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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

DIRECT TESTIMONY OF

PATRICIA Q. WEST

ON BEHALF OF

PROGRESS ENERGY FLORIDA

DOCKET NO. 110007-EI

April 1, 2011

Q. Please state your name and business address.

A. My name is Patricia Q. West. My business address is 299 First Avenue North, St. Petersburg, FL 33701.

Q. By whom are you employed and in what capacity?

A. I am employed by the Environmental Services and Strategy Department of Progress Energy Florida ("Progress Energy" or "Company") as Manager of Environmental Services / Power Generation Florida.

Q. What are your responsibilities in that position?

A. I am responsible for ensuring that environmental technical and regulatory support is provided to Power Generation Florida for the implementation of compliance strategies associated with the environmental requirements for power generation facilities in Florida.

COM 5
APA 1
ECR 7
GCL 1
RAD 1
SSC
ADM
OPC
CLK CLP

1 **Q. What current PSC-approved projects are you responsible for?**

2 **A.** I am responsible for Pipeline Integrity Management (Project No. 3);
3 Aboveground Storage Tank Secondary Containment (Project No. 4), Phase II
4 Cooling Water Intake (Project No. 6), CAIR Peaking - Demand (Project No.
5 7.2), Arsenic Groundwater Standard (Project No. 8), Underground Storage
6 Tanks (Project 10), Modular Cooling Towers (Project No. 11), Thermal
7 Discharge Permanent Cooling Tower (Project No. 11.1), Greenhouse Gas
8 Inventory and Reporting (Project No. 12), Mercury Total Daily Maximum
9 Loads Monitoring (Project No. 13), Hazardous Air Pollutants (HAPs) ICR
10 Program (Project No. 14), and the Effluent Limitation Guidelines ICR Program
11 (Project No. 15).

12
13 **Q. What is the purpose of your testimony?**

14 **A.** The purpose of my testimony is to explain material variances between the
15 Actual project expenditures and the Estimated/Actual cost projections for
16 environmental compliance costs associated with three approved projects within
17 my areas of responsibility. In addition, I am sponsoring Exhibit No. __ (PQW-
18 1), which is PEF's review of the efficacy of its Integrated Clean Air Compliance
19 Plan and of retrofit options in relation to expected environmental regulations.

20
21 **Q. Which projects have a material variances for which you be providing
22 variance explanations?**

23 **A.** I will provide an explanation for the Pipeline Integrity Management Program
24 (Project 3), aspects of PEF's Integrated Clean Air Compliance Program within

1 my area of responsibility (Project 7.2), and PEF's Effluent Limitation
2 Guidelines ICR Program (Project 15) for the period January 2010 through
3 December 2010.
4

5 **Q. Please explain the variance between the actual project expenditures and the**
6 **Estimated/Actual projections for the Pipeline Integrity Management**
7 **(Project No. 3) for the period January 2010 to December 2010.**

8 A. The operation and maintenance ("O&M") expenditures for the Pipeline Integrity
9 Management program expenditures were \$269,104 or 24% lower than projected
10 in the Estimated/Actual filing. This variance is primarily attributable to repair
11 projects that were anticipated to be started and completed during the third and
12 fourth quarter of 2010 not being completed until the first quarter of 2011.
13

14 **Q. Please explain the variance between the actual project expenditures and the**
15 **Estimated/Actual projections for the CAIR Combustion Turbine Predictive**
16 **Emissions Monitoring Systems (Project No. 7.2) for the period January**
17 **2010 to December 2010.**

18 A. The CAIR Combustion Turbine Predictive Emissions Monitoring Systems
19 O&M expenditures were \$20,401 or 30% lower for this program than projected
20 in the Estimated/Actual filing. This variance is attributable to reduced costs for
21 software maintenance and a lower number of recertification tests than were
22 originally anticipated.
23

1 **Q. Please explain the variance between the actual project expenditures and the**
2 **Estimated/Actual projection for the Effluent Limitation Guidelines ICR**
3 **Program (Project No. 15) for the period January 2010 to December 2010.**

4 A. Expenditures for the Effluent Limitation Guidelines ICR Program were \$38,824
5 or 65% lower than projected. This variance is attributable to contractor costs
6 being less than originally expected due to the availability of PEF employees to
7 support the data gathering and survey response preparation.

8
9 **Q. In Order No. PSC 10-0683 -FOF-EI issued in Docket 100007-EI on**
10 **November 15, 2010, the Commission directed PEF to file as part of its**
11 **ECRC true-up testimony “a yearly review of the efficacy of its Plan D and**
12 **the cost-effectiveness of PEF’s retrofit options for each generating unit in**
13 **relation to expected changes in environmental regulations.” Has PEF**
14 **conducted such a review?**

15 A. Yes. PEF’s yearly review of the Integrated Clean Air Compliance Plan is
16 provided as Exhibit No. __ (PQW-1)

17
18 **Q. Please summarize the conclusions of PEF’s review.**

19 A. Based on project milestones achieved to date, PEF remains confident that Plan
20 D will have the desired effect of achieving timely compliance with the
21 applicable regulations in a cost-effective manner. No new or revised
22 environmental regulations have been adopted that have a direct bearing on
23 PEF’s compliance plan. Although FDEP initiated the process of developing a
24 cap-and-trade program to regulate carbon dioxide (“CO₂”) emissions over a year

1 ago, no regulations have been adopted to date and there currently are no
2 demonstrated retrofit options to reduce CO₂ emissions from fossil fuel-fired
3 electric generating units. For these reasons, PEF's Plan D continues to
4 represent the most cost-effective alternative for achieving and maintaining
5 compliance with the applicable regulatory requirements. PEF will continue to
6 evaluate future compliance options in light of EPA's ongoing development of
7 MACT standards for coal and oil-fired generating units.

