

State of Florida



# Public Service Commission

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**DATE:** May 26, 2016  
**TO:** Office of Commission Clerk (Stauffer)  
**FROM:** Division of Economics (Higgins, Wu) *Wu*  
Division of Accounting and Finance (Archer, Buys, Yeazel) *ALM*  
Office of the General Counsel (Mapp) *KRM*  
**RE:** Docket No. 150265-EI – Petition for approval of 2015 nuclear decommissioning study, by Florida Power & Light Company.

**AGENDA:** 06/09/16 – Regular Agenda – Interested Persons May Participate

**COMMISSIONERS ASSIGNED:** All Commissioners

**PREHEARING OFFICER:** Edgar

**CRITICAL DATES:** None

**SPECIAL INSTRUCTIONS:** None

## Case Background

On December 14, 2015, Florida Power & Light Company (FPL or company) filed its 2015 Nuclear Decommissioning Cost Study (2015 study or current study) for Plant Turkey Point Units 3 and 4 (TP3 and TP4) and Plant St. Lucie Units 1 and 2 (SL1 and SL2). Rule 25-6.04365, Florida Administrative Code (F.A.C.), requires any utility under Florida Public Service Commission (Commission) jurisdiction that owns a nuclear generating unit to file a site-specific decommissioning cost study at least once every five years. The purpose of periodic decommissioning reviews is to recognize developments affecting decommissioning cost estimates, and to also consider such factors as additional information, improvements in technology, and regulatory changes that have transpired since the last decommissioning study. Staff has reviewed the company's current study and presents its recommendation herein.

### ***Nuclear Decommissioning***

Decommissioning involves the physical dismantling and removing of plant buildings, materials, and equipment that are no longer used and useful but remain following retirement of the nuclear generating unit. With respect to the funding of decommissioning activities, the Nuclear Regulatory Commission's (NRC) final rule, 10 C.F.R. Section 50.75, requires that licensees provide reasonable financial assurance that funds will be available for decommissioning through prepayment prior to the start of operation, an external sinking fund or a surety method, insurance, or other guarantee method. An external sinking fund is defined as:

A fund established and maintained by setting funds aside periodically in an account segregated from licensee assets and outside the administrative control of the licensee and its subsidiaries or affiliates in which the total amount of funds would be sufficient to pay decommissioning costs at the time permanent termination of operations is expected. An external sinking fund may be in the form of a trust, escrow account, or Government fund, with payment by certificate of deposit, deposit of Government or other securities.

FPL's funding program has historically provided for financial assurance through monthly contributions to its nuclear decommissioning trust (NDT) funds. As discussed later, the company's currently authorized monthly/annual base rate decommissioning contribution (Accrual) is set at zero dollars per month/year.<sup>1</sup> Thus, financial assurance standards are being satisfied solely by fund growth since 2005. FPL's decommissioning funds are held externally with The Bank of New York Mellon, which serves as fund trustee, with numerous financial management firms governing asset investments.<sup>2</sup> FPL's external sinking fund complies with the NRC's final rule because reasonable financial assurance is provided that funds will be available for the future decommissioning of its nuclear units.<sup>3</sup>

The Commission approved the external sinking funding method by Order No. 21928.<sup>4</sup> In determining the annual provision for decommissioning, the current cost estimate is escalated to the expected dates of actual decommissioning. The escalation rate used is determined by using a combination of general economic inflation rates and inflation rates for decommissioning labor, transportation, and burial of nuclear waste. Once the escalated decommissioning cost is known, a sinking fund annuity is calculated to determine the annual annuity. This annual annuity plus the earnings on the NDT fund, net of taxes, will grow to the escalated cost of decommissioning.

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<sup>1</sup> Order No. PSC-05-0902-S-EI, issued September 14, 2005, in Docket No. 050045-EI, In re: Petition for rate increase by Florida Power & Light Company; and Docket No. 050188-EI, In re: 2005 comprehensive depreciation study by Florida Power & Light Company. (2005 FPL Settlement)

<sup>2</sup> Responses to Staff's First Data Request No. 68.

<sup>3</sup> Responses to Staff's First Data Request Nos. 56, 57, 58, and 74.

<sup>4</sup> 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 was acquired by Carolina Power & Light Company and became Progress Energy Florida, Inc., effective January 1, 2003. On April 29, 2013, Progress Energy Florida, Inc. officially changed its name to Duke Energy Florida, Inc. (d/b/a Duke Energy Florida) following its merger with Duke Energy. On September 15, 2015, the Commission acknowledged Duke Energy Florida, Inc.'s name change to Duke Energy Florida, LLC.

The primary objective of a NDT fund is to have enough money on hand at the time of 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. To this end, the Commission, by Order No. 21928, required that the fund's assets earn a consistent positive real return over a market cycle.<sup>5</sup> The imposed minimum fund earnings rate is at least the rate of inflation measured by the Consumer Price Index (CPI) over each five-year review period.

First appearing in FPL's 1994 Nuclear Decommissioning Cost Study (1994 study) were considerations for the treatment of spent fuel generated during the operation of its nuclear units.<sup>6</sup> While the storage and disposal of spent nuclear fuel (SNF) assemblies (high-level waste) generated during plant operations were not considered a decommissioning expense, the presence of SNF on-site does impact the cost of decommissioning. Faced with the uncertainties of the Department of Energy (DOE) meeting its 1998 deadline for the acceptance of SNF, the Commission recognized that SNF may have to remain on-site long after decommissioning begins. For this reason, an allowance for on-site dry storage costs was made in determining decommissioning accruals for each nuclear unit. The primary goal in requiring an on-site dry storage allowance was to ensure that the funds needed to fully decommission FPL's nuclear units are available when the plants retire, while being recovered from customers who received nuclear generated energy. The Commission found that these costs should continue to be reviewed to determine the prudence of their inclusion in decommissioning accruals. Staff notes that FPL's 2015 study does include provisions for on-site SNF management, which are further discussed in Issue 1.

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

In the review of FPL's 1998 Nuclear Decommissioning Cost Study (1998 study), the Commission addressed, for the first time, recovery of nuclear materials and supplies (M&S) costs,<sup>7</sup> as well as the costs of unburned nuclear fuel (Last Core)<sup>8</sup> expected to remain at the end of each generating unit's life (EOL). The Commission found that these costs are unique to the nuclear unit and are the direct result of unit shut down.<sup>9</sup> However, the Commission recognized that these costs do not meet the intent of nuclear decommissioning because they do not involve

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<sup>5</sup> Id.

