

State of Florida



Public Service Commission

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COMMISSION
CLERK
ALM

DATE: March 29, 2012

TO: Office of Commission Clerk (Cole)

FROM: Division of Economic Regulation (L'Amoreaux, Bulecza-Banks, Cicchetti, Franklin)
Office of the General Counsel (Klancke)

RE: Docket No. 100461-EI – Petition for approval of nuclear decommissioning cost study, by Progress Energy Florida, Inc.

AGENDA: 04/10/12 – Regular Agenda – Proposed Agency Action – Interested Persons May Participate

COMMISSIONERS ASSIGNED: All Commissioners

PREHEARING OFFICER: Edgar

CRITICAL DATES: None

SPECIAL INSTRUCTIONS: None

FILE NAME AND LOCATION: S:\PSC\ECR\WP\100461.RCM.DOC

Case Background

Nuclear Decommissioning

Decommissioning involves the process of dismantling and removing materials and equipment that are no longer used and useful but which remain following retirement of the nuclear generating unit. While the definition does not include the removal and disposal of spent fuel, on-site storage facilities for spent fuel are included. Decommissioning changes the licensing status of the nuclear power plant site from operational to possession-only, and possibly, at some future date, to unrestricted use.

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The primary objective of a decommissioning trust fund is to have enough money on hand at decommissioning to meet all required expenses at the lowest possible cost to utility ratepayers. No set of investment policies will meet this goal with certainty. The management of the fund, therefore, must be concerned with both the preservation of contributions and the purchasing power of the contributions. By Order No. 21928,¹ the Commission required that the fund's assets earn a consistent positive real return over a market cycle. The imposed minimum fund earnings rate has been at least the rate of inflation measured by the Consumer Price Index (CPI) over each five-year review period.

The Commission also approved the external sinking funding method by Order No. 21928.² In determining the annual provision for decommissioning, the current cost estimate is escalated to the expected dates of actual decommissioning. The escalation rate used can be determined from a variety of sources, including a combination of the general economic inflation rates and inflation rates for decommissioning labor, transportation, and burial of nuclear waste. Once the escalated decommissioning amount is known, a sinking fund annuity is calculated to determine the annual annuity. This annual annuity plus the earnings on the annuities, net of taxes, will grow to the escalated decommissioning amount.

Progress Energy Florida, Inc. (PEF or Company) provides for financial assurance through monthly contributions to its nuclear decommissioning trust funds.³ PEF's funds are held in trust with State Street Bank and Trust Company as trustee. PEF believes that its external sinking funds comply with the NRC's final rule and the Internal Revenue Service (IRS) requirements, and that reasonable financial assurance is provided that funds will be available for decommissioning.

The IRS has few requirements pertaining to the control of nuclear decommissioning funds. The IRS Regulations are silent as to how funds qualified under the Internal Revenue Code are to be managed. The IRS does require that in order for contributions to a Qualified Fund to be deductible for tax purposes, the Commission must specifically address certain issues, such as, the after-tax rate of return to be earned by the amounts collected for decommissioning, the total estimated cost of decommissioning, and the frequency of the contributions to the nuclear decommissioning fund for a tax year. Staff has addressed issues required by the IRS in Issues 1, 4, and 5 of this recommendation.

The Nuclear Regulatory Commission (NRC) accepts the following three decommissioning methods: prompt removal/dismantling (DECON), entombment (ENTOMB), and mothballing with delayed dismantling (SAFSTOR). One alternative to complete decommissioning involves repowering the electric generating system after the original nuclear steam supply has been isolated and decommissioned. The NRC recommends prompt

¹ See Order No. 21928, issued September 29, 1989, in Docket No. 870098-EI, In re: Petitions for approval of an increase in the accrual of nuclear decommissioning costs by Florida Power Corporation and Florida Power & Light Company. On June 20, 2001, Florida Power Corporation (FPC) was acquired by Carolina Power & Light Company and became Progress Energy Florida, Inc. (PEF), effective January 1, 2003.

² Id.

³ The monthly contribution at the present time is zero for PEF's nuclear unit.

dismantlement absent a clear showing of why a nuclear plant should be decommissioned on a delayed basis.

The NRC and this Commission have recognized the desirability of performing site-specific cost studies, since such studies account for factors unique to an individual nuclear unit. A major change was made in PEF's 1994 site-specific decommissioning cost study regarding the treatment of spent fuel generated during the operation of the nuclear unit.⁴ While the disposal of spent fuel assemblies (high-level waste) generated during a unit's operations is not considered a decommissioning expense, the presence of those assemblies on-site does affect the costs to decommission nuclear facilities. In light of uncertainties of the Department of Energy (DOE) meeting its 1998 deadline for the acceptance of spent nuclear fuel (SNF) or the 2010 date for a permanent high level waste repository, the Commission recognized in PEF's 1994 Nuclear Decommissioning Study that spent fuel may need to remain on-site long after decommissioning begins. Accordingly, an allowance for on-site dry storage costs was made in determining the decommissioning accruals for PEF's nuclear unit. The primary goal of requiring this allowance was to ensure that the money needed to fully decommission a nuclear unit is available when the plant is retired, and recovered from those customers who have benefitted from the low-cost nuclear generation. However, the Commission found that these costs should continue to be reviewed periodically.

Effective January 30, 2001, Rule 25-6.04365, Florida Administrative Code (F.A.C.), was promulgated.⁵ This rule requires each utility that owns a nuclear unit to file a nuclear decommissioning study at least once every five years, prescribes the method of calculating the accumulation of decommissioning accruals, establishes fund performance guidelines, and requires notification of communications with the NRC about major milestones concerning license renewal.

By Order No. PSC-02-0136-CO-EI,⁶ issued January 30, 2002, the Commission revised PEF's annual decommissioning accruals to \$7,654,524.⁷ Subsequently, the Commission approved a Stipulation, in Order No. PSC-02-0655-AS-EI,⁸ issued May 14, 2002 that, among other things, suspended PEF's nuclear decommissioning accruals through the settlement period ending December 31, 2005.

