Plan D contemplates use of CAMR's cap-and-trade feature after 2018. The Plan also includes installing powder-activated carbon (PAC) injection systems with additional polishing filters on Crystal River Unit 2 in 2017 to further reduce mercury emissions. The polishing filters would provide PEF the ability to continue selling the fly ash produced rather than disposing of the ash in a landfill, thereby avoiding additional landfill costs.

As discussed more fully below, a federal appeals court recently vacated the federal CAMR regulations. This development does not have any immediate, significant impact on PEF's implementation of Plan D because the plan does not contemplate installation of any mercury-specific controls until 2017. However, PEF will continue ongoing design of Continuous Mercury Monitors (CMMS) for Crystal River Units 1 and 2 because significant work has already been started and CMMS will likely be required in any rule the U.S. Environmental

Protection Agency (EPA) adopts in response to the federal court's vacation of CAMR.¹ 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, which will bring the Anclote units into compliance with CAIR. Per the Florida Department of Environmental Protection's (FDEP's) BART requirements, Rule 62-296.340, F.A.C., a BART determination is not required for SO₂ and NO_x for any BART-eligible source that is subject to CAIR. Therefore, visibility impacts from particulate matter emissions are only evaluated for the BART determination. The results of the modeling for Crystal River Units 1 and 2 showed visibility impacts at or above regulatory threshold levels. For that reason, PEF currently is in discussions with the FDEP to determine whether and to what extent any additional controls may be required.

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.

¹ In light of the significant pollution control projects being implemented for Crystal River Units 4 and 5, EPA granted PEF's petition for alternative mercury monitoring for those units; effectively extending the CMMS requirements for those units. As a result, PEF does not intend to go forward with design and testing of CMMS for Units 4 and 5 at this time. If, however, the rule survives as a result of any rehearing or appeal, PEF will have to perform testing this year on Units 4 and 5 to establish an emission rate to use next year for those units. Those tests will have to be repeated at least semi-annually and possibly quarterly until we install and certify the CMMS.

A. Project Milestones

PEF remains on schedule to complete installation of controls on Crystal River Units 4 and 5 as contemplated in PEF's 2007 ECRC filing. As discussed in last year's filing, PEF has executed contracts for specific project components, including contracts with:

- The Stebbins Engineering and Manufacturing Company to design, fabricate, construct, and assemble the two FGD Absorber Towers for the Crystal River Units 4 and 5 scrubber projects;
- CERAM Environmental, Inc., to design, fabricate, deliver, and test the SCR catalyst for the Crystal River Units 4 and 5 SCR projects;
- Commonwealth Dynamics, Inc., to design, fabricate and construct the Flue Gas Chimney for the Crystal River Units 4 and 5 scrubber projects; and
- Babcock & Wilcox to design and provide the major equipment for the Crystal River scrubber, LNB, and SCR projects.

Moreover, in October 2007, PEF entered into an over-arching engineering, procurement and construction (EPC) contract with Environmental Partners Crystal River (EPCR).² Since the Commission's final order in the 2007 ECRC docket, PEF has been working with EPCR to ensure that the Crystal River project remains on schedule to meet the in-service dates discussed in PEF's 2007 ECRC filings. The following table shows the upcoming major milestones for the Crystal River Clean Air project.

² All of the major Crystal River contracts were submitted for the Commission's review in the 2007 ECRC docket. See Hearing Exhibit Nos. 23 (TC-3) through 29 (TC-9) admitted into evidence at Hearing Transcript, p. 9 (Nov. 6, 2007).

UPCOMING CAIR COMPLIANCE MILESTONES

SCR Foundation Complete – Crystal River Unit 5 SCR	02/08	
Access Road Crystal River/North – Common	04/08	
Chimney Shell Complete – Common	06/08	
Limestone Prep steel complete – Common	07/08	
██	████	1
FGD building steel complete – Crystal River Unit 5 FGD	09/08	
SCR Steel complete – Crystal River Unit 5 SCR	09/08	
SCR Foundation complete – Crystal River Unit 4 SCR	09/08	
Access Road Piping delivered – Crystal River Unit 4 FGD	10/08	
██	████	2
██	████	3
Urea equipment delivery – Common	12/08	
██	████	4
FGD building Steel complete – Crystal River Unit 4 FGD	01/09	
Limestone handling complete – Common	03/09	
██	████	5
██	████	6
██	████	7
SCR Steel complete – Crystal River Unit 4 SCR	06/09	
██	████	8
██	████	9
██	████	10

B. Projects Costs

As of December 2007, PEF had incurred approximately \$329 million in capital costs for the Crystal River projects. This figure includes approximately \$301 million in contract billings, \$21 million of owner’s costs, and \$7 million of AFUDC. The contract billings include payments for: major construction work, design and engineering work, procurement of major equipment, and environmental permits.