8

9 **Q. Does this conclude your testimony?**

10 **A. Yes it does.**

Progress Energy Florida

Review of Integrated Clean Air Compliance Plan

**Submitted to the
Florida Public Service Commission**

April 1, 2011



Progress Energy

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Executive Summary

In the 2007 Environmental Cost Recovery Clause (ECRC) Docket (No. 070007-EI) and as reaffirmed in the 2008, 2009 and 2010 ECRC Dockets (Nos. 080007-EI, 090007-EI and 100007-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 2011.

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

Sulfur Dioxide (SO₂):

- Installation of wet scrubbers, flue gas desulfurization 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:

- Crystal River Unit 5 SCR in service in June 2009;
- Completion of the SCR Common project in July 2009;
- Crystal River Unit 5 FGD in service in December 2009;
- Crystal River FGD Common in service in December 2009; and
- Crystal River Unit 4 SCR/FGD in service in May 2010;

All of the Crystal River Unit 4 & 5 projects are now in-service and the targeted environmental benefits have been met or exceeded. The Unit 4 & 5 SCRs reduce NO_x emissions by approximately 90%. The Unit 4 & 5 FGDs remove 97% of the Sulfur Dioxide (SO₂).

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 Maximum Achievable Control Technology (MACT) standards for coal and oil-fired electric generating units. EPA released its proposed MACT rule on March 16, 2011 and PEF is actively assessing the rule.

I. Introduction

In its Final Order in the 2007 ECRC Docket (No. 070007-EI) and as reaffirmed in the 2008, 2009 and 2010 ECRC Dockets (Nos. 080007-EI, 090007-EI and 100007-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 2010 activities.

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 began 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, to the Commission. 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 2010, the Commission approved PEF's annual Review of Integrated Clean Air Compliance Plan. Order No. PSC-10-0683-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 included 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, these components of the plan are no longer expected to be necessary in order to achieve the lowest overall cost when the cost of allowances and other relevant fuel selections are considered.

2. CAIR NO_x Plan

The primary component of PEF's NO_x compliance plan is the installation of LNBS and SCR systems on Crystal River Units 4 and 5. To achieve compliance with CAIR, PEF has taken strategic advantage of CAIR's cap-and-trade feature by purchasing some annual and ozone season NO_x 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 NO_x 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 required.

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 included switching to low-sulfur oil and the installation of LNBS at Anclote Units 1 and 2 or other alternative NO_x 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. The modeling of air emissions from Anclote Units 1 and 2 supported FDEP's exempting these units from CAVR. 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 completed installation of Plan D's controls on Crystal River Units 4 and 5 as contemplated in PEF's 2010 ECRC filing. Since the submittal of last year's annual review, PEF has achieved the following project milestones:

ACHIEVED CAIR COMPLIANCE MILESTONES

Coal Pile Runoff Treatment System in service	Feb 10
FGD Settling Ponds in service	Feb 10
Chimney installation complete	Mar10
Unit 4 Absorber complete	Mar 10
Dibasic Acid System in service	Apr 10
Unit 4 SCR Duct work Tie-in complete	May 10
Unit 4 FGD Duct work Tie-in complete	May 10
Unit 4 SCR mechanical completion	May 10
Unit 4 FGD mechanical completion	May 10
Acid Mist Mitigation System in service	May 10
Crystal River Unit 4 SCR in service	May 10
Crystal River Unit 4 FGD in service	May 10

B. Projects Costs

During 2010, PEF incurred approximately \$62 million in capital costs for the Crystal River projects. The 2010 figure includes approximately \$47 million in contract billings, \$9 million of owner's costs, and \$6 million of AFUDC. As of December 2010, the life-to-date capital costs were approximately \$1,243 million. This figure includes approximately \$1,073

million in contract billings, \$43 million of owner's costs, and \$127 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, costs are on track to be completed within the overall budget.

C. Uncertainties

PEF successfully completed installation of controls on Crystal River Units 4 and 5. The project is now in the close-out phase which includes, among other things, completing the punch-list, demobilization and site restoration. The primary risk remaining on the PEF CAIR compliance projects is associated with the timing of project close-out activities while the plant is operating; however, emergent risks could still occur. Project contingency has been developed to cover these unknowns, and PEF employees 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 until EPA revises or replaces the CAIR. *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. In July 2010, EPA proposed the Transport Rule, which would replace CAIR with a new, limited cap-and-trade program for SO₂ and NO_x. A final Transport Rule is expected in the summer of 2011. The rule is expected to be at least as stringent as the CAIR; therefore, PEF's Integrated Clean Air Compliance Plan will continue to be necessary.

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 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. As required by Consent Decree, EPA promulgated a proposed electric generating unit (EGU) MACT on March 16, 2011, and a final rule must be in place no later than November 16, 2011. *See 74 Fed. Reg. 55547* (Oct. 28, 2009). To that end, in 2010 the EPA 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 final 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. 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. A number of

bills that would regulate greenhouse gas (GHG) emissions have been introduced to Congress over the past several years, but to date none have passed both houses. In the meantime, EPA has begun implementation of a regulatory approach to reducing GHG emissions through the Clean Air Act. However, 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. As of May 2010, PEF has placed in service all of the Plan D major components.

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. 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.

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.