By Order No. PSC-05-0945-S-EI,⁹ issued September 28, 2005, the Commission approved a Stipulation and Settlement that continued the suspension of PEF's nuclear decommissioning

⁴ See Order No. PSC-95-1531-FOF-EI, issued December 12, 1995, in Docket No. 941352-EI, In re: Petition for approval of increase in accrual for nuclear decommissioning costs by Florida Power Corporation. (1994 PEF Nuclear Decommissioning Study)

⁵ Docket Nos. 810100-EI, 870098-EI, and 941352-EI.

⁶ See Order No., issued, in Docket No. 001835-EI, In re: Petition for approval of revised annual accrual for nuclear decommissioning costs by Florida Power Corporation; and Docket No. 991931-EG, In re: Determination of appropriate method of recovery for the last core of nuclear fuel for Florida Power & Light Company and Florida Power Corporation. (2000 PEF Nuclear Decommissioning Studies)

⁷ The effective date for PEF's revised accruals was January 1, 2001.

⁸ See Order No. PSC-02-0655-AS-EI, issued May 14, 2002, in Docket No. 000824-EI, In re: Review of FPC's earnings including effects of acquisition by Carolina Power & Light.

⁹ See Order No. PSC-05-0945-S-EI, issued September 28, 2005, in Docket No. 050078-EI, In re: Petition for rate increase by Progress Energy Florida, Inc. (2005 PEF Settlement)

annual accruals. This Stipulation and Settlement approved PEF's 2005 nuclear decommissioning study and provided that PEF's next decommissioning study was due on or before July 31, 2009.

In PEF's 2009 rate case,¹⁰ the Commission found that the issues associated with PEF's 2008 nuclear decommissioning study should be deferred from the rate case and addressed at the same time as Florida Power & Light's (FPL's) 2010 nuclear decommissioning study. While PEF was not required to prepare a new site-specific decommissioning cost study, it was required to update its 2008 study by incorporating the most currently available escalation rates. On December 13, 2010, PEF filed its updated nuclear decommissioning study. As part of the Settlement Agreement approved in Order No. PSC-12-0104-FOF-EI, PEF is required to place its nuclear unit, Crystal River Unit 3 (CR3), in extended cold shutdown effective January 1, 2011, at which time depreciation and other accruals will be suspended or reversed until the unit is returned to commercial operation or retired.¹¹ In addition, PEF is required to file a Depreciation Study, Fossil Dismantlement Study, and Nuclear Decommissioning Study on or before July 31, 2017.

End of Life Materials and Supplies and Last Core of Nuclear Fuel

In its review of the 2000 PEF Nuclear Decommissioning Study, the Commission first addressed the recovery of the level of materials and supplies (M&S) inventories and unburned fuel (Last Core) expected to remain at the end of a nuclear unit's life (EOL). The Commission found that these unrecovered costs are unique to the nuclear unit and are the direct result of the unit's shut down. However, the Commission recognized that these costs do not satisfy the intent of nuclear decommissioning because they do not involve the removal of the plant facility. The Commission concluded that the unrecovered costs associated with EOL M&S inventories and Last Core should be amortized over the remaining life span of the site. Such recovery would ratably allocate the costs to those receiving the benefit of the nuclear generation and avoid a burdensome expense at the time of unit shut down.

The Commission found that the amortization of the costs associated with EOL M&S inventories should be accounted for as a debit to nuclear maintenance expense with a credit to an unfunded Account 228 reserve. For the EOL Last Core's costs, the Commission found that the amortization should be recorded as a base rate fuel expense with a credit to an unfunded Account 228 reserve. The annual amortization expense for PEF relating to the EOL Last Core costs was \$1.1 million. The annual amortization expense relating to M&S inventories was \$1.5 million. The Commission concluded that for administrative ease, PEF should address these associated EOL costs in subsequent decommissioning studies so the related annual amortization expense could be revised, if warranted.

Although PEF's 2005 decommissioning study was approved by the 2005 PEF Settlement, that study did not address EOL M&S or Last Core amortizations. The amortization amounts approved in the 2000 decommissioning study, thus, were continued to be recorded.

¹⁰ See Order No. PSC-10-0131-FOF-EI, issued March 5, 2010, in Docket No. 090079-EI, In re: Petition for increase in rates by Progress Energy Florida, Inc. (2009 PEF Rate Case)

¹¹ See Order No. PSC-12-0104-FOF-EI, issued March 8, 2012, in Docket No. 120022-EI, In re: Petition for limited proceeding to approve stipulation and settlement agreement by Progress Energy Florida, Inc.

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The Commission is vested with jurisdiction over these matters through several provisions of Chapter 366, Florida Statutes, including sections 366.04, 366.05, 366.06.

Discussion of Issues

Issue 1: Should the currently approved annual nuclear decommissioning accruals for Progress Energy Florida be revised?

Recommendation: No. A review of the PEF's current site-specific decommissioning cost study indicates that decommissioning base cost estimates have increased since the 2005 cost study. However, as discussed in Issue 4, assumptions relating to escalation rates and inflation forecasts, support the position that the currently approved zero annual decommissioning accrual does not need to be revised at this time. Additionally, staff recommends that the assumptions included in PEF's 2010 decommissioning study are reasonable. (L'Amoreaux)

Staff Analysis: PEF has filed an updated site-specific decommissioning cost study. The purpose of this study is to recognize developments and changes affecting decommissioning cost estimates, and to consider such factors as additional information, improvements in technology, and regulatory changes that have transpired since the last decommissioning study.

Operating Licenses

The existing license expiration date for CR3 is December 3, 2016. On March 9, 2009, the NRC docketed, or accepted for review, PEF's application for a 20-year renewal of the operating license for CR3, which would extend the operating license through 2036, if approved. The current cost study assumes that the unit will operate through this extended license period.