C. Uncertainties

While a significant amount of study, engineering, and analysis has been completed and construction has begun on the Crystal River projects, there are still a number of uncertainties that could affect project schedules and the 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:

- **Current and future craft labor availability:** The current market for craft labor is in short supply due to the high number of ongoing complex construction projects. The risk is that EPCR could potentially have difficulty staffing enough qualified onsite labor to complete the project according to schedule.
- **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.
- **Modification to ESP crane arrangement:** The proposed crane arrangement by General Electric/Aker Kvaerner (GE/AK) interferes with plant equipment as well as EPCR's outage lifting plans for the SCR duct and steel. PEF is working with GE/AK and EPCR to modify the lifting plans in order to monitor adherence to the critical path.
- **Condition of Certification (COC) Modification delay:** A lengthy delay in the potable water design could create a delay in receiving the necessary modifications to the existing Conditions of Certification for Crystal River Units 4 and 5.
- **Coal pile liner and/or settling pond liner not approved:** The design of the coal pile liner and the percolation pond liner must be approved by FDEP. If the submitted design is not approved, then redesign would be necessary with construction schedule slippage.

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 2007 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 two potential regulatory developments that have been the topic of discussion since the Commission's final order in Docket No. 070007-EI.

A. 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. Since PEF's 2007 CAIR filing, Governor Crist issued Executive Order 07-127 directing FDEP to promulgate regulations requiring reductions in utility carbon dioxide (CO₂) emissions. However, no such regulations have been adopted to date. FDEP currently is still in the early stages of developing a plan for implementing the Governor's CO₂ emission reduction goals. Numerous key issues, including the basic approach (i.e., cap-and-trade v. carbon tax or fee) remain unresolved. Until legislation is enacted or regulations are adopted at the state or federal level, the potential impact of CO₂ regulation will remain uncertain.

At this time, there are 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. Carbon capture and sequestration technology has never been utilized on an electric generating unit. Until numerous technological, regulatory and liability issues are resolved, it will be impossible to determine whether carbon capture and sequestration would be a feasible or cost-effective means of complying with a CO₂ regulatory regime, particularly when the requirements of the yet-to-be-adopted regulatory regime remain unknown.

Replacing coal-fired generation from Crystal River Units 4 and 5 with lower CO₂-emitting natural gas-fired combined cycle generation³ would not be feasible or cost-effective in light of the imminent 2009 and 2010 CAIR deadlines. Due to construction and permitting lead times, sufficient combined-cycle generation could not be placed on-line until the 2014-2015 timeframe. Thus, if PEF were to abandon Plan D in favor of replacing Units 4 and 5 with gas-fired generation, 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 4 and 5 with gas-fired generation would decrease PEF's fuel diversity and potentially increase fuel price volatility.

B. Recent Developments Related to CAMR

As noted above, the U.S. Court of Appeals for the District of Columbia (D.C.) Circuit recently issued an opinion vacating the federal CAMR regulations. *See, New Jersey v. U.S. Environmental Protection Agency*, ___ F. 3d ___, 2008 WL 341338 (D.C. Cir. Feb. 8, 2008). In 2005, 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 2000 finding that mercury emissions from electric utilities 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.

³ 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.

If the D.C. Circuit's opinion stands, EPA will be required to re-evaluate whether utility mercury emissions should be regulated under CAA Section 112 and, if so, to adopt new rules establishing MACT standards. EPA has not announced any rulemaking schedule in response to the D.C. Circuit's decision. Thus, it is impossible to predict when EPA will begin the regulatory process, much less the date any rulemaking will be finalized. 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.

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 discussion of potential regulation of CO₂ emissions continues, no legislation or 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. Furthermore, replacing coal-fired generation from Crystal River Units 4 and 5 with lower CO₂-emitting natural gas-fired combined cycle generation would not be feasible or cost-effective in light of the imminent 2009 and 2010 CAIR deadlines. Although EPA may be required to adopt new standards for utility mercury 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 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.