<sup>6</sup> Order No. PSC-95-1531-FOF-EI, issued December 12, 1995, in Docket No. 941350-EI, In re: Petition for increase in annual accrual for Turkey Point and St. Lucie nuclear unit decommissioning costs by Florida Power & Light Company; and Docket No. 941352-EI, In Re: Petition for Approval of Increase In Accrual for Nuclear Decommissioning Costs by Florida Power Corporation.

<sup>7</sup> EOL M&S inventories are the level of unique inventories that will remain at the end of each nuclear site's life (license expiration of the last nuclear unit at the site).

<sup>8</sup> The Last Core is the unburned fuel that will remain in the fuel assemblies at the end of the last operating cycle of each nuclear unit when it ceases operation.

<sup>9</sup> Order No. PSC-02-0055-PAA-EI, issued January 7, 2002, in Docket No. 981246-EI, In re: Petition by Florida Power & Light Company for approval of annual accrual for Turkey Point and St. Lucie nuclear decommissioning unit costs; Docket No. 990324-EI, In re: Disposition of Florida Power & Light Company's accumulated amortization pursuant to Order PSC-96-0461-FOF-EI; 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.

the removal of plant facilities. The Commission concluded that the costs associated with EOL M&S inventories and Last Core should be amortized over the remaining life span<sup>10</sup> of each unit. The Commission found that amortizing EOL M&S and Last Core costs over the remaining life span of each plant ratably allocates the costs to customers receiving nuclear generated power.

The Commission further ordered that the amortization of costs associated with EOL M&S inventories be accounted for as a debit to nuclear maintenance expense with a credit to an unfunded Account 228 reserve. For costs associated with the Last Core, the Commission ordered that the amortization should be recorded as a base rate fuel expense with a credit to an unfunded Account 228 reserve.<sup>11</sup> The Commission also found that the costs associated with EOL M&S and the Last Core should be addressed in subsequent decommissioning studies so that the related annual amortization expenses could be revised, if warranted. Staff notes FPL has provided updates for its respective EOL M&S and Last Core costs in the current study. These updated costs and amortizations are further discussed in Issues 3 and 4.

### ***Recent Decommissioning Orders Pertaining to FPL***

By Order No. PSC-05-0902-S-EI, issued September 14, 2005, the Commission approved a Settlement Agreement that suspended FPL's then annual nuclear decommissioning accrual.<sup>12</sup> Per the terms of the Stipulation and Settlement, FPL was to file a decommissioning study (2005 study) on or before December 31, 2005, and the results of the study would have no impact on customer rates for the term of the Settlement. FPL's annual base rate nuclear decommissioning accrual (which is exclusive of EOL M&S and Last Core amortization expenses) has remained at zero dollars per year from 2005 forward.

FPL's last decommissioning proceeding, in accordance with Rule 25-6.04365, F.A.C., occurred in 2010. The company's cost analysis and continuation of a zero annual accrual was approved by Order No. PSC-11-0381-PAA-EI.<sup>13</sup> Generally speaking, FPL's current study is similar to its 2010 Decommissioning Study (2010 study or prior study) both in terms of the general scope of decommissioning and plant inventory levels. Staff notes that additional plant inventories resulting from FPL's Extended Power Uprate Project were initially accounted for as part of the 2010 study.<sup>14</sup>

The Commission is vested with jurisdiction over these matters through several provisions of Chapter 366, Florida Statutes (F.S.), including Sections 366.04, 366.05, and 366.06.

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<sup>10</sup> Remaining life span for each nuclear unit is that period of years from the decommissioning study date to the nuclear license expiration date.

<sup>11</sup> Order No. PSC-02-0055-PAA-EI.

<sup>12</sup> Order No. PSC-05-0902-S-EI.

<sup>13</sup> Order No. PSC-11-0381-PAA-EI, issued September 12, 2011, in Docket No. 100458-EI, In re: Petition for approval of 2010 nuclear decommissioning study, by Florida Power & Light Company.

<sup>14</sup> Order No. PSC-08-0021-FOF-EI, issued January 7, 2008, in Docket No. 070602-EI, In re: Petition for determination of need for expansion of Turkey Point and St. Lucie nuclear power plants, for exemption from Bid Rule 25-22.082, Florida Administrative Code (F.A.C.), and for cost recovery through the Commission's Nuclear Power Plant Cost Recovery Rule, Rule 25-6.0423, F.A.C.

## Discussion of Issues

**Issue 1:** What are the current total estimated costs to decommission Florida Power and Light Company's Turkey Point Nuclear Units 3 and 4, and St. Lucie Nuclear Units 1 and 2, valued in 2015 dollars terms?

**Recommendation:** Staff recommends the Commission find that the total current estimated cost valued in 2015 dollars for decommissioning Turkey Point Nuclear Units 3 and 4 is \$1,777,304,990, and \$1,806,479,491 for St. Lucie Nuclear Units 1 and 2. (Higgins)

**Staff Analysis:** In accord with Rule 25-6.04365, F.A.C., FPL filed an updated site-specific decommissioning cost study on December 14, 2015. The purpose of this study is to recognize developments and changes impacting decommissioning cost estimates of the company's nuclear units, and to also consider such factors as additional information, improvements in technology, and regulatory changes that have transpired since FPL's last nuclear decommissioning study and review in 2010.

### Operating License

FPL's Turkey Point Nuclear Generating Station (Turkey Point) began service in 1972 with the commissioning of Unit No. 3, while Unit No. 4 achieved operational status one year later in 1973. The St. Lucie Nuclear Power Plant (St. Lucie) began service in 1976 with Unit 1, while Unit 2 began service approximately seven years later in 1983. All four units were originally licensed by the NRC to operate for a maximum of forty years. From 2000-2001, FPL filed applications with the NRC for twenty-year operating license extensions for all four units. In 2002, the NRC approved FPL's license extension request for TP3 and TP4, while approving extensions for SL1 and SL2 in 2003. Accordingly, all four units' investment amounts will continue to be included in rate base until expiration of their respective extended operating licenses/retirement. The operating license expiration dates for TP3 and TP4 are July 2032 and April 2033, respectively. The operating license expiration dates for SL1 and SL2 are March 2036 and April 2043, respectively. The current cost study assumes that each unit will operate throughout its extended license period.