Decommissioning Methods

Consistent with PEF's 2000 and 2005 cost studies, PEF's current study continues to utilize the DECON decommissioning method. PEF believes the DECON decommissioning method is the most cost-effective and most reasonable means for terminating the license for the site in the shortest possible time.

Decommissioning Cost Estimates

The major cost drivers to the overall decommissioning costs are related to changes in program management and spent fuel storage. While the scope may not have changed, there are differences in the base assumptions since the 2005 study.

As with its previous decommissioning cost studies, PEF commissioned TLG Services Inc. (TLG) to develop the decommissioning base cost estimates. These estimates are based on a number of assumptions, including regulatory requirements, project contingencies, low-level radioactive waste disposal practices, high-level radioactive waste management options, and site restoration requirements. The estimates assume a five and one-half year cooling period for the spent nuclear fuel (SNF) that resides on-site when operations cease. Once cooled, the SNF will be transferred to either a DOE site or to an independent spent fuel storage installation (ISFSI) for interim storage. The cost estimates also include the dismantling of site-structures and non-essential facilities, and limited site restoration.

TLG uses a unit factor method¹² for estimating decommissioning activity costs. These unit factors capture site-specific costs, the most current worker productivity in decommissioning activities, and lessons learned from other decommissioning projects. Unit factors for concrete removal, steel removal, and cutting costs were developed using local labor rates. Activity-dependent costs were estimated with item quantities developed from plant drawings and inventory documents. Removal rates and material costs for conventional disposal relied on information available from R.S.Means.¹³

The overall estimate to decommission CR3 increased by approximately 22 percent over the 2005 study. Program management increased \$94.8 million, removal-related activities increased \$19.0 million and low-level radioactive waste disposal increased by \$9.4 million. Spent fuel management costs decreased due to extending plant operations by an additional 20 years, which allowed a significant portion of the spent fuel to be transferred directly to DOE and reduced the cost of on-site, interim storage by \$21 million.

Program Management

Program management is the largest contributor to overall decommissioning costs. PEF states in its current study that “The magnitude of the expense is a function of both the size of the organization required to manage decommissioning, as well as the duration of the program.” In addition to changes in staffing levels and general increase in wages and benefits, extending CR3 licensed operating life and a larger security force results in changes to program management costs.

In January 2007, the NRC approved a final rule that enhanced its security regulations governing the design basis threat (DBT). This rule imposed security requirements similar to those previously imposed by the Commission’s April 29, 2003, DBT Orders. However, the new rule also modified and enhanced the DBT based on experience and insight gained by the Commission during implementation of the Orders, and extensive consideration of the factors specified in the Energy Policy Act of 2005. Based on the industry’s response to the NRC’s rulemaking, security forces for decommissioning have been increased.

Removal-related activities

Consistent with the decontamination-related activities, the higher craft labor rates contributed to the increase in removal activities by \$19.0 million. Higher labor rates accounted

¹² The unit factor method of estimating costs is based on activity costs (i.e., costs to decontaminate and remove components for disposal), period-dependent costs (e.g., management staff for the duration of the program), and collateral costs (e.g., insurance and taxes). These costs include labor, equipment, materials, energy, and services. In addition, the effect of salvage and scrap values and contingencies are incorporated into the estimate. Unit factors for concrete removal (\$/cubic yard), steel removal (\$/ton), and cutting costs (\$/inch) are developed using local labor rates. The activity-dependent costs are estimated with the item quantities (cubic yards and tons), developed from plant drawings and inventory documents. Each activity such as cutting pipe, segmenting vessels, demolishing concrete, transporting and disposing of wastes, is individually cost estimated. The unit factors are expressed in terms of the cost per cut, cost per cubic foot demolished, cost per trip, or cost per cubic yard of burial. The unit costs factors are applied to the inventory of plant equipment and structures to be removed from each nuclear unit to develop a cost estimate.

¹³ Robert Snow Means Company, Inc., “Building Construction Cost Data 2010,” Kingston, Massachusetts.

for \$6.3 million of the increase. In addition, higher costs for heavy equipment (including operating costs), supplies, and dismantling tooling and materials costs added \$12.7 million to the estimate.

Low-level radioactive waste (LLRW) disposal

The contaminated and activated material generated in the decontamination and dismantling of a nuclear reactor is classified as LLRW, although not all of the material is suitable for “shallow-land” disposal. Amendments of 1985 to the Low-Level Radioactive Waste Policy Act required states to become responsible for the disposition of LLRW generated within their own borders.

Until recently, there were two facilities available to PEF for disposal of LLRW generated by CR3: one facility in South Carolina and one in Utah. As of July 1, 2008, however, the facility in Barnwell, South Carolina was closed to generators outside the Atlantic Compact.¹⁴ This leaves the facility in Clive, Utah, operated by Energy Solutions as the only available destination for LLRW requiring controlled disposal. Energy Solution’s facility does not have a license to dispose of Class B or C radioactive waste, which is more highly radioactive than Class A. In the current decommissioning cost study, Energy Solutions’ facility was used as the basis for estimating the disposal cost for the majority of PEF’s radioactive waste (Class A).

Spent Fuel Management

The Nuclear Waste Policy Act of 1982 (NWPA) committed the DOE to accept SNF and high-level radioactive waste (HLRW) by January 31, 1998, under the Standard Disposal Contracts with waste generators. However, the DOE has announced delays in the program schedule several times. To date, the DOE has not accepted any spent fuel or high-level waste, as required by NWPA and utility contracts.

The DOE submitted its license application to the NRC on June 3, 2008, seeking authorization to construct a repository at Yucca Mountain, Nevada. The NRC formally docketed the DOE’s license application on September 8, 2008, triggering a three-year deadline, with a possible one-year extension, set by Congress for the NRC to decide on whether to authorize construction. However, on March 3, 2010, the DOE filed a motion with the NRC to withdraw the application for the repository with prejudice. This case is still pending at the NRC.

