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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

DIRECT TESTIMONY OF

PATRICIA Q. WEST

ON BEHALF OF

PROGRESS ENERGY FLORIDA

DOCKET NO. 130007-EI

April 1, 2013

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 (PEF) as Manager of Generation Environmental Field Support Services.

Q. What are your responsibilities in that position?

A. Currently, my responsibilities include ensuring that environmental technical and regulatory support is provided during the development and implementation of environmental compliance strategies for power generation facilities in Florida.

Q. Please describe your educational background and professional experience.

COM 5
AFD 1
APA 1
ECO 1
ENG 4
GCL 1
IDM
TEL
CLK 1-C+Prep

1 A. I obtained my Bachelor of Arts degree in Biology from New College of the
2 University of South Florida in 1983. I was employed by the Polk County Health
3 Department between 1983 and 1986 and by the Florida Department of
4 Environmental Protection (FDEP) from 1986 - 1990. At FDEP, I was involved
5 in compliance and enforcement efforts associated with petroleum storage
6 facilities. I joined Florida Power Corporation in 1990 as an Environmental
7 Project Manager and then held progressively more responsible positions through
8 the merger with Carolina Power and Light, and more recently through the
9 merger with Duke Energy when I assumed my current position as Manager of
10 Generation Field Support Services.

11

12 **Q. Have you previously filed testimony before this Commission in connection**
13 **with Progress Energy Florida's Environmental Cost Recovery Clause**
14 **(ECRC)?**

15 A. Yes.

16

17 **Q. What is the purpose of your testimony?**

18 A. The purpose of my testimony is to explain material variances between the actual
19 project expenditures and estimated/actual cost projections for environmental
20 compliance costs associated with PEF's Pipeline Integrity Management (PIM)
21 Program (Project 3), aspects of PEF's Integrated Clean Air Compliance Program
22 within my area of responsibility (Project 7.2), Best Available Retrofit
23 Technology (BART) (Project 7.5), National Pollutant Discharge Elimination
24 System (NPDES) (Project 16) and Mercury & Air Toxics Standards (MATS) –

1 CR 4&5 (Project 17) for the period January 2012 through December 2012. In
2 addition, I am co-sponsoring Exhibit No. __ (PQW-1), PEF's review of the
3 efficacy of its Integrated Clean Air Compliance Plan and retrofit options in
4 relation to expected environmental regulations, as outlined in sections I, II, III,
5 IV (parts A and B.3), V and VI. Mr. Ben Borsch is sponsoring section IV (parts
6 B, 1 and 2, C and D). These sections of the exhibits are true and accurate.

7
8 **Q. Please explain the variance between actual project expenditures and**
9 **estimated/actual projections for Pipeline Integrity Management (PIM) for**
10 **the period January 2012 to December 2012.**

11 A. Pipeline Integrity Management operation and maintenance (O&M) costs were
12 \$1,124,385 or 81% lower than the Estimated/Actual Filing. This variance is
13 primarily due to the cancellation of a substantial number of "5 year assessment"
14 projects and postponement of two major "Florida Department of Transportation
15 (FDOT) highway support" projects. The "5 year assessment" projects were
16 cancelled given the planned Anclote Gas Conversion and limited need to operate
17 the pipeline. PEF decided to reduce the Maximum Operating Pressure (MOP)
18 of the pipeline from 960 psig to 450 psig to decrease O&M costs and preserve
19 pipeline safety in conjunction with operating restrictions. Reducing the MOP
20 allows PEF to still use the pipeline during any period of time when there may be
21 a need to transfer oil to the Anclote station. PEF discussed the regulatory
22 implications of this decision with the U.S. Department of Transportation
23 Pipeline and Hazardous Material Safety Administration (PHMSA) auditor
24 during the May 2012 audit of the Pipeline Programs. The "FDOT highway

1 support” projects planned for later 2012 were subsequently postponed by FDOT
2 until 2013.

3

4 **Q. Please explain the variance between actual project expenditures and**
5 **estimated/actual projections for the CAIR Combustion Turbine Predictive**
6 **Emissions Monitoring Systems for the period January 2012 to December**
7 **2012.**

8 A. The CAIR Combustion Turbine Predictive Emissions Monitoring Systems
9 O&M costs were \$37,365 or 27% lower than the Estimated/Actual Filing. This
10 variance is primarily attributed to the payments for air emissions testing
11 performed at Bartow and Higgins stations in accordance with 40 CFR Part 75,
12 Appendix E being made in 2013 instead of 2012 as originally projected in the
13 Estimated/Actual Filing.

14

15 **Q. Please explain the variance between actual project expenditures and**
16 **estimated/actual projections for Best Available Retrofit Technology**
17 **(BART) for the period January 2012 to December 2012.**

18 A. BART O&M costs were \$50,468 or 187% higher than the Estimated/Actual
19 Filing. This variance is attributed to legal and environmental consulting services
20 required to support negotiations with the FDEP to obtain necessary permits for
21 Crystal River Units 1 and 2. The need to perform sulfur dioxide (SO₂)
22 emissions modeling is in support of the FDEP ongoing work to amend its State
23 Implementation Plan as directed by the Environmental Protection Agency. The
24 need for this type of effort was referenced in the May 14, 2012 update of PEF’s

1 Integrated Clean Air Compliance Plan, and my August 1, 2012 Direct
2 Testimony and Exhibit No. PQW-1 (page 9) in Docket 120007-EI.

3

4 **Q. Please explain the variance between actual project expenditures and**
5 **estimated/actual projections for the NPDES project for the period January**
6 **2012 to December 2012.**

7 A. NPDES O&M costs were \$50,229 or 22% lower than the Estimated/Actual
8 Filing. This variance is attributable to FDEP changes to and approval of a plan
9 of studies (POS) for cooling water intake investigations being conducted at the
10 Suwannee, Anclote and Bartow power stations in accordance with Section
11 316(a) of the Clean Water Act. Suwannee's POS sampling schedule was
12 reorganized to incorporate 2012 winter sampling events. Anclote's POS has not
13 been approved by FDEP. Bartow's POS was approved during the third quarter
14 of 2012 and implemented during the fourth quarter of 2012.

15

16 NPDES recoverable capital costs were \$24,166 or 45% lower than the
17 Estimated/Actual Filing. This variance is the result of a delay in the project to
18 allow for nitrogen Waste Load Allocation (WLA) approval from the Tampa Bay
19 Nitrogen Consortium. This approval was necessary for FDEP to approve the
20 substantial NPDES permit modification for the installation of an internal surface
21 water outfall for discharge of process wastewater at the Bartow power station.
22 PEF submitted a permit modification application to FDEP in September 2012,
23 and the WLA was issued in October 2012. FDEP issued a draft permit

1 modification to PEF in January 2013 with a final permit expected early in the
2 second quarter of 2013.