### Decommissioning Methods

The NRC accepts the following three decommissioning methods: prompt removal/dismantling (DECON), mothballing with delayed dismantling (SAFSTOR), and entombment (ENTOMB). Consistent with the 2010 study, the current study continues to utilize a combination of DECON and SAFSTOR decommissioning methods. FPL selected DECON for the Turkey Point units because this method provides the lowest cost and employs those individuals familiar with the nuclear facility to support the dismantling effort. Further, DECON eliminates a potential long-term safety hazard and relieves the company of the long-term obligation and liability for continuing maintenance of the property. For the St. Lucie units, due to the timing difference in operating license expiration dates, SAFSTOR is utilized for SL1 with an approximate seven-year dormancy period, followed by prompt dismantlement (DECON) of both SL1 and SL2 concurrently. This allows for a one-time mobilization of contractor personnel and equipment by mothballing SL1 until the expiration of SL2's license.

The company currently projects SNF to remain at each plant site after the majority of nuclear facilities have been removed. Staff notes that in order for a nuclear plant to be considered fully-decommissioned, no on-site SNF may be present. The company is projecting that the final fuel assemblies will be removed from Turkey Point by 2072, and by 2073 for St. Lucie.

Towards the end of the decommissioning process, or at least two years prior to the expected license termination dates of approximately 2072 for Turkey Point, and 2073 for St. Lucie, FPL is required to submit to the NRC a License Termination Plan (LTP). Once the physical decommissioning process (including removal of SNF and storage facilities) is complete, the NRC will determine if site remediation has been performed in accordance with the LTP; and if envisioned by the LTP, the site will be released (by the NRC) for unrestricted use.<sup>15</sup> Staff notes that FPL's current decommissioning study assumes site remediation to the level of unrestricted use.<sup>16</sup> At this point, the nuclear license will be terminated thus concluding NRC oversight.

### **Decommissioning Cost Estimates**

The major decommissioning cost drivers/centers in FPL's 2015 study are: program management (staffing/labor), high and low-level radioactive waste management and disposal, site security, and removal-related activities (engineering, demolition, and support equipment). Consequently, these cost drivers also reflect the greatest dollar value changes from the 2010 study. These specific cost drivers are discussed individually further in staff's recommendation.

As with previous decommissioning cost studies, FPL commissioned TLG Services Inc. (TLG) to develop its current decommissioning cost estimates. The cost estimates are based on a number of assumptions, including regulatory requirements, low-level waste disposal practices, high-level radioactive waste management options, project contingencies, and site restoration requirements. The estimates include a five and one-half year cooling period (in fuel pool) for the SNF when plant operations cease and the reactors are permanently de-fueled. Once cooled, the SNF will be transferred to an on-site independent spent fuel storage installation (ISFSI) for interim storage. The decommissioning cost estimates include the dismantling of facilities, site structures, ISFSI, and site restoration.

TLG utilizes a unit factor method for estimating decommissioning activity costs.<sup>17</sup> These factors incorporate site-specific costs, the most current worker productivity in decommissioning

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<sup>15</sup> U.S. Code of Federal Regulations, Title 10, Part 20, Subpart E, "Radiological Criteria for License Termination," Federal Register, Volume 62, Number 139, July 21, 1997.

<sup>16</sup> Responses to Staff's Second Data Request No. 2.

<sup>17</sup> The unit factor method of estimating costs is based on activity-dependent 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 cost factors are applied to the inventory of plant equipment and structures to be removed from each nuclear unit to develop a cost estimate.

activities, and lessons learned from other decommissioning projects. Unit factors for concrete removal, steel removal, and cutting costs were developed and valued using local labor rates. The activity-dependent costs were estimated with item quantities developed from plant drawings and inventory documents. Staff notes that unit factors are not used for non-repetitive tasks, such as removal of a steam generator or segmentation of the reactor pressure vessel. For estimating equipment, consumable, and sorbent costs, the company relied upon information published by R.S. Means<sup>18</sup> (adjusted for the geographic/regional locations of the nuclear plants), and McMaster-Carr.<sup>19</sup>

The total estimated cost to decommission Turkey Point has increased by approximately 28.2 percent from the 2010 study.<sup>20</sup> The total estimated costs to decommission St. Lucie increased by 22.2 percent during the same timeframe. Tables presenting the cost comparisons by major category using the selected methods of decommissioning from 2010 to 2015 are presented below. Staff notes that the two vintages of cost figures shown below are unadjusted (nominal) and presented as they were in the year of study, or 2010 dollars and 2015 dollars, respectively.

**Table 1-1  
 Turkey Point Decommissioning Cost Comparison 2010-2015**

<b>Plant Turkey Point Units 3 and 4</b>	<b>2010 Study (\$1000s)</b>	<b>2015 Study (\$1000s)</b>	<b>Percent Difference</b>	<b>Annual Percent Difference</b>
License Termination	932,988	1,204,251	29.1	5.2
Spent Fuel Management	374,006	478,765	28.0	5.1
Site Restoration	79,223	94,289	19.0	3.5
<b>Total*</b>	<b>1,386,216</b>	<b>1,777,305</b>	<b>28.2</b>	<b>5.1</b>

Source: FPL's 2010 and 2015 Decommissioning Studies

**Table 1-2  
 St. Lucie Decommissioning Cost Comparison 2010-2015**

<b>Plant St. Lucie Units 1 and 2</b>	<b>2010 Study (\$1000s)</b>	<b>2015 Study (\$1000s)</b>	<b>Percent Difference</b>	<b>Annual Percent Difference</b>
License Termination	1,052,235	1,208,237	14.8	2.8
Spent Fuel Management	331,105	486,705	47.0	8.0
Site Restoration	95,414	111,537	16.9	3.2
<b>Total*</b>	<b>1,478,754</b>	<b>1,806,479</b>	<b>22.2</b>	<b>4.1</b>

Source: FPL's 2010 and 2015 Decommissioning Studies

\*May not add due to rounding

On an individual unit basis, the current estimated costs in 2015 dollars for the decommissioning of FPL's nuclear plants are as follows: TP3 equals \$844,719,728, TP4 equals \$932,585,262, SL1

<sup>18</sup> Robert Snow Means Company, Inc., "Building Construction Cost Data 2015," Kingston, Massachusetts.

<sup>19</sup> [www.mcmaster.com](http://www.mcmaster.com) online catalog, McMaster Carr Spill Control.