The current study includes costs to operate and maintain an ISFSI at the nuclear site. A decrease in spent fuel management costs resulted from extending plant operations an additional 20 years, thus allowing a significant portion of the spent fuel to be transferred directly to the DOE and reducing the cost of on-site, interim storage, by \$21 million. PEF assumes in its study that DOE will commence repository operation in 2020. CR3 fuel is projected to be removed beginning in 2024 and the process is expected to be completed by the year 2072.

¹⁴ The Atlantic Compact is comprised of the states of Connecticut, New Jersey, and South Carolina.

Other factors

Transportation and decontamination estimates have increased since the 2005 cost study. Transportation increases are due to a combination of higher tariffs and fuel surcharges. The increase in decontamination estimates are associated with higher craft labor rates, and higher costs for heavy equipment, supplies, and dismantling tooling and material costs.

Conclusion

While a review of PEF's site-specific decommissioning cost study indicates that decommissioning base cost estimates have increased since 2005, assumptions relating to escalation rates and inflation forecasts, as discussed in Issue 4, indicate that PEF's currently approved zero annual decommissioning accrual does not need to be revised at this time. Increases in base cost estimates recognize factors including additional information, changes in technology, and regulatory changes that have transpired in the last study. Staff recommends that the assumptions included in PEF's 2010 decommissioning study are reasonable.

Issue 2: Should a contingency allowance be applied to the estimated costs of decommissioning, and if so, what should the percentage be?

Recommendation: Yes. Staff recommends that a contingency allowance should be applied to the costs of decommissioning CR3. A 17.24 percent contingency factor for CR3 is reasonable and should be approved. (L'Amoreaux)

Staff Analysis: The practice of budgeting a contingency allowance is common in large-scale construction and demolition projects. Project cost estimates generally include a baseline cost estimate, which is based on ideal conditions, and a contingency allowance, which is a specific provision to account for unforeseeable elements of cost within the defined project scope. For a large, complex, and long-running project such as decommissioning, unforeseeable events are likely to occur; therefore, a contingency allowance is necessary. The Commission has allowed contingency allowances to ensure that the full decommissioning costs are borne by those that will benefit from the power generated by the nuclear units.

Contingency allowances are site-specific and activity-dependent. In this cost study, TLG applied specific contingency allowances to the decommissioning of cost components on a line item basis, yielding an overall weighted average contingency value for CR3. The line item contingency allowances were developed based on the guidelines developed by the Atomic Industrial Forum (now the Nuclear Energy Institute) in its report "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates."¹⁵

Staff notes that the composite decommissioning contingency estimate for CR3 has been in the range of 17.2 percent to 17.3 percent in the preceding three decommissioning studies. A contingency factor of 17.24 percent for PEF's CR3 nuclear unit continues to stay in the range of prior studies and is reasonable.

Conclusion

Staff recommends that a contingency allowance should be applied to the costs of decommissioning CR3. A composite contingency factor of 17.24 percent for CR3 is reasonable and should be approved.

¹⁵ LaGuardia, T. S., et al., May 1986, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036, National Environmental Studies Project, Washington, D.C. The contents of these guidelines were prepared under the review of a task force consisting of representatives from utilities, state and federal regulatory agencies, and architect/engineering firms.

Issue 3: Should the total estimated cost of nuclear decommissioning include a provision for on-site storage of spent fuel beyond the termination of the operating licenses of each nuclear unit?

Recommendation: Yes, staff recommends that it is prudent for the total estimated costs of nuclear decommissioning to include the costs for interim storage of spent fuel incurred after the retirement of this nuclear unit. However, this amount should continue to be reviewed in subsequent decommissioning studies. (L'Amoreaux)

Staff Analysis: Under the terms of the Nuclear Waste Policy Act of 1982, the federal government is assigned the responsibility of providing for the permanent disposal of SNF and HLRW. This legislation also committed the DOE to begin acceptance of SNF no later than January 31, 1998. However, this deadline was not met by the DOE.

In its review of the 2000 PEF Nuclear Decommissioning Study, the Commission recognized that the need for interim dry storage was based on industry expectation that the DOE would not have a permanent repository in operation before 2010. Current expectations are that a permanent repository will not be in operation until 2020, at the earliest. Under this circumstance, to permit prompt decommissioning of a unit at the end of its license, transfer of SNF for interim dry storage prior to the DOE's acceptance of the fuel is the most cost-effective option over the long term. Therefore, interim dry storage of SNF after the retirement of a unit, is needed. The Commission decided in the 1994 PEF Nuclear Decommissioning Study that:

We agree that an allowance must be made in the FPL's and FPC's accruals for on-site dry storage costs. Our primary goal in requiring this allowance is to ensure that the money needed to fully decommission a nuclear unit is available when the plants are retired, and not recovered from customers who have not benefitted from the low-cost nuclear generation. FPL's and FPC's annual accrual amounts must, therefore, include the anticipated cost for dry storage of SNF after retirement of each respective unit. We will continue to review these amounts in future decommissioning studies in order to determine the prudence of their inclusion.

Subsequent developments confirm the appropriateness of including the costs of interim dry storage in decommissioning estimates. Faced with costs associated with interim dry storage, utilities sought relief in the federal courts. On November 14, 1997, the U.S. Court of Appeals for the District of Columbia Circuit issued a decision holding that the DOE has an unconditional obligation to begin accepting SNF beginning in 1998. However, the decision also stated that the court lacked authority to order DOE to begin spent fuel disposal. The DOE continues to maintain that its delayed performance is unavoidable because it does not have an operational repository and does not have authority to provide storage in the interim.

PEF initiated legal action against the DOE for breach of contract and obtained an \$82.8 million judgment for damages incurred from January 1, 1998 to December 31, 2005. The DOE appealed that judgment, and the appeal resulted in a remand with respect to the calculation of damages. PEF believes the new calculation of damages will result in up to an additional \$9 million being awarded to the company. The remand hearing was held February 16, 2011. The court has yet to rule on the additional damages. To date, PEF has not received any monies.