3
4 **Q. Please explain the variance between actual project expenditures and**
5 **estimated/actual projections for MATS for the period January 2012 to**
6 **December 2012.**

7 A. MATS recoverable capital costs were \$33,121 or 87% lower than the
8 Estimated/Actual Filing. This variance is primarily the result of a reduction in
9 the level of mercury monitoring activities on Crystal River Units 4 and 5 from
10 what was included in the Estimated/Actual Filing. Monitoring of mercury
11 emission levels via the use of carbon traps was determined to be acceptable for
12 the purpose of initial data acquisition to assess the units' emissions so that
13 compliance options could be evaluated. Therefore, no additional monitoring
14 system equipment was installed in 2012. Assessment of mercury and other
15 pollutants regulated by MATS is ongoing and PEF will continue to apprise the
16 Commission on the progress of these assessments and any compliance actions
17 that may be required. This will include the evaluation of any additional
18 monitoring system equipment that may be necessary to monitor, report and/or
19 comply with MATS.

20
21 **Q. In Order No. PSC 10-0683 -FOF-EI issued in Docket 100007-EI on**
22 **November 15, 2010, the Commission directed PEF to file as part of its**
23 **ECRC true-up testimony “a yearly review of the efficacy of its Plan D and**
24 **the cost-effectiveness of PEF’s retrofit options for each generating unit in**

1 **relation to expected changes in environmental regulations.” Has PEF**
2 **conducted such a review?**

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

5
6 **Q: Is PEF evaluating any options to extend the operation of Crystal River**
7 **Units 1 and 2 beyond the MATS compliance dates?**

8 A: Yes. PEF is evaluating alternative fuel options that would allow Crystal River
9 Units 1 and 2 to continue operating in compliance with MATS for a limited
10 period of time. PEF plans to schedule and obtain permits for operational tests in
11 2013 to determine how the units perform with alternative coals. If these tests
12 are successful, it may be possible for PEF to extend Crystal River Units 1 and 2
13 operations to the 2018-2020 timeframe in compliance with MATS.

14
15 **Q: What is the estimated cost of alternative coals testing?**

16 A: The preliminary cost estimate to perform alternative coal trials on Crystal River
17 Units 1 and 2 is about \$1 million. A refined cost estimate will be provided to the
18 Commission as part of the 2013 ECRC Estimated/Actual filing.

19
20 **Q: When would alternative coals testing costs be incurred?**

21 A: PEF expects to incur all costs for the alternative coal trials in 2013.

22
23 **Q: How would these costs be recovered?**

1 A: Consistent with the Petition filed simultaneously with this testimony, PEF
2 proposes to recover costs for alternative coal testing on Crystal River Units 1
3 and 2 through the ECRC consistent with other MATS activities.

4
5 **Q. Please summarize the conclusions of PEF's review of its Integrated Clean
6 Air Compliance Plan.**

7 A: PEF installed emission controls contemplated in its CAIR Plan on time and
8 within budget. The Flue Gas Desulfurization (FGD) and Selective Catalytic
9 Reduction (SCR) system have enabled PEF to comply with CAIR requirements
10 and will continue to be the cornerstone of PEF's integrated air quality
11 compliance strategy. PEF is confident that the approved Plan, along with
12 compliance strategies under development, will enable it to achieve and maintain
13 compliance with all applicable regulations, including MATS, in a cost effective
14 manner. PEF is evaluating additional compliance options in light of MATS and
15 other regulatory developments affecting fossil fuel-fired electric generating
16 units. The results of the analyses performed to date are discussed in Exhibit No.
17 __ (PQW-1), as well as the testimony of Benjamin Borsch.

18
19 **Q. Does this conclude your testimony?**

20 A. Yes.

Progress Energy Florida, Inc.

Review of Integrated Clean Air Compliance Plan

**Submitted to the
Florida Public Service Commission**

April 1, 2013



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Acronyms

ACI – Activated Carbon Injection
BART – Best Available Retrofit Technology
CAIR – Clean Air Interstate Rule
CAMR – Clean Air Mercury Rule
CAVR – Clean Air Visibility Rule
CO₂ – Carbon Dioxide
CSAPR – Cross-State Air Pollution Rule
EPA – Environmental Protection Agency
EGU – Electric Generating Unit
ESP – Electrostatic Precipitator
FDEP – Florida Department of Environmental Protection
FGD – Flue Gas Desulfurization
GHG – Greenhouse Gas
ID Fan – Induced Draft Fan
LNB – Low NO_x Burner
MATS – Mercury and Air Toxic Standards
NERC – National Electric Reliability Council
NO_x – Nitrogen Oxides
PAC – Powdered Injection Carbon
PM – Particulate Matter
PJFF - Pulse Jet Fabric Filter
SCR – Selective Catalytic Reduction
SIP – Site Implementation Plan
SO₂ – Sulfur Dioxide

Executive Summary

In the 2007 Environmental Cost Recovery Clause (ECRC) Docket (No. 070007-EI) and as reaffirmed in all subsequent ECRC Dockets (Nos. 080007-EI, 090007-EI, 100007-EI, 110007-EI, and 120007-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), Clean Air Mercury Rule (CAMR), 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 2013.

The primary original components of PEF's 2006 Compliance Plan D included:

Sulfur Dioxide (SO₂):

- Installation of wet scrubbers, flue gas desulfurization (FGD) system 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 in 2017

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 applicable regulatory requirements. The Plan was designed to strike 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 continued to review the efficacy of Plan D and the cost-effectiveness of retrofit options in relation to expected changes in environmental regulations. With regard to efficacy, Plan D remains the cornerstone of PEF's efforts to comply with applicable air quality regulations in a cost-effective manner. Crystal River Units 4 and 5 FGD and SCR projects are now in-service and the targeted environmental benefits are being met or exceeded.

As indicated in last year's ECRC proceeding, the U.S. Court of Appeals for the District of Columbia had stayed the effect of the Cross-State Air Pollution Rule (CSAPR) that the U.S. Environmental Protection Agency (EPA) had recently proposed to replace CAIR, leaving CAIR in effect until the court completed its review of CSAPR. In August 2012 the D.C. Circuit Court of Appeals vacated the CSAPR in its entirety, and in January 2013, the court denied EPA's petition for a rehearing of the court's decision. Therefore, the CAIR will continue to be in effect for the foreseeable future until EPA adopts a valid replacement rule.

Additionally, on February 16, 2012, EPA issued the new Mercury and Air Toxics Standards (MATS) to replace the vacated CAMR for emissions from coal and oil-fired electric generating units (EGUs), including, potentially, PEF's Anclote Units 1 and 2, Suwannee Units 1, 2, and 3, and Crystal River Units 1, 2, 4, and 5. The following summarizes the results of PEF's MATS compliance analyses for these units:

Anclote Units 1 & 2: PEF determined that the most cost-effective option for PEF's Anclote Units 1 and 2 is to convert the units to fire 100% natural gas rather than install emission controls in order to comply with the new MATS. The Commission approved PEF's petition for ECRC recovery of costs associated with the Anclote Conversion Project in Docket 120103-EI.