<sup>20</sup> Please refer to FPL's response to Staff's Second Data Request, No. 6, for the most current decommissioning cost figures for Turkey Point Units 3 and 4, which staff references throughout this recommendation.

equals \$934,648,631, and SL2 equals \$871,830,860. Staff notes that due to SL2 being jointly-owned with the Orlando Utilities Commission and Florida Municipal Power Agency (Joint Owners), FPL is responsible for approximately 85.1 percent of the unit's total decommissioning cost. The joint owners fund the remaining amount. Staff further notes that the joint owners maintain separate (from FPL) external sinking funds for satisfying both their decommissioning cost obligations and the NRC's financial assurance rule. The funding level status of the joint owners' NDTs as of December 31, 2014 are sufficiently above the NRC's required minimum.<sup>21</sup>

As discussed above, all costs are ultimately classified as those relating to the activities of License Termination, Spent Fuel Management, or Site Restoration. However, these major cost classifications are comprised of individual cost elements. Below, staff analyzes estimated cost variances between FPL's current and 2010 study by these individual elements.

### ***Program Management***

Program management is the largest single element of the overall decommissioning cost estimate. The program management cost element primarily captures costs relating to the staffing (both plant personnel and contractors) and organization during the decommissioning process. This includes overall project oversight as well as management of day-to-day activities. Program management costs increased by approximately 17.1 percent, or \$83.7 million for Turkey Point, and 14.0 percent, or \$69.2 million for St. Lucie from the company's prior study in 2010. Primarily driving the higher costs are general increases in wages and benefits over the five-year study period.

### ***Security***

Due to insight gained from recent and active decommissioning projects, for example the decommissioning of Vermont Yankee, TLG adjusted its cost model to increase the number of on-site security personnel throughout the decommissioning process. The current study assumes that a 24-hour security organization will be present with possible modifications made as the decommissioning process progresses (i.e. reduced security forces once all SNF has been removed from the plant sites). Security costs increased by approximately \$91.9 million, or 65.9 percent for Turkey Point, and by \$71.2 million, or by 64.6 percent for St. Lucie. As well as the increased number of onsite personnel, a general increase in wages and benefits also contributed to the higher cost of security.

### ***Spent Fuel Management (Direct Expenditures)***<sup>22</sup>

The Nuclear Waste Policy Act of 1982 (NWPA) committed the DOE to accept and dispose of SNF and high-level radioactive waste (HLRW). The acceptance and disposal of SNF and HLRW by the DOE was to begin by January 31, 1998, as stipulated under its Standard Disposal Contract with waste generators. With respect to a final SNF repository, the DOE submitted its license application to the NRC on June 3, 2008, seeking authorization to construct a storage facility located 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

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<sup>21</sup> Responses to Staff's First Data Request No. 60.

<sup>22</sup> Direct spent fuel management expenditures excludes program management costs but includes costs for dry shielded storage canisters and horizontal storage modules, spent fuel loading/transfer/spent fuel pool O&M fees.

by Congress for the NRC to decide whether to authorize construction. The application review was suspended in 2011, which generated legal action in the United States Federal Court of Appeals. In August 2013, the US Court of Appeals for the District of Columbia Circuit issued a Writ of Mandamus ordering the NRC to comply with federal law and resume its review of DOE's Yucca Mountain repository license application.<sup>23</sup> As part of its resumed review, the NRC has now issued all volumes of its formal Safety Evaluation Report (SER) of the project.<sup>24</sup> Staff notes that further actions and formal proceedings must occur before a licensing decision can be made and that substantial uncertainty remains as to the operational prospects of the Yucca Mountain repository.

Separate and apart from the Yucca Mountain project and NRC reviews, the DOE has “begun implementing a consent-based siting process to establish an integrated waste management system to transport, store, and dispose of commercial spent nuclear fuel and high level defense radioactive waste.”<sup>25</sup> Staff understands the purpose of this policy direction and approach, which is in an early and investigative state, is to ultimately establish a number of high-level nuclear waste sites specializing in specific classes of waste. However, to date, no national final repository has been identified and fully licensed to receive commercial SNF.

The NRC requires that licensees establish a program to manage and provide funding for the caretaking of all spent fuel at the reactor site until title of the fuel is transferred to the DOE.<sup>26</sup> Accordingly, FPL has incorporated costs relating to the storage and management of SNF generated at the Turkey Point and St. Lucie sites into its current study. However due to the non-performance by the DOE of terms contained in the Standard Disposal Contract with FPL, litigation was brought by the company. Ultimately, in 2009, FPL entered into a settlement agreement with the federal government for damages incurred relating to SNF storage and management.<sup>27</sup> As part of the settlement agreement, the company receives annual payments to cover the costs incurred for managing and storing SNF that it would otherwise not have incurred if the original terms of its Standard Disposal Contract with the DOE had been met. FPL is currently projecting that SNF management costs incurred before years 2059 at Turkey Point and 2063 at St. Lucie, are eligible for reimbursement. Staff notes that the company's expenditures for storing and managing SNF that have already been reimbursed by the federal government through 2014 equal \$233,328,195.<sup>28</sup>

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<sup>23</sup> 725 F.3d 255 (D.C. Cir. 2013) IN RE: AIKEN COUNTY, ET AL., PETITIONERS, STATE OF NEVADA, INTERVENOR

<sup>24</sup> The NRC's Yucca Mountain Repository SER details the evaluation the DOE's license application for a construction authorization. The NRC staff issued its SER in five volumes. The five SER Volumes document the NRC staff's review of the general information (SER Volume 1), repository safety before permanent closure (Volume 2), repository safety after permanent closure (Volume 3), administrative and programmatic requirements (Volume 4), and proposed conditions on the construction authorization and probable subjects of license specifications (Volume 5).

<sup>25</sup> “Invitation for Public Comment To Inform the Design of a Consent-Based Siting Process for Nuclear Waste Storage and Disposal Facilities; Notice of Invitation for Public Comment,” 80 Federal Register 246 (23 December 2015), pp. 79874 – 79874.

<sup>26</sup> U.S. Code of Federal Regulations, Title 10, Part 50 – Domestic Licensing of Production and Utilization Facilities, Subpart 54 (bb), “Conditions of Licenses”.

<sup>27</sup> Responses to Staff's First Data Request, No. 77.

<sup>28</sup> Responses to Staff's First Data Request, No. 1.

For the purposes of the current study, FPL assumes a DOE repository for disposing of commercial SNF will be operational and available in 2030. This date assumes a decision to select a repository site is made within the next two to four years, five years to complete licensing, and eight years for construction. Assumptions relating to FPL's spent fuel management plan in its current decommissioning study include: (1) 2031 Turkey Point and 2032 St. Lucie start dates for transfer of SNF to a federal facility; (2) pickup based on the oldest fuel receiving priority by the DOE; and (3) a maximum acceptance capacity of 3,000 metric tons of uranium per year at a geologic repository. Accounting for the aforementioned assumptions, transfer of all SNF from Turkey Point to the DOE would be completed by the end of 2072. Transfer of all SNF from St. Lucie to the DOE would be completed by 2073.