Currently, the DOE has no plans to accept SNF before the year 2020. For the purposes of estimating SNF long-term on-site storage costs in the current cost study, PEF assumes the DOE will commence repository operations in 2020 and CR3 fuel is projected to be removed from the site beginning in 2024. PEF estimates that the SNF transfer will be completed by 2072 for CR3. Thus, costs relating to the construction, operation, and dismantlement of an on-site independent spent fuel storage installation (ISFSI) are included in PEF's decommissioning cost estimates. Staff believes that PEF's 2020 assumption for DOE acceptance of SNF and Greater than Class C waste (GTCC) is optimistic and could very well be delayed further.

PEF's costs associated with Spent Fuel Management storage included in its 2010 decommissioning study for CR3 are approximately \$223 million (in 2008 dollars).

Staff believes including the costs for interim dry storage of SNF incurred after retirement of the nuclear unit is prudent. If such costs are not included, they may have to be borne by future customers that did not benefit from the power generated by the nuclear unit. The major components of the costs associated with the interim dry storage are the ISFSI capital costs, operation costs after the unit retires, and decommissioning costs when the transfer of SNF to an interim or permanent off-site repository is completed. These amounts should continue to be reviewed in subsequent decommissioning studies.

Conclusion

Staff recommends that the total estimated costs of nuclear decommissioning should include the costs for interim storage of spent fuel incurred after the retirement of the nuclear unit. This amount should continue to be reviewed periodically in subsequent decommissioning studies.

Issue 4: What is the appropriate annual accrual in equal dollar amounts necessary to recover future decommissioning costs over the remaining life of each nuclear power plant for PEF?

Recommendation: Staff recommends a continuation of the suspension of the accrual for nuclear decommissioning as approved by the Commission in Order No. PSC-02-0655-AS-E¹⁶ and Order No. PSC-05-0945-S-EI.¹⁷ Accordingly, the appropriate jurisdictional annual accrual amount necessary to recover future decommissioning costs over the remaining life of the CR3 nuclear unit is zero. Additionally, staff recommends that the assumptions included in PEF's 2010 decommissioning study to determine the annual accrual are reasonable. (Cicchetti)

Staff Analysis: The annual accrual amount recommended by staff is based upon information provided by PEF in their site-specific cost study and in its responses to staff's data requests. The base level costs are in 2008 dollars for PEF's nuclear decommissioning study. Once the cost of decommissioning a nuclear unit is determined in current dollars, this cost is escalated into future dollars. The determination of the annual accrual amount then resembles an annuity calculation. The question becomes how much money needs to be collected from ratepayers in equal monthly payments, earning at a given rate, to equal decommissioning costs in future dollars at a future date. The appropriate escalation rates and fund earnings rate will be discussed in detail later in this issue.

To qualify for tax deductibility of contributions made to a qualified decommissioning fund, the amounts must be consistent with the purpose of IRC Section 468A, principles and provisions of Federal Tax Regulations under the Code section, and be based on reasonable assumptions.^{18 19} The Company can generally satisfy its burden of proof by demonstrating that the amounts are calculated based on the assumptions used by the Commission in its most recent order.²⁰ The Commission's order must be based on reasonable assumptions concerning: (i) the after-tax rate of return to be earned by the amounts collected for decommissioning; (ii) the total estimated cost of decommissioning the nuclear power plant; and (iii) the frequency of contributions to the nuclear decommissioning fund for a tax year.²¹ Staff believes that the assumptions proposed by PEF are reasonable, and therefore should be deemed appropriate for ruling amounts in the nuclear decommissioning study.

Base Costs of Decommissioning

PEF provided the estimated cost in current (December 31, 2008) dollars to decommission the CR3 nuclear unit. This cost estimate assumes a 2030 DOE acceptance date of spent fuel as discussed in Issue 3 and the unit-specific contingency allowance discussed in Issue 2. The estimated cost to decommission CR3 has increased from the \$668,668,051, in 2005 dollars to

¹⁶ See Order No. PSC-02-0655-AS-E, issued May 14, 2002, in Docket No. 000824-EI, In re: Review of Florida Power Corporation's earnings, including effects of proposed acquisition of Florida Power Corporation by Carolina Power & Light.

¹⁷ See Order No. PSC-05-0945-S-EI, issued September 28, 2005, in Docket No. 050078-EI, In re: Petition for rate increase by Progress Energy Florida, Inc.

¹⁸ 26 USC §468A (2011).

¹⁹ Treas. Reg. §1.468A.

²⁰ Treas. Reg. §1.468A-3(a)(4).

²¹ Treas. Reg. §1.468A-3(a)(2).

\$842,623,000 in 2010 dollars. The amount of decommissioning funds as of December 31, 2010 was \$553.5 million which reflects the total amount of funds in the Decommissioning Trust, all of which are available for Radiological Decommissioning, if needed.

The analysis performed by PEF breaks the decommissioning process into seven specific categories. The categories are decontamination, removal, packaging, shipping, burial, program management and other. TLG provided PEF with estimates of the base costs for each activity. These cost estimates were determined through a site-specific cost study and include a contingency allowance. The PEF study reflects a weighted average contingency allowance of 17.24 percent. Staff's recommendation regarding the appropriate contingency allowance to recognize in the determination of the annual accrual amount for CR3 is discussed in Issue 2.

According to PEF, the primary reasons for the net increase in decommissioning costs are changes in the costs associated with program management and spent fuel storage. The areas of greatest change in the costs reported to decommission CR3 were in the areas of program management (+\$94.8 million), removal-related activities (+\$19 million), low-level radioactive waste disposal (+\$9.4 million), and spent fuel management (-\$21 million). The determination of the base cost of decommissioning CR3 is discussed in Issue 1.