Suwannee Units 1, 2 & 3: PEF determined that no further modifications are needed on Suwannee Units 1, 2 and 3 in order to comply with MATS, as they are currently capable of operating on 100% natural gas.

Crystal River Units 4 & 5: PEF anticipates that the FGDs and SCRs at Crystal River Units 4 and 5 will allow those units to comply with the new MATS, but testing is being

conducted to confirm expected performance levels and to determine if trim systems or emission chemical additive systems might be needed to ensure mercury emissions performance.

Crystal River Units 1 & 2: With respect to Crystal River Units 1 and 2, the Company has completed its analysis of two primary compliance options: installing emission controls (including Dry FGD, SCR, and Activated Carbon Injection (ACI) systems) and early retirement of the units. As discussed in Section IV of this report, based on the current state of technology, the Company has determined that it is more cost effective to retire the units and replace the generation with alternative sources. To ensure that PEF can continue to provide reliable service in compliance with applicable regulations, including National Electric Reliability Council (NERC) standards, PEF is considering seeking a one-year extension of the MATS compliance date, so that the units can continue running until April 2016. It is anticipated that this extension will be needed to allow time to make changes necessary on the transmission system, and provide flexibility and options to the Company as it moves forward with securing purchased power in the short term. At the same time, given the potential transmission system limitations that may limit the reliable supply of purchased power, the Company is evaluating whether a fuel switch at Crystal River Units 1 and 2 is a feasible and cost-effective means to allow the units to continue running for a limited period of time in compliance with MATS until new generation can be built. PEF has not made a decision to use alternative fuels to continue operating the units, but will continue to evaluate the operating requirements to preserve the option.

Although EPA has begun implementation of a regulatory approach to reducing greenhouse gas (GHG) emissions through the Clean Air Act, there currently are no GHG emission standards applicable to PEF's existing units. Moreover, there are still no retrofit options commercially available to reduce carbon dioxide (CO₂) emissions from fossil fuel-fired EGUs.

PEF is confident that the emission controls installed pursuant to Plan D, along with compliance strategies under development and discussed further in this Plan, will enable the Company to achieve and maintain compliance with all applicable environmental regulations in a cost-effective manner.

I. Introduction

In its Final Order in the 2007 ECRC Docket (No. 070007-EI) and as reaffirmed in all subsequent ECRC Dockets (Nos. 080007-EI, 090007-EI, 100007-EI, 110007-EI, and 120007-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 *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 2013.

II. Regulatory Background

The CAIR and CAVR programs required PEF and other utilities to significantly reduce emissions of sulfur dioxide (SO₂) and nitrogen oxides (NO_x). CAIR contemplates emission reductions in incremental phases. Phase I began in 2009 for NO_x and in 2010 for SO₂. Phase II is scheduled to begin in 2015 for both NO_x and SO₂. As noted later in this Plan, CAIR was remanded by the courts in 2008, but remains in place while EPA works on an acceptable replacement rule. The current status of permitting and implementing the Best Available Retrofit Technology (BART) requirements under CAVR is provided in part D of this section of this Plan. The CAMR originally required reduction of mercury emissions at a system level and installation of mercury monitors. As discussed later in this Plan, however, CAMR was vacated in early 2008 and on February 16, 2012, EPA published a final MATS rule.

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 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. Since 2007, the Commission has approved PEF's annual Review of Integrated Clean Air Compliance Plan in the final orders rendered in each annual ECRC docket. See Order No. PSC-12-0613-FOF-EI, at 16-17 (Nov. 16, 2012); PSC-11-0553-FOF-EI, at 13-14 (Dec. 7, 2011); Order No. PSC-10-0683-FOF-EI, at 6-7 (Nov. 15, 2010); Order No. PSC-09-0759-FOF-EI, at 18 (Nov. 18, 2009); Order No. 08-0775-FOF-EI, at 11 (Nov. 24, 2008).

A. Status of CAIR and CSAPR

In July 2008, the U.S. Circuit Court of Appeals for the District of Columbia (D.C. Circuit) issued a decision vacating CAIR in its entirety. *North Carolina v. EPA*, 531 F.3d 896 (D.C. Cir. 2008). However, the Court subsequently decided to remand CAIR without vacatur, thereby leaving the rule and its compliance obligations in place until EPA revises or replaces CAIR. *North Carolina v. EPA*, 550 F.3d 1176 (D.C. Cir. 2008). EPA subsequently adopted CSAPR to replace CAIR by publication in the *Federal Register* in August 2011. 76 Fed. Reg. 48,208 (Aug. 8, 2011).

In Order No. PSC-11-0553-FOF-EI issued in Docket No. 110007-EI on December 7, 2011, the Commission addressed the impact of CSAPR on PEF's recovery of NOx emission allowance costs. Because CSAPR would no longer allow PEF to use NOx allowances previously obtained under CAIR for compliance effective January 1, 2012, the Commission established a regulatory asset to allow PEF to recover the costs of its remaining NOx allowance

inventory over a three year amortization period. However, on December 30, 2011, the D.C. Circuit Court of Appeals stayed CSAPR, leaving CAIR in effect until the court completed its review of the new rule. Thus, PEF continued to maintain its NOx allowance inventory in order to comply with CAIR. Pursuant to the stipulation approved in Order No. PSC-11-0553-FOF-EI, PEF continued to expense NOx allowance costs incurred to comply with CAIR based on actual usage consistent with current practice. In August 2012 the D.C. Circuit Court of Appeals vacated the CSAPR in its entirety, and in January 2013, the court denied EPA's petition for a rehearing of the court's decision. *See, EME Homer City Generation, L.P. v. EPA*, 696 F.3d 7 (D.C. Cir. 2013). Therefore, CAIR continues to be in effect for the foreseeable future until EPA adopts a valid replacement rule.

B. Vacatur of CAMR and Adoption of MATS

In February 2008, the D.C. Circuit vacated the CAMR regulation and rejected EPA's delisting of coal-fired EGUs from the list of emission sources that are subject to Section 112 of the Clean Air Act. *See, New Jersey v. EPA*, 517 F. 3d 574 (D.C. Cir. 2008). As a result, in lieu of CAMR, EPA was required to adopt new emissions standards for control of various hazardous air pollutant emissions from coal-fired EGUs. *Id.* EPA issued its proposed rule to replace CAMR on March 16, 2011, with publication following in the *Federal Register* on May 3, 2011. *See* 76 Fed. Reg. 24976 (May 3, 2011). On February 16, 2012, EPA published the final rule, which requires compliance by April 16, 2015. The rule establishes new MATS limits for emissions of various metals and acid gases from both coal and oil-fired EGUs. The new standards apply to all existing coal and oil-fired EGUs including PEF's Crystal River Units 1, 2, 4, and 5, Anclote Units 1 and 2, and Suwannee Units, 1, 2, and 3. Compliance generally must be achieved within three years of EPA's adoption of the standards (i.e., 2015), although the Clean Air Act authorizes permitting authorities to grant one-year compliance extensions in certain circumstances.