Total estimated direct costs for spent fuel management increased 32 percent, or \$69.7 million, for Turkey Point and 30 percent, or \$65.4 million, for St. Lucie from FPL's prior study. The increase is primarily due to the current cost estimate containing more comprehensive assumptions for contractor mobilization, physical transfer of SNF to the DOE, and performing required survey and safety validations.

#### ***Low-level radioactive waste disposal***

The contaminated and activated material generated in the decontamination and dismantling of a nuclear reactor is classified as low-level radioactive waste (LLRW). LLRWs are classified based on levels of radioactivity (lowest-to-highest) as either Class A, B, C, or Greater than Class C (GTCC). Staff notes the majority of LLRW assumed for disposal in FPL's analysis, in terms of both volume and mass, is Class A waste.

For LLRW disposal cost estimation and planning purposes, the company has a Life of Plant Agreement with EnergySolutions (Energy Solutions) to dispose of Class A nuclear waste at Energy Solutions' facility in Clive, Utah. Energy Solutions' facility does not have a license to dispose of Class B or C radioactive waste, which is more highly radioactive than Class A. For purposes of the current cost estimate, disposal costs for Class A waste are based on FPL's agreement with Energy Solutions.

On November 10, 2011, Waste Control Specialists (WCS) opened the Texas Low-Level Radioactive Waste Disposal Compact Facility in Andrews County, Texas. This facility is licensed to dispose of Class A, B, and C low-level radioactive wastes. For purposes of FPL's 2015 study, Classes B and C waste are assumed to be shipped and disposed of at the WCS facility with costs based upon published rates for non-Texas Compact generators.<sup>29</sup> The current cost estimate also assumes that certain amounts of radioactive metallic material will be conditioned and processed as to allow for non-controlled disposal. Metal conditioning is assumed to be performed by Energy Solutions in Oak Ridge, Tennessee.

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<sup>29</sup> Current members of the Texas Compact include Texas and Vermont, however; non-compact states or waste generators can enter into contractual agreements with the Texas Low-Level Radioactive Waste Disposal Compact Commission to dispose of nuclear waste in Texas.

The total estimated cost of low-level radioactive waste disposal increased 32 percent for Turkey Point, and 15 percent for St. Lucie, or by \$37.6 and \$23.1 million respectively, from FPL's 2010 study. The increase is primarily due to shifting the cost basis for disposing of Class B and Class C waste from the previously assumed Barnwell Low-Level Radioactive Waste Disposal Facility in South Carolina to the WCS facility in Texas.<sup>30</sup>

The greater estimated cost increase at Turkey Point relative to St. Lucie was due to the addition of 5,220 cubic yards of contaminated soil/earthen material at Turkey Point. This specific soil was generated from past projects at Turkey Point and had not been accounted for in prior studies due to the material's low level of radioisotopes. However, FPL elected to utilize this material as engineering fill in the construction of a Low-Level Waste Storage Facility expansion/laydown area. The company claims that for conservatism, the soil along with the waste storage facility, were added to the scope of the Turkey Point decommissioning cost estimate.<sup>31</sup>

### **Removal**

Removal costs primarily capture costs related to the disassembly of plant components and placed in a central area or zone for processing/disposal, controlled removal of contaminated and activated concrete, remediation of any hazardous waste, excavation of soil, and demolition of site structures. Removal costs increased by approximately 21.8 percent, or \$32.6 million for Turkey Point, and 18.1 percent, or \$33.1 million for St. Lucie from the company's prior study in 2010. Approximately half of the increase in projected removal costs are attributed to changes in heavy equipment assumed necessary to complete the decommissioning projects.

### **Contingency Allowance**

The practice of budgeting a cost contingency allowance is common in large-scale construction and demolition projects. Such project cost estimates generally include a baseline cost estimate, which is formulated based on ideal conditions, and a contingency allowance. A contingency allowance is a specific provision for unforeseeable elements and associated costs within the defined project scope. For large, complex, and long-running projects such as nuclear plant decommissioning, unforeseeable events are likely to occur; therefore, a contingency allowance is necessary.

For each of FPL's four nuclear units, TLG applied specific contingency allowances to the individual units' decommissioning cost estimates on a line item basis to produce a weighted average contingency value. These specific line item contingency allowances are based on guidelines developed by the Atomic Industrial Forum (now Nuclear Energy Institute) in its report "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates," AIF/NESP-036. Dividing the sum (dollar value) of the line item contingency allowances by the total decommissioning cost for each unit respectively results in the company's proposed weighted average contingency percentages. The contingency values for all four nuclear units have marginally increased from FPL's prior study as displayed in the table below:

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<sup>30</sup> Beginning in 2008, the Barnwell Low-Level Radioactive Waste Disposal Facility, operated by EnergySolutions, only accepts waste from the Atlantic compact states (Connecticut, New Jersey, and South Carolina).

<sup>31</sup> Responses to Staff's First Data Request No. 23, 30, 37, and Responses to Staff's Second Data Request No. 5.

**Table 1-3  
Weighted Average Contingency  
Factors**

<b>Nuclear Unit</b>	<b>2010 Study<sup>32</sup></b>	<b>2015 Study</b>
TP3	17.39%	17.46%
TP4	17.36%	17.41%
SL1	17.07%	17.37%
SL2	17.92%	18.04%

Source: FPL's 2010 and 2015 Decommissioning Studies

Staff believes the contingency provisions presented in FPL's 2015 decommissioning study, which are based on industry standards and guidelines, as discussed above are reasonable.<sup>33</sup>

#### **Site Characterization and License Termination Surveys**

Characterization and site survey cost estimates have increased substantially from the prior study.<sup>34</sup> Site characterization and survey costs increased 107.4 percent, or \$19.3 million, at Turkey Point, and 77.9 percent, or \$18.9 million at St. Lucie. The primary driver of the cost increase is the inclusion of new remedial action surveys that were not included in the 2010 study for either nuclear plant. Other elements include increased labor and material costs.