Cost Escalation Rates

The next issue that must be addressed is the determination of the appropriate escalation rates to use to convert the current decommissioning cost to the future decommissioning cost for each nuclear unit. The analysis performed by PEF breaks the decommissioning process into seven specific stages or activities. The stages are decontamination, removal, packaging, shipping, burial, staff, and other. Where applicable, each of these activities is separated into one or more sub-components. These sub-components are labor, materials, burial, and other. The base level costs are in 2008 dollars. These current dollar estimates are escalated to future dollar estimates using separate inflation forecasts for the major cost components. PEF relied upon the October 2010 edition of Moody's Economy.com for everything except the burial index as the source for their specific inflation measures. PEF's burial cost escalation rate is 5.0 percent. This is a reduction from the 6.0 percent rate assumed in the 2005 study. The burial index was derived from the NUREG-1307 Revision 12 – Report on Waste Burial Charges, discussion with industry experts at TLG services, and a comparison of burial costs in the 2005 and 2008 studies. Staff reviewed the various updates to these forecasts and believe the original forecasts are appropriate due to the small variance between the October 2010 edition and the updated June 2011 edition of Moody's Economy.com.

For comparative purposes, staff has also listed the escalation rates used in the Company's current study and the rates approved in Order No. PSC-02-0055-PAA-EI. The determination of the escalation rate for CR3 is provided below. The indicated escalation rate to use to convert the current decommissioning cost to a future decommissioning cost for CR3 nuclear unit has decreased from 3.45 percent in 2005 to 2.80 percent in 2010.

Future Cost to Decommission

Based on the current dollar base costs to decommission CR3 as provided by TLG's site-specific study, the contingency allowance discussed in Issue 2, the cost of extended storage of spent fuel discussed in Issue 3, and the escalation rate that staff has recommended above, staff has verified the estimate of the total cost to decommission the CR3 nuclear unit in future dollars based upon an operating license termination date of 2036. The estimated cost to decommission the CR3 nuclear unit at its license termination date has decreased from \$2,587,759,772 in 2005 to \$2,308,244,353 in 2010.

Funding Period

The funding period is that period over which revenues are collected from ratepayers for purposes of decommissioning CR3. Funding periods are assumed to expire on the last day of the month preceding the month in which the operating license for the unit is due to expire. The operating license expiration date for CR3 is December 2036.²²

Years of Fund Expenditures

The accumulated decommissioning funds will be expended over the period 2036-2073.

Fund Earnings Rate

The fund earnings rate is an important assumption in the determination of the appropriate annual accrual amount. The amount of the annual accrual moves inversely to the fund earnings rate. In other words, the higher the assumed fund earnings rate, the lower the indicated annual accrual and vice versa. However, in the instant case, PEF's current annual accrual requirements are zero. In Order No. 21928, approving the annual accrual following the 1989 study, the Commission approved the use of an assumed fund earnings rate equal to CPI. In Order No. PSC-95-1531-FOF-EI, approving the annual accrual following the 1994 study, the Commission approved the use of an assumed fund earnings rate of CPI plus 1.1 percent. In Order No. PSC-02-0055-PAA-EI, for purposes of the 2000 study, the Commission departed from the past practice of approving annual accrual amounts based on the same fund earnings rate for all nuclear units and instead approved an annual accrual amount for PEF based on a fund earning rate of 6.0 percent.

In the instant case, PEF used an assumed fund earnings rate of 5.47 percent. This rate is the weighted average of the expected long-term, after-tax, and net of fees, return on the nuclear decommissioning trust fund as forecasted by LCG Associates and a 25-year average for long-term CPI. For purposes of determining the assumed fund earnings rate in its study, PEF utilized the 2008 estimate of expected after-tax returns of 6.93 percent (developed by LCG Associates). The estimated management fees, trustee fees, and outside professional service expenses of .33 percent were subtracted from the expected after-tax returns of 6.93 percent, resulting in the net

²² PEF's NRC operating license for CR3 expires in December 2016. On March 9, 2009, the NRC accepted PEF's application for a 20-year renewal on the operating license for CR3 through 2036. The license renewal is currently under review by the NRC.

return after taxes and fees of 6.60 percent. The long-term CPI of 2.07 percent is subtracted from the 6.60 percent and then multiplied by 75 percent to obtain 3.40 percent. The long-term CPI of 2.07 percent is then added back to the 3.40 percent to obtain the proposed after-tax, after-expenses assumed fund earnings rate of 5.47 percent. PEF contends its methodology to derive the assumed fund earnings rate has been validated by the fund's historical after-tax return since the inception of the fund.

Recognizing the relatively conservative investment strategy for nuclear decommissioning trust (NDT) funds and that this issue will be addressed every five years, staff believes it is reasonable to continue to use an assumed fund earnings rate greater than the long-term forecast for CPI in the determination of the annual accrual amounts for PEF's CR3 nuclear unit. Table 4-1 shows the historic performance of PEF's nuclear decommissioning trust fund (calculated net of administrative costs on an after-tax, time weighted rate of return basis as of December 31, 2010) relative to CPI for the past year, 3 years, 5 years, and since the inception of the fund.

Table 4-1

<u>PEF</u>	<u>Fund Return</u>	<u>CPI</u>	<u>Spread</u>
1 Year	6.53%	1.14%	5.39%
3 Years	-3.83%	1.57%	-5.40%
5 Years	1.36%	1.90%	-0.54%
Inception	5.74%	2.69%	3.05%

As demonstrated by the range of earned returns shown in Table 4-1, total fund returns experience some volatility from year to year. However, since inception of the NDT funds, the overall return has remained above CPI. PEF has projected long-term CPI at 2.0 percent.

The fundamental purpose of the Commission's review of the decommissioning study is to make sure there is adequate funding on hand at the time a nuclear unit is decommissioned. The assumed fund earnings rate should be conservative enough to avoid a situation whereby future customers are burdened by inadequate funding for decommissioning. However, an assumed fund earnings rate that is too conservative inappropriately burdens current customers with expenses that are going to be incurred in the future. As such, a certain amount of judgment is necessary to determine a fair balance between generations of ratepayers. Accordingly, staff recommends an assumed fund earnings rate of 5.47 for PEF. This rate represents a spread of 3.47 percentage points over the forecasted CPI of 2.0 percent.