In the 2011 ECRC docket, the Commission recognized that EPA's adoption of the new MATS for EGU's would require PEF to modify its Integrated Clean Air Compliance Plan. Order No. PSC-11-0553-FOF-EI, at 11 (Dec. 7, 2011). Accordingly, consistent with the Commission's expectation that utilities "take steps to control the level of costs that must be incurred for environmental compliance," Order No. PSC-08-0775-FOF-EI, at 7 (Nov. 24, 2008),

the Commission approved PEF's request to recover costs incurred to assess EPA's proposed rule, to prepare comments to the EPA, and to develop compliance strategies within the aggressive regulatory timeframes proposed by EPA. Specifically, in 2011 and 2012, PEF requested and the Commission approved costs to perform emission testing, and engineering and other analysis necessary to develop compliance strategies at Crystal River Units 4 and 5. Results of 2012 analyses support the expectations stated in the 2012 Integrated Clean Air Plan that the FGDs and SCRs at Crystal River Units 4 and 5 allow those units to comply with the new MATS standards. However, PEF is conducting additional testing to confirm expected performance levels and to determine if trim systems or emission chemical additive systems might be needed to ensure mercury emissions performance. PEF will continue to apprise the Commission on progress of these assessments and any compliance actions that may be required as more information is gathered. PEF also completed its analysis of the impact of the new MATS on Suwannee Units 1, 2 and 3 and determined that no further modifications are needed on those units, as they are currently capable of operation on 100% natural gas. In Docket 120103-EI, the Commission approved PEF's request for ECRC recovery of costs associated with the conversion of Anclote Units 1 and 2 to 100% natural gas fired capability as part of PEF's MATS compliance strategy. Finally, with respect to MATS compliance for Crystal River Units 1 and 2, as detailed in Section IV below, PEF has determined that the most cost-effective compliance option, given the current state of technology, is to retire the units. Due to potential constraints with replacing the power from the units, PEF is also analyzing the option to burn alternative fuels in the short term to achieve compliance and extend the life of the units for a limited time period.

C. Greenhouse Gas Regulation

In 2007, then-Governor Crist issued Executive Order 07-127 directing the Florida Department of Environmental Protection (FDEP) to promulgate regulations requiring reductions in utility 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. However, FDEP did not adopt any cap-and-trade rules, and the Legislature subsequently repealed the 2008 law. Likewise, although a number of bills that would regulate GHG emissions have been introduced to Congress over the past several years, 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. At this time, however, there are no GHG emission standards applicable to PEF's existing generating units. Moreover, 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 storage 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. Moreover, replacing coal-fired generation from Crystal River Units 4 and 5 with lower CO₂-emitting natural gas-fired combined cycle generation is not a viable option at this late date, particularly given the fact that PEF has placed in service the Plan D components.

D. Status of BART

In 2009, FDEP issued a permit imposing BART requirements for particulate matter emissions from Crystal River Units 1 and 2. The 2009 permit did not impose BART requirements for SO₂ and NO_x emissions because, at the time, EPA assumed that compliance with CAIR would satisfy BART requirements for SO₂ and NO_x. Following the adoption of CSAPR, in early 2012 EPA revised its previous determination to replace the "CAIR satisfies BART" assumption with "CSAPR satisfies BART." Although the CSAPR was subsequently vacated, leaving CAIR in effect, EPA has yet to revise its determination back to "CAIR satisfies BART" and, in any event, must still eventually replace CAIR. Therefore, the determination that "CAIR satisfies BART" for SO₂ and NO_x is currently unresolved and ultimately will no longer be valid when EPA adopts a replacement for CAIR. As a result, in 2012, PEF worked with FDEP to develop and finalize air construction permits to address SO₂ and NO_x emissions from Crystal River Units 1 and 2 in support of FDEP's development of a revised Regional Haze State Implementation Plan (SIP) to address CAVR requirements for SO₂ and NO_x. The permits call for the installation of Dry FGD and SCR no later than January 1, 2018, or within 5 years of the effective date of EPA's approval of the Florida Regional Haze SIP, whichever is later, or alternatively the discontinuation of the use of coal in Crystal River Units 1 and 2 by December 31, 2020. FDEP subsequently submitted to EPA a revised Regional Haze SIP containing unit-

specific determinations for SO₂ and NO_x, including the new permit requirements for Crystal River Units 1 and 2. Thus, assuming EPA takes final action approving Florida's Regional Haze SIP, PEF would maintain the option to install emission controls in lieu of retiring Crystal River Units 1 and 2 if the assumptions underlying the economic analysis in Section IV of this report were to change significantly. EPA has proposed to approve the FDEP's revised Regional Haze SIP, but final action is not due until the end of June 2013. *See 77 Fed. Reg. 73369 (Dec. 10, 2012).*

III. PEF's Integrated Clean Air Compliance Plan

PEF's original compliance plan (Plan D) will continue to help PEF meet 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. The controls installed in accordance with Plan D will continue to be the cornerstone of PEF's compliance strategy with the adoption of MATS and other ongoing regulatory efforts. Specific components of the Plan are summarized below.

A. FGD Systems

The most significant component of PEF's Integrated Clean Air Compliance Plan is the installation of FGD systems, also known as wet scrubbers, on Crystal River Units 4 and 5 to comply with SO₂ requirements of CAIR, Title IV of the Clean Air Act, and SO₂ control requirements in PEF's air permits for Crystal River Units 4 and 5. Together with the SCR systems discussed below, the FGDs also reduce mercury and other air toxic emissions and, therefore, will be a key component of PEF's MATS compliance strategy. Preliminary analyses indicate that the co-benefits of the FGDs and SCRs reduce mercury emissions by approximately 80%.

B. SCR & Other NO_x Controls

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. These controls enable PEF to comply with CAIR and other NO_x control requirements included in PEF's air permits for Crystal River Units 4 and

5. As discussed above, the SCRs also will help achieve MATS requirements for mercury. To achieve compliance with CAIR, PEF also has taken strategic advantage of CAIR's cap-and-trade feature by purchasing some annual and ozone season NOx allowances.

C. Additional MATS Compliance Strategies

PEF has determined that the most cost-effective option for PEF's Anclote Units 1 and 2 is to convert the units to fire 100% natural gas rather than install emission controls in order to comply with the new MATS for oil-fired EGUs. This was approved by the Commission in Docket 120103-EI. PEF's current estimate of the cost to convert the Anclote units is \$94.3 million. As explained in more detail in Mr. George Hixon's testimony, filed simultaneously with this Plan, the project cost has increased because further engineering demonstrated that changes to the units' forced draft (FD) fans were needed to maintain unit output. However, conversion to 100% natural gas firing remains the most cost-effective option for MATS compliance at the Anclote units.