#### **Other Factors**

Transportation, regulatory fees, and energy cost estimates have increased since the 2010 cost study. The increase in transportation cost estimates are due to a combination of higher tariffs, fuel surcharges and a greater amount of assumed shipments. Costs for insurance (Nuclear Liability and Nuclear Property insurance), Emergency Planning Fees, Nuclear License Fees, and NRC reviews and inspections fees have all increased since the 2010 study. Partially mitigating the overall increase in decommissioning costs are lower costs for off-site waste processing (cost of conditioning metals/material for non-LLRW disposal). The reduction in off-site waste processing costs is due to reduced contractual rates with Energy Solutions for this service.

#### **Conclusion**

Staff believes the company, in estimating current decommissioning costs for Turkey Point and St. Lucie as discussed above, appropriately recognized and reflected factors including new/updated information, improvements in technology, and regulatory changes that have transpired during the last five years. Thus, based on information contained in FPL's 2015 Decommissioning Study and associated data request responses, staff recommends the Commission find that the total current estimated cost valued in 2015 dollars for decommissioning TP 3 and TP4 is \$1,777,304,990, and \$1,806,479,491 for SL1 and SL2.

<sup>32</sup> Order No. PSC-11-0381-PAA-EI.

<sup>33</sup> Responses to Staff's First Data Request No. 48 and Responses to Staff's First Request for Documents No. 1.

<sup>34</sup> Decommissioning Characterization refers to the process of obtaining and analyzing information relating the types, quantities, and chemical /physical states of radionuclides that will affect the decommissioning process.

**Issue 2:** What are the appropriate annual accruals, in equal dollar amounts, necessary to recover the future decommissioning costs of Florida Power and Light's Turkey Point Nuclear Units 3 and 4, and St. Lucie Nuclear Units 1 and 2?

**Recommendation:** Staff recommends a continuation of the suspension of the accrual for nuclear decommissioning as approved by the Commission in Order No. PSC-11-0381-PAA-EI. The appropriate jurisdictional annual accrual amount necessary to recover future decommissioning costs over the remaining life of each nuclear power plant is currently zero. Additionally, staff recommends the assumptions included in FPL's 2015 decommissioning study to determine the annual accrual are reasonable. (Archer, D. Buys, Yeazel)

**Staff Analysis:** The annual accrual amounts recommended by staff are based upon information provided by FPL in its site-specific cost study and in its responses to staff's data requests. The base level costs included in the study are in 2015 dollars. Once the cost of decommissioning a nuclear unit is determined in current dollars, this cost is escalated to future dollars. The determination of the annual accrual amounts then resembles an annuity calculation. The question becomes how much money needs to be collected from customers 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, the principles and provisions of Federal Tax Regulations under the Code section, and be based on reasonable assumptions.<sup>35</sup> 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.<sup>36</sup> 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.<sup>37</sup> Staff believes the assumptions proposed by FPL are reasonable, and therefore, should be deemed appropriate for establishing amounts in the nuclear decommissioning study. FPL's annual accruals and contributions to FPL's qualified and non-qualified trust funds were suspended in 2005, and FPL's 2015 Decommissioning Study confirms that the trust continues to be adequately funded without additional accruals. Therefore, a specific ruling to allow FPL to obtain IRS approval pursuant to IRC Section 468A is not required in this docket.

### **Base Costs of Decommissioning**

FPL provided the estimated cost in current (December 31, 2015) dollars to decommission each of its nuclear units. The estimated cost to decommission each nuclear unit is shown in Table 2-1.

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<sup>35</sup> 26 USC §468A (2011), and Treas. Reg. §1.468A.

<sup>36</sup> Treas. Reg. §1.468A-3(a)(4).

<sup>37</sup> Treas. Reg. §1.468A-3(a)(2).

**Table 2-1  
Decommission Costs per Plant**

<b>Nuclear Unit</b>	<b>2015 Dollars</b>
TP3	844,720,000
TP4	932,585,000
SL1	934,649,000
SL2	871,831,000
<b>Total</b>	<b>3,583,785,000</b>

Source: FPL's 2015 Decommissioning Study

FPL divides the analysis performed for the decommissioning process into five general components. The components are labor, materials, transportation, burial, and other. TLG provided FPL with estimates of the base costs for each activity. These cost estimates were determined through site-specific cost studies and include a contingency allowance. The cost studies reflect weighted average contingency allowances of 17.46 percent for TP3, 17.41 percent for TP4, 17.37 percent for SL1, and 18.04 percent for SL2.

According to FPL, the primary reasons for the net increase in decommissioning costs from 2010 to 2015 are due to actual data ascertained from recent ongoing decommissioning experience in the industry. The largest increases of costs were in security, program management, and spent fuel management. FPL indicated that it has no evidence to suggest that the rate of increase experienced over the last five years would continue prospectively, but instead, believes that these increases are due to the heightened level of current decommissioning activity which has significantly expanded its knowledge base regarding actual costs for certain specific activities compared to what was known in 2010.

### **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 FPL divides the decommissioning process into five major cost components. These stages are labor, materials and equipment, shipping, burial, and other. The base level costs are in 2015 dollars. The 2015 current dollar estimates are escalated to future dollar estimates at the respective license termination date for each nuclear unit using separate inflation forecasts for the major cost components. FPL relied upon "The U.S. Economy, The 30-Year Outlook, August 2015," published by Global Insight as the source for their specific inflation measures, except for the burial escalation rate. FPL's burial cost escalation is based on company-specific data/historical experience and CPI.

The methodology used by FPL in the 2015 decommissioning study to determine the assumed escalation rates is consistent with the methodology used in the 2010 study. While FPL used a methodology consistent with the 2010 decommissioning cost study, the escalation rates do differ. The differences between the escalation rates used in the prior decommissioning study can be attributed to the change in the projections of the rates of inflation. The indicated escalation rate used to convert the current decommissioning cost to a future decommissioning cost for each nuclear unit is included in Table 2-2.

**Table 2-2  
 Escalation Rate Comparison**

<b>Nuclear Unit</b>	<b>2010 Study</b>	<b>2015 Study<sup>38</sup></b>
TP3	2.95%	3.23%
TP4	2.95%	3.20%
SL1	2.84%	3.11%
SL2	2.97%	3.21%

Source: FPL's 2010 and 2015 Decommissioning Studies

**Future Cost to Decommission**

FPL's estimate of the total cost to decommission each nuclear unit in future dollars was based on present operating license termination dates, the current dollar base costs to decommission each nuclear unit as provided by TLG's site-specific study, the contingency allowances, and the escalation rates. The estimated costs in future dollars to decommission each nuclear unit at its respective license termination date are listed in Table 2-3.