Minimum Fund Earnings Rate

Separate from the issue of the assumed fund earnings rate is the issue of whether the Commission should impose a minimum fund earnings rate. In Order No. 21928, the Commission determined that a minimum fund earnings rate equivalent to the level of inflation

over each five-year review period would be appropriate.²³ The Commission reaffirmed this approach in previous PEF Nuclear Decommissioning Studies and in Order Nos. 21928, PSC-95-1531-FOF-EI, and PSC-02-0055-PAA-EI. The Commission stated:

Rather than attempting to set a prospective minimum fund earnings rate which may or may not be reasonable under future economic conditions, we will require that the companies set aside funds sufficient to meet the Commission's best estimate of the decommissioning liability and require the companies to maintain the purchasing power as well as the principal amount of these contributions. The companies' investment performance will be evaluated along with all other decommissioning activities every five years. If it is found that the companies' investment earnings, net of taxes and all other administrative costs charged to the trust fund, did not meet or exceed the CPI average for the period, then we will consider ordering the utility to cover this shortfall with additional monies to keep the trust fund whole with respect to inflation. We therefore find a minimum fund earnings rate equivalent to the level of inflation over each five-year review period would be appropriate.²⁴

Staff believes this approach is reasonable and recommends it remain in effect.

Conclusion

The current annual expense accrual requirement for PEF's CR3 nuclear unit decommissioning costs presented in the study supports a zero accrual and funding requirement as of December 31, 2010. Based on the current dollar cost to decommission CR3 as determined in TLG's site-specific study, the unit-specific contingency allowance discussed in Issue 2, the escalation rate recommended above, the cost of extended storage for spent fuel, and the assumed fund earnings rates of 5.47 percent, staff believes PEF's request to continue the suspension of the accrual is reasonable.

Consistent with prior Commission practice and Rule 25-6.04365, F.A.C., the assumptions presented in PEF's nuclear decommissioning study will be reviewed and updated as appropriate at least once every five years, which may change the accrual requirement prospectively.

As such, staff recommends a continuation of the suspension of the accrual for nuclear decommissioning as approved by the Commission in Order No. PSC-02-0655-AS-EI²⁵ and Order No. PSC-05-0945-S-EI.²⁶ Accordingly, the appropriate jurisdictional annual accrual amount for PEF necessary to recover future decommissioning costs over the remaining life of CR3 is zero.

²³ See Order No. 21928, issued September 21, 1989, in Docket No. 870098-EI, Petitions for approval of an increase in the accrual of nuclear decommissioning costs by Florida Power Corporation and Florida Power & Light Company.

²⁴ Id., p.5.

²⁵ See Order No. PSC-02-0655-AS-EI, issued May 14, 2002, in Docket No. 000824-EI, In re: Review of Florida Power Corporation's earnings, including effects of proposed acquisition of Florida Power Corporation by Carolina Power & Light.

²⁶ See Order No. PSC-05-0945-S-EI, issued September 28, 2005, in Docket No. 050078-EI, In re: Petition for rate increase by Progress Energy Florida, Inc.

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The assumptions and methodology proposed by PEF to determine the appropriate annual accrual are reasonable, and therefore, should be deemed appropriate as ruling amounts in the nuclear decommissioning study.

Issue 5: Should the amortization expense associated with the unrecovered value of Materials and Supplies inventories that will exist at the nuclear site following shut down (EOL M&S inventories) be revised?

Recommendation: Yes. Staff recommends that the jurisdictional annual amortization expense associated with EOL M&S inventories for PEF should be decreased by \$0.1 million, effective January 1, 2011. The amortization of EOL M&S inventories should be included in subsequent decommissioning studies so the related annual accruals can be revised if warranted. (L'Amoreaux)

Staff Analysis: EOL M&S inventories consist of spare replacement parts and supplies²⁷ needing to be kept in inventory to ensure safe and reliable operations. These inventories are unique and will have little value other than scrap at the end of the licensed operating life of the units.

The Commission found with regard to the 2000 PEF Nuclear Decommissioning Study that the unrecovered EOL M&S inventories costs should be amortized over the remaining life span of each site to ratably allocate costs to those receiving the benefit of the generated power. PEF was authorized to record \$1.5 million annually for CR3. Further, for administrative ease, PEF was required to address the amortization status of EOL M&S inventories in its subsequent nuclear decommissioning studies so the related annual amortization expense could be revised, if necessary.

As part of the 2009 PEF Rate Case, the Commission approved an annual amortization of EOL M&S inventories for PEF of \$1.1 million, a decrease of \$0.4 million from that approved in 2002. In the current study, PEF quantified the remaining net unrecovered cost of its EOL M&S inventories to be approximately \$27 million as of December 31, 2010, based on the assumption that the 20-year license renewal for CR3 is granted. Recovery over the number of months remaining to the end of the site's operating license results in an annual expense of approximately \$1.0 million, or approximately a \$0.1 million decrease from that approved in the 2009 PEF Rate Case. However, PEF is not requesting to decrease its currently approved amortization expense.

Conclusion

Staff recommends that the jurisdictional annual amortization expense associated with EOL M&S inventories for PEF should be \$1.0 million, effective January 1, 2011. This represents a decrease of \$0.1 million. The amortization of EOL M&S inventories should be included in subsequent decommissioning studies so the related annual accruals can be revised, if warranted.

²⁷ EOL M&S inventories include such things as spare pumps and subassemblies, motors, control modules, circuit boards, switch gear, circuit breakers, valves and valve parts, ventilation parts and filters, radiation monitoring parts, and similar types of equipment.

Issue 6: Should the amortization expense associated with the cost of the last core of nuclear fuel be revised?