PEF will utilize the co-benefits of the existing FGD and SCR systems as the primary MATS compliance measure for Crystal River Units 4 and 5, but PEF is conducting tests to confirm expected performance levels and to determine if trim systems or emission chemical additive systems might be needed to ensure mercury emissions performance. With respect to Suwannee Units 1, 2 and 3, PEF intends to comply with MATS by running the units exclusively on natural gas. PEF has completed its evaluation as to the most cost-effective MATS compliance option for Crystal River Units 1 and 2. A detailed summary of that evaluation is contained in Section IV below.

D. Visibility Requirements

PEF operates four units that are potentially subject to BART under CAVR: Anclote Units 1 and 2 and Crystal River Units 1 and 2. Based on modeling of air emissions from Anclote Units 1 and 2, those units are exempt from BART for particulate matter. Because the modeling results for Crystal River Units 1 and 2 showed visibility impacts at or above regulatory threshold levels, PEF obtained a BART permit in 2009 for particulate matter for those units. This permit established a combined BART particulate matter emission standard for Crystal River Units 1 and 2 that must be demonstrated by October 1, 2013. As discussed above, in 2012, FDEP issued air

construction permits addressing SO₂ and NO_x requirements for Crystal River Units 1 and 2 in support of FDEP's development of a revised Regional Haze SIP.

IV. Evaluation of MATS Compliance Options for Crystal River Units 1 and 2

In order to comply with the new MATS and other environmental compliance requirements at Crystal River and maintain reliable service to its customers, PEF has determined that the most cost effective approach to compliance would be to retire Crystal River Units 1 and 2 and replace the generation with alternative sources, as summarized in this section. Given PEF's projected system requirements and other planned retirements, PEF will need to replace the generation, and evaluations of purchased power and new generation options are currently underway to determine the most reasonable and cost effective approach. Transmission grid modifications will also likely be required as a result of the unit retirements.

A. Overview of Compliance Requirements

As noted above, in February 2012 EPA issued the final MATS rule, which imposes significant compliance requirements for the coal-fired units at Crystal River. Additionally, in September and October 2012, FDEP issued new SO₂ and NO_x permits for Crystal River Units 1 and 2, which added strict new emissions requirements and compliance deadlines in accordance with the state's revised Regional Haze Plan. Based on these new regulatory requirements, the Company has been reassessing its compliance strategy for Crystal River Units 1 and 2.

MATS Compliance: The final MATS rule defines emissions performance requirements for coal and oil fired electric utility generators (EGU's). The new MATS Rule replaces the old CAMR and eliminates the cap-and-trade approach for mercury and other controlled pollutants. The MATS rule establishes emissions limits for a wide range of metals and gases (applicable hazardous air pollutants) which were established to define the Maximum Achievable Control Technology (MACT) performance levels for existing and new units. PEF is focusing on direct measurement of mercury, SO₂ (and/or HCl), and particulate matter (PM) for assurance of

compliance with specific MATS limits for release of mercury, acid gases and non-condensable particulate, respectively.

Table A-1 MATS Compliance Limits

			MATS Limit	Averaging Period
Hg	MATS Limit	lb/TBtu	1.2	30 day
	Alternate Limit	lb/TBtu	1.0	90 day
Filterable PM	MATS Limit	lb/MMBtu	0.030	30 day
HCl	MATS Limit	lb/MMBtu	0.002	30 day
SO ₂	MATS Limit	lb/MMBtu	0.2	30 day

Note: The SO₂ limit is an allowed surrogate limit to demonstrate compliance with limits for acid gases.

For Crystal River Units 1 and 2 to meet these limits as stand-alone units, PEF would need to install substantial additional emission control systems. PEF is also exploring the use of the site-wide averaging provisions of the MATS rule which allow for averaging of selected regulated emissions across co-located units at a plant site, like Crystal River.

FDEP's Regional Haze Plan Requirements: As discussed above, in support of its effort to develop a revised Regional Haze SIP addressing CAVR requirements for SO₂ and NO_x, FDEP issued PEF an air permit for Crystal River Units 1 and 2 which requires the Company to either add Dry FGD and SCR systems to the units within certain time-frames or discontinue use of coal in the units by December 2020.

B. Compliance Alternatives

PEF cannot continue to operate the Crystal River Units 1 and 2 beyond the MATS compliance date without implementation of additional measures to bring the units into compliance with MATS. The two main options that PEF considered were: (1) installing new emission control systems to reduce NO_x, SO₂ and mercury emissions and (2) retiring the units and replacing the generation. While PEF has determined that retirement of the units and replacing the generation with alternative sources is the most cost-effective option, PEF is also considering whether an alternate fuel could be burned at Crystal River Units 1 and 2, to allow the units to continue to operate without installing high cost new emission controls. Such operation

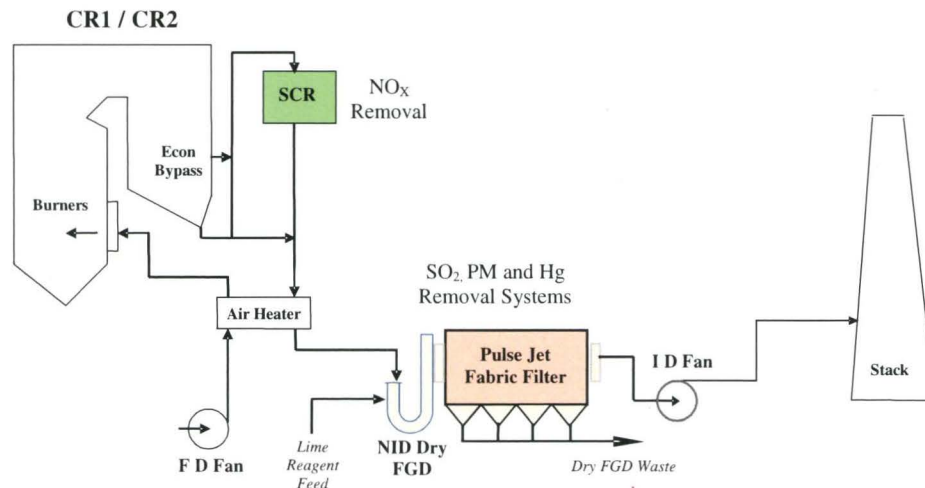
would be in compliance with the MATS, but cease coal fired operation consistent with the permit requirement for retirement if additional controls are not installed.

1. Emission Controls Alternative

Crystal River Units 1 and 2 meet all current regulatory requirements for emission controls with low NO_x burner systems (with overfire air) and electrostatic precipitators (ESPs) for particulate control. Under the provisions of the original CAIR/CAMR rules, Crystal River Units 1 and 2 would have been permitted to continue operating in essentially their current configuration utilizing reduced sulfur fuel and participating in the cap-and-trade provisions of the rules to meet overall system emission limits. With the recent FDEP permit requirements for SO₂, new emission controls would ultimately be required to be in-service to support the 2018 reasonable progress date in Florida's Regional Haze Plan.