**Table 2-3  
 Future Cost to Decommission 2015 Study**

<b>Nuclear Unit</b>	<b>Dollars</b>
TP3	1,909,345,000
TP4	2,125,111,000
SL1	2,556,058,000
SL2	2,552,581,000
<b>Total</b>	<b>9,143,095,000</b>

Source: Responses to Staff's Second Data Request, No. 6.

**Funding Period**

The funding period is that period over which revenues are collected from ratepayers for purposes of decommissioning the nuclear units. 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 dates for the nuclear units are listed in Table 2-4.

<sup>38</sup> Staff notes that FPL's 2015 Decommissioning Study points out that the funding status is highly dependent upon the assumed escalation rates, which are currently assumed to be at near all-time lows, and could increase significantly in the future.

**Table 2-4**  
**NRC Operating License Expiration Dates**

<b>Nuclear Unit</b>	<b>Expiration Date</b>
TP3	July 19, 2032
TP4	April 10, 2033
SL1	March 1, 2036
SL2	April 6, 2043

Source: FPL's 2015 Decommissioning Study

### **Years of Fund Expenditures**

The years in which the accumulated decommissioning funds will be expended are listed in Table 2-5.

**Table 2-5**  
**Years of Fund Expenditures**

<b>Nuclear Unit</b>	<b>Period</b>
TP3	2032-2073
TP4	2033-2073
SL1	2036-2074
SL2	2043-2074

Source: FPL's 2015 Decommissioning Study

### **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. In its 2015 study, FPL used an assumed fund earnings rate of 3.7 percent for all four of its nuclear units. FPL's assumed rate is based on the CPI rate of 2.4 percent, plus a projected real long-term, after tax and net of fees, earnings rate (or spread) of 1.3 percent.

This is the same approach FPL used in the 2005 and 2010 decommissioning studies where the assumed earnings rate is compared to the CPI to assure that the overall return remains above CPI to maintain the purchase power of the accruals until actual decommissioning. In FPL's 2005 decommissioning study, in which the Commission took no action due to a settlement between Office of Public Counsel (OPC) and the company, FPL used an assumed fund earnings rate of 5.0 percent (CPI of 2.6 percent plus a spread of 2.4 percent). In FPL's 2010 study, the assumed fund earnings rate was 3.9 percent (CPI of 2.0 percent plus a spread of 1.9 percent). FPL explained that the lower rate in the 2015 study is due to softened post-recession long-term return expectations in light of uncertainty in the sustainability of long-term global economic growth and a lower base of interest rates. This assumption is based on an estimate of the expected nominal return of 3.7 percent over the life of FPL's nuclear decommissioning trust (NDT) fund.

The decrease in the long-term fund earnings rate reaffirms the importance of maintaining adequate funding and the value of the periodic review of these studies as required by Rule 25-

6.04365, F.A.C. The assumed fund earnings rate of 3.7 percent compared to a CPI of 2.4 percent reflects the projection of continued adequacy of the funds. This projection assumes an investment strategy where the funds are moved from an initial mix of 40 percent equities, 48.5 percent fixed income and 11.5 percent alternatives to one that reduces exposure to alternative strategies by the end of 2025. From 2026 to 2055 the NDT will consist of 100 percent fixed income and from 2056 to 2074 the fund will consist of 50 percent fixed income and 50 percent cash.

As demonstrated by the range of earned returns shown in Table 2-6, total fund returns have experienced some volatility from year to year. However, since 2010, the NDT has increased 5.1 percent, and since inception, the overall return has remained above CPI. FPL has projected long-term CPI at 2.4 percent, and based on the actual returns since inception, staff believes FPL's forecasted fund earnings rate of 3.7 percent is reasonable for the purpose of determining the appropriate annual accrual amount.

**Table 2-6**  
**NDT Time Weighted Returns**

<b>FPL</b>	<b>Fund Return</b>	<b>CPI</b>	<b>Spread</b>
1 Year	-1.1%	0.9%	-0.2%
2 Years	3.0%	0.8%	2.2%
3 Years	6.1%	1.0%	5.1%
5 Years	6.2%	1.6%	4.6%
10 Years	5.0%	1.9%	3.1%
Inception	6.8%	2.7%	4.1%

Source: Responses to Staff's First Data Request, No. 53.

The fundamental purpose of the Commission's review of the decommissioning study is to make sure there will be adequate funding on hand at the time the nuclear units are 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 to be incurred in the future. As such, a certain amount of judgment is necessary to determine a fair balance between generations of customers.

For the reasons outlined above, staff believes FPL's assumed fund earnings rate of 3.7 percent is reasonable and should be used in the determination of the annual accrual amounts.

### **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.<sup>39</sup> The Commission reaffirmed this approach in the 1994 and 1998 FPL Nuclear Decommissioning Studies. In those orders<sup>40</sup> 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.

FPL believes a minimum funds earnings rate should not be imposed and the current approach, as approved by the Commission, should remain in effect. The company explained that economic and financial market conditions can vary widely over time and are difficult, if not impossible, to predict. FPL also indicated that it is reasonable that the company be accountable for taking appropriate steps intended to preserve the principal value and the purchasing power of contributions collected from its customers. Staff concurs with FPL and believes this approach is reasonable and recommends that it remain in effect.

### **Conclusion**

The current annual expense accrual requirements for FPL's nuclear unit decommissioning costs presented in the 2015 FPL Nuclear Decommission Study support a zero accrual and funding requirement as of December 31, 2015. Based on the current dollar cost to decommission each nuclear unit as determined in TLG's site-specific study, the unit-specific escalation rates recommended above, and the assumed fund earnings rates of 3.7 percent, staff believes FPL'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 FPL's nuclear decommissioning study should 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-11-0381-PAA-EI. Accordingly, the appropriate jurisdictional annual accrual amounts necessary to recover future decommissioning costs over the remaining life of each nuclear power plant are currently zero.

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<sup>39</sup> Order No. 21298.

<sup>40</sup> Order No. PSC-95-1531-FOF-EI and Order No. PSC-02-0055-PAA-EI.

Additionally, staff recommends that the assumptions included in FPL's 2015 decommissioning study to determine the annual accrual are reasonable.

**Issue 3:** Should the amortization expense associated with the unrecovered value of End-of-Life Materials and Supplies inventories that will exist at the nuclear site following shut down be revised?