Recommendation: No. PEF's amortization expense associated with the cost of last core of nuclear fuel (Last Core) does not warrant revision at this time. PEF should address the costs associated with the Last Core in subsequent decommissioning studies so the related annual accruals can be revised, if warranted. (L'Amoreaux)

Staff Analysis: A nuclear reactor core is composed of fuel assemblies arranged in a regular array of cells surrounded by a coolant, which in most reactors is water. This is the case for PEF's nuclear reactor. Because of the fission process that consumes the fuel, the old fuel rods must be periodically replaced. This period is referred to as a cycle.

During any given cycle, an amount of unburned fuel exists in the reactor. However, fuel assemblies are continually rotated and the current existing unburned fuel will be burned in the next generating cycle. It is only at the time when the unit ceases operations that there are no future generating cycles to burn the residual fuel in the reactor. According to PEF, no feasible solution currently exists to use all of the nuclear fuel by the time of a nuclear unit's shutdown.

The Commission found with regard to the 2000 PEF Nuclear Decommissioning Study that Last Core is associated with the final shut down of a nuclear unit, equating to an unrecovered cost at the end of each nuclear unit's life. For the purpose of the current study under review, PEF assumes a 20-year license renewal. Final shut down of CR3 is assumed to be 2036.²⁸

With regard to the 2000 PEF Nuclear Decommissioning Study, the Commission authorized PEF to begin recording the amortization of estimated Last Core costs as a base rate fuel expense with a credit to a separate unfunded Account 228 reserve. The approved jurisdictional annual amortization amount was \$1.1 million.

In 2005, PEF entered into a Stipulation and Settlement agreement. As part of this agreement, PEF's Nuclear Decommissioning Study was approved and no changes to its currently approved jurisdictional annual amortization of \$1.1 million were made.

However, in the 2009 PEF rate case, PEF was authorized to revise its jurisdictional annual amortization of the Last Core to \$1.2 million, jurisdictional, effective January 1, 2010. PEF's costs estimates presented in the current study indicate that no increase above the \$1.2 million approved in the rate case is warranted. Staff notes that if CR3 does not return to operational status, the estimated unrecovered costs associated with the last core of nuclear fuel are \$32.1 million as of December 31, 2010.

The December 31, 2010 estimated jurisdictional costs, reserve balances, remaining amounts to be recovered, and the annual amortization amounts associated with the Last Core are presented in Table 6-1:

²⁸ License extension for CR3 is currently under NRC review.

Table 6-1

PEF's Crystal River Unit 3

(000)	EOL Last Core as of 12/31/2010	Reserve Balance as of 12/31/2010	Remaining Amounts to be Recovered	Current Amortization	Revised Amortization	Change in Amortization
Unit 3	\$43,209,119	\$11,100,036	\$32,109,083	\$1,200,000 ²⁹	\$1,200,000	\$0

Source: PEF Response to Staff's First Data Request, No. 90(b).

PEF's Last Core estimates reflect an expected residual value of the unburned fuel remaining at the end of the last cycle for CR3. The amortization periods reflect the 20-year extended operation.

Conclusion

Based on the foregoing, staff recommends that the jurisdictional amortization expense associated with the cost of the last core of nuclear fuel does not warrant revision at this time and should remain at the level approved in PEF's last rate case. PEF should address the costs associated with the Last Core in subsequent decommissioning studies so the related annual accruals can be revised, if warranted.

²⁹ Current accrual authorized by Commission Order No. PSC-10-0131-FOF-EI

Issue 7: What should be the effective date for adjusting the annual decommissioning accrual amounts, amortization of nuclear EOL M&S inventories, and amortization of the costs associated with the Last Core?

Recommendation: If the staff recommendations in Issues 1 – 4 are approved, there is no change to the current approved zero decommissioning accrual. Therefore, the effective date for adjusting the annual decommissioning accrual is moot. If staff's recommendations in Issues 5 and 6 are approved, the effective date for amortization of nuclear EOL M&S and Last Core would be January 1, 2011 and January 1, 2010, respectively. (L'Amoreaux)

Staff Analysis: If the staff recommendation in Issues 1 – 4 are approved, the currently approved zero annual decommissioning accrual amount continues and is not revised. The zero accrual for the nuclear unit will be included in the cost of service for ratemaking purposes until it is subsequently revised or the unit's operating license expires.

As previously discussed in Issues 5 and 6, PEF's current study filing indicates revisions to the amortization of nuclear EOL M&S inventories and costs associated with Last Core are warranted. By Order No. PSC-10-0131-FOF-EI, PEF is currently amortizing \$1.1 million annually related to nuclear EOL M&S and \$1.2 million related to the Last Core of nuclear fuel.

Conclusion

If the staff recommendation in Issues 1 – 4 are approved, there is no change to the currently approved zero decommissioning accrual. Depending on the Commission's vote in Issue 5, the effective date for amortization of nuclear EOL M&S should be January 1, 2011. If Issue 6 is approved, the amortization cost associated with Last Core should continue with an effective date of January 1, 2010.

Issue 8: When should PEF file its next nuclear decommissioning study?

Recommendation: The next decommissioning cost study for PEF should be filed no later than July 31, 2017, and should include an update of the amortization of EOL M&S inventories and the Last Core. (L'Amoreaux)

Staff Analysis: Rule 25-6.04365, F.A.C., requires each utility to file a site-specific nuclear decommissioning study update at least once every five years from the submission date of the previous study unless otherwise required by the Commission. However, in the stipulation approved in Order No. PSC-12-0104-FOF-EI, the next decommissioning cost study for PEF is required to be filed no later than July 31, 2017. As discussed in previous issues, the study should also include an update of the amortization of EOL M&S inventories and Last Core.

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Issue 9: Should this docket be closed?

Recommendation: Yes. If no person whose substantial interests are affected by the proposed agency action files a protest within 21 days of the issuance of the Order, this docket should be closed upon the issuance of a Consummating Order. (Klancke)

Staff Analysis: If no person whose substantial interests are affected by the proposed agency action issue files a protest within 21 days of the issuance of the Order, this docket should be closed upon the issuance of a Consummating Order.