The Crystal River Units 1 and 2 emission controls project plan that was developed for long term compliance requires installation of SCR, Dry FGD, and Pulse Jet Fabric Filter (PJFF) systems for each of the Crystal River Units 1 and 2. With the proposed new system configuration, the flue gas for each unit would exit the economizer and be ducted to new SCR's to remove NO_x before entering the air heaters. Flue gas from each unit would then exit the air heater and travel through the new Dry FGD and PJFF systems to the Induced Draft (ID) Fans before being discharged to a new stack. The Dry FGD system and particulate removal systems are based on an Alstom Power design called the "NID System" with Pulse Jet Fabric Filters. Figure 1.1 is a simplified diagram of the Crystal River Units 1 and 2 in the proposed new configuration.

Figure 1.1. Proposed Boiler and Emission Controls System Configuration



In the new configurations, the existing ESPs would no longer be used for particulate control and would be removed to make room for the new equipment. Due to the extremely limited space availability, the existing precipitators, ID Fans, and stacks would also be removed. The necessary removal of the existing equipment prior to new construction would result in substantial unit outages, as noted in the summary project schedule provided below.

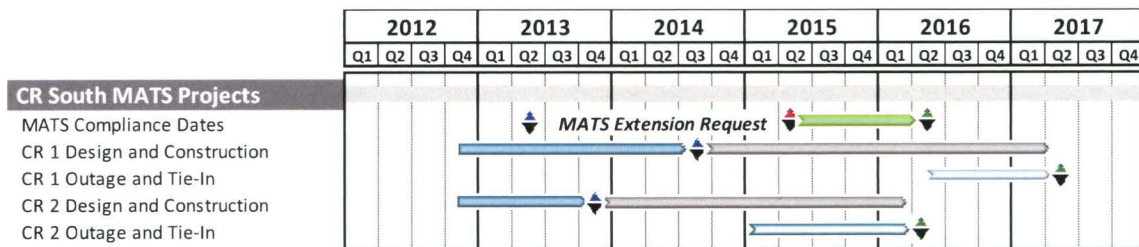
PEF also commissioned Worley Parsons to prepare the initial engineering, design, and layout, and to provide guidance on major equipment selection, initial project scope, schedules and estimates for the Crystal River Units 1 and 2 Clean Air Compliance Projects. The Company's estimating group reviewed the Worley Parsons study and provided supplemental information to complete the initial cost projections, which are consistent with a Class 5 estimate with an approximate accuracy of +/- 30%. Given the complexity and time constraints for these projects, it is likely that the actual costs for these projects would be on the high side of the estimate.

Table B-1. Air Compliance Projects Cost Estimate

CR South Clean Air Compliance Projects			
Project Cost Estimates in \$Millions (nominal)			
	CR 1	CR 2	Total
<i>Construction EPC Subtotal</i>	290	362	651
<i>Owner's Cost and Contingency</i>	71	89	161
<i>Project Contingency</i>	<u>36</u>	<u>45</u>	<u>81</u>
<i>Project Total (\$2010)</i>	397	496	893
<i>Projected Escalation</i>	<u>60</u>	<u>62</u>	<u>121</u>
Total In-Service Cost	457	558	1,015

PEF then prepared a milestone schedule for the conceptual plan to retrofit Dry FGD/PJFF and SCR systems. This schedule reflects an aggressive, outage driven work plan which reflects the approach necessary to construct the equipment – after demolition clears the way for the construction. The Unit 2 systems would be constructed first, with a 15 month total outage duration envisioned for the demolition and construction of Unit 2 equipment. Demolition and construction of the Unit 1 equipment would take approximately 13 months.

Figure 2-1. Crystal River Units 1 and 2 Clean Air Compliance Projects – Schedule Overview



In addition, the plant operations team, with assistance from engineering and construction, developed lifecycle cost projection studies for Crystal River Units 1 and 2 addressing the emission compliance projects with a holistic view of life extension and modernization costs required to prepare the plant for an additional 25 years of reliable operations.

Additional capital cost allowances of roughly \$225 million were included in the years preceding, during and just after the new compliance systems are placed in service to accommodate life extension and modernization projects required. In the late part of this decade and early 2020's, capital allowances of roughly \$330 million were also included to address water policy compliance costs (e.g. new cooling water intake requirements under section 316(b) of the Clean Water Act). This high level estimate is reasonable for planning purposes, based on PEF's early analysis of the rules.

The lifecycle cost studies also addressed the increased level of complexity inherent in an updated scrubbed plant and provided cost projections associated with operating expenses and maintenance capital costs, for both the existing and new plant systems. These detailed projections, which reflect the cyclic, periodic nature of some of the more significant operating costs, carry through the extended remaining life of the units to a projected new retirement date of 2041. These projections were used to support the economic analysis of alternatives and are reasonable for planning purposes and high level analysis.

2. Crystal River Units 1 and 2 Retirement Alternative

The Company has taken the advancing age, physical limitations and long term economic feasibility of significant new investments in Crystal River Units 1 and 2 into consideration in its compliance options review. As an alternative to the plant life extension investments discussed above, PEF's planning, development and engineering teams completed a series of studies defining economic options for replacement power and system infrastructure requirements if the Crystal River Units 1 and 2 were shut down. These findings are summarized in this section and reflect the basis of the assumptions used in the economic analyses of alternatives.

Transmission Grid Requirements: The planning and development teams addressed concerns identified in the system thermal and stability studies performed for the plant shut down scenarios. In the current planning environment, with Crystal River Unit 3 not returning to service, plans to shut down the Crystal River Units 1 and 2 create a

significant power need and cause material challenges on the transmission system. For purposes of the economic feasibility studies, budget planning estimates in a cost range of \$175 to \$200 million were used to characterize a reasonable range of significant transmission upgrades likely required on PEF's system when Crystal River Units 1 and 2 shut down. The actual costs for the transmission solutions required will ultimately depend on the final selections for replacement generation options and the timing of those resource additions, which are decisions that are currently under review.

Power Generation Operations Florida (PGOF) Requirements: Crystal River Units 1 and 2 were the first units built at the site, so there are common systems that are integrated into site operations that will need to be addressed when Crystal River Units 1 and 2 are shut down. Some of the site systems currently slated to be addressed include the Crystal River Units 1 and 2 coal yard and Site Electrical Distribution System, Helper Cooling Tower controls and supporting power feeds, and the site communications systems and instrument towers. An allowance of \$10 to \$15 million has been assumed for these related costs.

Replacement Power Requirements: If the Company elects to shut down Crystal River Units 1 and 2, there are a variety of power resource options under consideration to address the timing and scope of replacement power needs, including both purchased power and self build options. Shutting down Crystal River Units 1 and 2 eliminates roughly 900 MW of coal-fired baseload generation which will ultimately need to be replaced to meet reliability and economic needs on the system. Specific recommendations for replacement power are actively being developed and pursued by the Company's planning and development teams. For the purposes of the long term comparative economic evaluation of alternatives, the replacement capacity and energy is assumed to be a blend of natural gas combined cycle and peaking energy which is reasonable for planning purposes and representative of the options PEF is pursuing.

Crystal River Units 1 and 2 Retirement Date: The Company's 2012 Ten Year Site Plan includes retirement of Crystal River Units 1 and 2 at the end of 2020. This is consistent

with current plant permits, which require, at a minimum, cessation of uncontrolled coal-fired operations at that time. For planning purposes in these evaluations, PEF assumed an April 2016 retirement date, in accordance with provisions in the MATS rule and based on a presumption that a one-year compliance extension is needed to address system reliability issues and will be granted by the FDEP. While the Company is actively evaluating options for new combined-cycle generation, likely in the 2018 timeframe, an April 2016 retirement would likely require bridge power purchases and other actions to ensure that system resource and reserve requirements are met. The Company is also investigating options to continue Crystal River Units 1 and 2 operations for a limited period if the limited term MATS compliance alternatives prove to be feasible. The viability and cost of the options for bridge power purchases, transmission system requirements, limited continued Crystal River Units 1 and 2 operations and new generation are all being considered to establish a reasonable path forward to ensure cost effective and reliable service. Once these investigations have been completed, a recommendation for the planned retirement date for the Crystal River Units 1 and 2 units will be finalized.

3. Crystal River Units 1 and 2 Limited Term MATS Compliance

As noted, the Company is evaluating limited term options for extending operation of Crystal River Units 1 and 2 beyond the MATS compliance dates utilizing alternate fuels that support MATS compliance. The evaluation of alternate fuel options is being pursued to identify options that would allow Crystal River Units 1 and 2 to continue operating in compliance with the MATS (and BART) requirements, with limited new investment, until replacement generation resources can be completed to meet system needs. The MATS rule allows for site-wide emissions averaging which would potentially allow continued use of coal at Crystal River Units 1 and 2, provided that the plants can reliably operate at levels below the new MATS limits. PEF is studying operational viability and economic feasibility of several low constituent coals and coal blends for potential site-wide MATS compliance scenarios, but results are not yet available. Planning is currently underway to schedule and obtain permits for operational tests in 2013 to determine how the units perform with the alternate coal(s) being considered, and with additional

reagents, if necessary to meet the MATS and BART compliance limits. These tests are necessary at this time to support PEF's ongoing compliance evaluations and to ensure the feasibility of this compliance option. The cost of performing these compliance feasibility tests has been estimated to be in the range of \$1.0 million. In all of these scenarios, coal-fired operations would cease before the end of 2020. The initial long term planning studies addressing these limited term alternate fuel options point toward development of new combined cycle generation to replace Crystal River Units 1 and 2 as soon as practicable, which would allow the units to retire earlier, perhaps in the 2018 timeframe.

C. *Economic Feasibility Planning Analysis*

1. APPROACH TO THE ANALYSIS

In the analyses, PEF focused on the comparative economics of a scenario in which Crystal River Units 1 and 2 continue to operate through 2041, equipped with significant life extension upgrades, state of the art emission control systems and a long term supply of low cost coal, versus a scenario where Crystal River Units 1 and 2 are retired in 2016. The preferred approach to long term comparative economic studies, and the approach used most often in regulatory review proceedings, is the comparison of system operations and investment costs between various alternatives and a characterization of the results in terms of the present value of annual and cumulative revenue requirements (PVRR and CPVRR). The revenue requirements approach provides a long range perspective of costs from the customers' perspective which is a fundamental consideration in regulatory reviews of alternatives.

The Company's Integrated Resource Planning group used the comparative PVRR approach in this review to provide the differential CPVRR results between the two primary alternatives. The study referenced in this Plan was conducted in October 2012 using planning forecasts and standard key assumptions that were current at that time. The base (reference) case was evaluated using the corporate mid-range fuel price forecasts, corporate forecasts for the cost of capital, projections for emission allowances and a proxy forecast for potential CO₂ allowance costs that were all used in the 2012 regulatory studies. Sensitivities reflecting higher gas prices and/or no CO₂ allowance costs were also prepared for comparison. The initial planning case referenced the 2012 Ten-Year Site Plan to establish the baseline for PEF's generation fleet,

purchase power resources, firm system demand and energy requirements. In the long term compliance alternative, the retirement dates for Crystal River Units 1 and 2 were extended from 2020 to 2041. In the retirement alternative, Crystal River Units 1 and 2 were retired in 2016 and replaced with a combination of purchased power and new generation.

2. ECONOMIC ANALYSIS – RESULTS

The results of the base case and sensitivity scenario analysis reflect the long range, or life cycle cost differences between the two primary compliance alternatives. The comparisons are expressed as a difference in the CPVRR values calculated (in 2012) for each alternative scenario over the planning period in the study.

In the base case analysis (corporate mid-range fuel prices, proxy forecast for potential CO₂ allowance costs) the lifecycle projected system cost (CPVRR) for the option of retiring Crystal River Units 1 and 2 was \$1.32B lower overall than the system CPVRR for the option of installing the environmental controls, i.e. a projected system savings, of approximately \$1.3 billion in 2012 dollars.

Three additional sensitivities were examined to explore the impacts of sustained high natural gas prices, and to see the results without the costs for CO₂ allowances considered. The high gas sensitivity forecast used is a statistical high range forecast of fuel prices provided by PEF's fuels group based on measures of volatility. Figure 3.1 below provides a summary of the results of six scenarios which reflect the difference between the system CPVRR's for the option of retiring Crystal River Units 1 and 2 and the system CPVRR for the option of installing the environmental controls. A negative value implies that the retirement option is more cost effective than continued operations. The retirement alternative is favorable in all cases except for the high gas price, no CO₂ price case.

Table C-1. Scenario Sensitivity Results - CPVRR Differentials

<i>Crystal River Units 1 and 2 Retirement versus Crystal River Units 1 and 2 Life Extension</i> <i>(CPVRR Differential¹ ... Alternative 2 versus Alternative 1)</i>			
	Fuel Price Scenarios		
CO₂ Cost Scenarios	Low Gas	Mid Fuel	High Gas
No CO ₂ Price	<i>Favorable</i> ²	(995)	596
Corporate CO ₂ Proxy	<i>Favorable</i> ²	(1,317)	(731)
High CO ₂	<i>Favorable</i> ²	<i>Favorable</i> ²	<i>Favorable</i> ²

Note 1: Differential CPVRR values presented in \$M in \$2012

Note 2: These simulations were not run, but are "Favorable" based on observable trends in results

3. QUALITATIVE CONSIDERATIONS

In addition to the quantitative processes in the economic analysis, there are also important factors in the evaluation process that are more difficult to quantify and can be addressed at a qualitative level in the review. Some of the stronger factors weighing in both directions are summarized below. In addition, Table D-1 provides a summary overview of qualitative areas that were considered in the development of recommendations amongst alternatives for MATS compliance for Crystal River Units 1 and 2.

Factors Weighing Toward Retirement: While there were many factors considered, construction risk, facility age and condition, and long term operability were weighted as the most negative considerations for the addition of emissions controls and life extension. While the project estimates provided funding for plant modernization, the units would be nearing 50 years of age by the time the projects would be completed and the current condition of the units are not conducive to continued operations for an additional 25 years. Also, the physical layout is very tight and construction of the emissions control systems would be quite involved and would require extensive unit outages to accommodate the removal of most of the ducts, fans and stacks beyond the air heaters.

Factors Weighing Toward Life Extension: If Crystal River Units 1 and 2 are retired, PEF will lose some of its fuel diversity, which is a factor that has value in the long run. Conceptually, the Company has considered replacing Crystal River Units 1 and 2 with new high efficiency coal

generation, but this is not a viable option given the uncertainty surrounding new emissions and climate change regulations.

Table D-1. Qualitative Comparison of Alternatives

Crystal River 1 & 2 MATS Compliance Alternatives Analysis Qualitative Considerations Overview			
	Level	Life Extension	Retirement
Construction Risk	H	●	○
Facility Age and Condition	H	●	◐
Long Term Operability	M	◐	○
Permitting Approvals	M	◐	○
Fuel Diversity	M	○	◐
○ Most Favorable ● Least Favorable			

D. Results and Recommendations

1. SUMMARY OF FINDINGS

The Company's findings in the life-cycle cost analysis favor retirement of the older units at Crystal River. The costs and implementation challenges of retrofits and life extension are extensive, and the benefits do not outweigh the costs and the risks. Looking at the base case results, the compliance alternative is roughly \$1.3 billion more expensive over the long term study period than the alternative to shut the units down and replace the generation. When considering fuel and emissions sensitivity cases, the emissions controls alternative only becomes positive (as compared to retirement) in the case which presumes both long term high gas prices and no cost for carbon policy compliance. Both of these assumptions are unlikely based on current information.

In the qualitative assessment, the negative attributes of the emissions control alternative are significant. The plant is nearing 50 years of age, and the conditions of the units are not

conducive to an investment in continued operations for an additional 25 years. In addition, there are significant construction risks associated with installing emission controls at Crystal River Units 1 and 2, given the configuration of the units.

The Company's planning groups are also actively assessing options that may allow the Company to continue operations at Crystal River Units 1 and 2 for a limited period of time with an adoption of alternate fuels to reduce emissions. These investigations are still in progress and the options being studied have shorter design and implementation timelines. PEF plans to complete those evaluations and ultimately finalize plans for Crystal River Units 1 and 2 sometime in 2013.

2. CONCLUSIONS AND SELECTED PLAN

Long Term Compliance Alternative: Based on the results of the quantitative and qualitative analyses, retirement of Crystal River Units 1 and 2 and replacing generation is the preferable option from a number of perspectives in response to the MATS standards. Retirement is the least cost option on a cumulative present value revenue requirements basis in all scenarios except the unlikely high gas, no carbon scenario. In addition, the qualitative factors favor retirement over installation of emission controls on these aging units. The Company will continue to closely monitor legislative activity, rulemaking and court proceedings to ensure that its compliance plan for Crystal River Units 1 and 2 remains consistent with current policy.

Limited Term Alternate Fuel Options: The Company will continue its efforts to identify viable, cost effective alternate fuel compliance options, if they exist, to allow Crystal River Units 1 and 2 to continue operations until replacement generation capacity options can be implemented. It remains important to continue to pursue and refine the Company's understanding of alternate fuel options while the remaining assessments of power purchase and transmission system options are completed in 2013.

V. Efficacy of PEF's Plan D

A. Project Milestones

PEF completed installation of Plan D's controls on Crystal River Units 4 and 5 as contemplated in prior ECRC filings. Units 4 and 5 FGD and SCR projects are now in-service and the targeted environmental benefits have been met or exceeded. Units 4 and 5 SCRs reduce NO_x emissions by approximately 90% and Units 4 and 5 FGDs reduce SO₂ emissions by approximately 97%. The FGDs and SCRs have the combined effect of reducing emissions of mercury and other air toxics which will contribute to PEF's plans to comply with the new MATS.

As noted above, PEF has determined that converting Anclote Units 1 and 2 to fire 100% natural gas is more cost-effective than installing emission controls in order to comply with the new MATS for oil-fired units. PEF anticipates that the conversion of both Anclote Units will be completed by the end of calendar year 2013, while the necessary upgrade to the FD fans to maintain unit output will be completed in 2014. PEF is continuing to evaluate MATS compliance options for all of the Crystal River coal-fired units. These evaluations are now focused on the preferred approach for replacement power, transmission system requirements and operational compliance requirements for system operation following the retirement of Crystal River Units 1 and 2. Evaluations of alternative approaches are being conducted for the case in which PEF elects to extend operations at the units with a MATS compliant fuel option for a limited time period. Based on progress to date, PEF should complete these evaluations in 2013. PEF also completed its analysis of the impact of MATS on Suwannee Units 1, 2 and 3 and determined that no further modifications are needed on those units.

B. Projects Costs

Crystal River Units 4 and 5 FGD and SCR projects are now in-service, and the targeted environmental benefits have been met or exceeded. The Unit 4 and 5 SCRs reduce NO_x emissions by approximately 90%. The Units 4 and 5 FGDs remove 97% of the SO₂ emissions. Demobilization and site restoration have been completed. As noted above, PEF projects the costs of converting the Anclote units to fire 100% natural gas to be \$94.3 million. In addition, for Crystal River Units 1 and 2, PEF plans to spend an estimated \$1.0 million on compliance

feasibility tests to determine how the units perform with the alternate coal(s) being considered, and with additional reagents, if necessary to meet the MATS and BART compliance limits.

C. *Uncertainties*

The impacts of ongoing federal rulemaking activities on the compliance plan include:

The outcome of now pending regulation on cooling water intake structures (Clean Water Act Section 316(b)) could influence decisions with regard to control technologies to meet new standards. The rule is to be issued in July 2013 and, once its requirements are assessed in conjunction with new air regulations, compliance strategies may be altered.

EPA also is expected to issue updated Effluent Guidelines for electric power plants in 2013 with final adoption sometime in 2014. These guidelines are expected to affect decisions associated with the treatment of wastewater generated by wet FGDs.

As discussed above, in 2012 PEF worked with the FDEP to address the SO₂ and NO_x requirements in support of FDEP's development of a revised Regional Haze SIP. Although EPA has proposed to approve the revised SIP, final action is not due until June 2013.

VI. Conclusion

PEF has completed installation of the emission controls contemplated in its approved Plan D on time and within budget. The new FGD and SCR systems at Crystal River Units 4 and 5 have enabled PEF to comply with CAIR requirements and will continue to be the cornerstone of PEF's integrated air quality compliance strategy for years to come. PEF is confident that Plan D, along with compliance strategies under development, will enable the Company to achieve and maintain compliance with all applicable regulations, including MATS, in a cost-effective manner.