**Recommendation:** Yes. Staff recommends that the Commission recognize the revised annual amortization expense associated with End-of-Life Materials and Supplies inventories for FPL of \$1.973 million (system), based on the proposed January 1, 2017 effective date of new customer rates in the company's current rate case proceeding, Docket No. 160021-EI. FPL should address the amortization of End-of-Life Materials and Supplies inventories in its subsequent decommissioning studies so the related annual accruals can be revised, if warranted. (Wu)

**Staff Analysis:** The end of life materials and supplies (EOL M&S) inventories of a nuclear powered electrical plant consist of spare replacement parts and supplies<sup>41</sup> needing to be kept in inventory to ensure safe and reliable operations of the nuclear plant. These inventories are unique and will have little value other than scrap when the associated nuclear units are decommissioned. Recognized that a level of EOL M&S inventories will remain at the end of life of each nuclear plant, the Commission authorized FPL to amortize the cost of unrecovered EOL M&S inventories over the remaining life span of each nuclear plant to ratably allocate costs to those receiving the benefit of the nuclear fuel generated electric power.<sup>42</sup> Further, the Commission required FPL, for administrative ease, to address the amortization status of EOL M&S inventories in the company's subsequent updated nuclear decommissioning cost studies so the related annual amortization expense could be revised, if necessary.

In accordance with Order No. PSC-02-0055-PAA-EI, effective May 2002, FPL began recording the annual amortization expense associated with the EOL M&S inventories as a debit to nuclear maintenance expense with a credit to an unfunded Account 228 reserve. FPL's current level of annual amortization expense was required in its 2010 study and approved by the Commission with Order No. PSC-11-0381-PAA-EI. Because the Commission previously found that the recovery of the costs associated with the EOL M&S inventories should be considered as a base rate component,<sup>43</sup> it ordered that changes in amortization of the EOL M&S inventory-related expenses shall be considered in conjunction with changes in other base rate costs and revenue requirement determinations at the time of FPL's base rate proceeding. Consequently, FPL's authorized annual amortization determined in its 2010 study became effective in January 2013, consistent with the Stipulation and Settlement Agreement approved by the Commission with Order No. PSC-13-0023-S-EI.

In a decommissioning study, a company's required EOL M&S-related annual amortization is determined by dividing the remaining net unrecovered cost associated with the EOL M&S inventories by the remaining amortization period. The remaining net unrecovered cost is the difference between the estimated cost of EOL M&S inventories and the actual reserve balance

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<sup>41</sup> EOL M&S inventories include assets such 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.

<sup>42</sup> Order No. PSC-02-0055-PAA-EI and Order No. PSC-13-0023-S-EI, issued January 14, 2013, in Docket No. 120015-EI, In re: Petition for increase in rates by Florida Power & Light Company.

<sup>43</sup> Order No. PSC-02-0055-PAA-EI.

Date: May 26, 2016

accrued at a point in time. The remaining amortization period is usually assumed to be from the considered point in time to the end of operating license of the last nuclear unit at a nuclear site. In its 2015 study, FPL estimated the remaining net unrecovered cost associated with the EOL M&S inventories, as of December 31, 2015, to be approximately \$19.13 million at St. Lucie (SL)<sup>44</sup> and \$21.51 million at Turkey Point (TP).

In its 2015 decommissioning study, FPL proposed that any change in amortization accruals relating to EOL M&S inventories should be addressed in FPL's next base rate proceeding. Thus, the company updated its analysis associated with the EOL M&S inventories to align with the effective date of FPL's 2016 base rate case.<sup>45</sup> FPL's estimate of remaining net unrecovered cost of EOL M&S inventories, as of January 1, 2017, is approximately \$18.66 million at SL and \$20.57 million at TP. The resulting EOL M&S annual amortization expense is estimated to be \$1.97 million (\$0.71 million for SL and \$1.26 million for TP), an increase of approximately \$0.57 million annually from the current level. Details of the estimated EOL M&S inventories, reserve balances, remaining amounts to be recovered, and annual amortization amounts, as of January 1, 2017, are presented in Table 3-1.

**Table 3-1**  
**EOL M&S-Associated Amortization Expenses**  
**(\$1000s)**

Plant Unit	EOL M&S Inventories as of 1/1/2017	Reserve Balance as of 1/1/2017	Remaining Amounts to be Recovered	Current Amortization	Revised Amortization	Change in Amortization <sup>46</sup>
TP4*	36,435	15,865	20,570	938	1,263	325
SL2**	24,892	6,228	18,664	470	710	240
<b>Total</b>	<b>61,327</b>	<b>22,093</b>	<b>39,234</b>	<b>1,408</b>	<b>1,973</b>	<b>565</b>

Notes: \* TP4 is the last unit to be decommissioned at Turkey Point nuclear site.

\*\* SL2 is the last unit to be decommissioned at St. Lucie nuclear site.

Data Source: FPL's responses to Staff's First Data Request, No. 46; FPL's Responses to Staff's Second Data Request, No. 6; FPL 2015 Decommissioning Study, Assumptions and Schedule E; and Order No. PSC-11-0381-PAA-EI, Pages 19-20.

Based on review of information contained in FPL's 2015 Decommissioning Study and associated data request responses as well as prior Commission orders, staff believes that the revised amortization amounts presented in Table 3-1 are appropriate. Staff also believes that the updated EOL M&S amortization, \$1.973 million, should be addressed in conjunction with changes in other base rate costs and revenue requirement determinations in FPL's current base rate proceeding, Docket No. 160021-EI.

<sup>44</sup> For 2015 Decommissioning Study, FPL's ownership share at the St. Lucie units is, 92.552245 percent, net of participants.

<sup>45</sup> FPL's Response to Staff's First Data request, No. 46.

<sup>46</sup> FPL's responses to Staff's First Data Request, No. 46; FPL's Responses to Staff's Second Data Request, No. 6; FPL 2015 Decommissioning Study, Assumptions and Schedule E; and Order No. PSC-11-0381-PAA-EI.

**Conclusion**

Staff recommends that the Commission approve the revised annual amortization expense associated with EOL M&S inventories for FPL of \$1.973 million (system), effective with the date of new customer rates in FPL's current rate case proceeding, Docket No. 160021-EI. This represents an increase of approximately \$0.57 million over the 2010 authorized amortization amount. The amortization of EOL M&S inventories should be included in subsequent decommissioning studies so the related annual accruals can be revised, if warranted.

**Issue 4:** Should the amortization expense associated with the cost of the Last Core of nuclear fuel be revised?

**Recommendation:** Yes. Staff recommends that the Commission recognize the revised annual amortization expense associated with the cost of the Last Core of nuclear fuel at FPL nuclear units of \$11.073 million (system), based on the proposed January 1, 2017, effective date of new customer rates in FPL's current rate case proceeding, Docket No. 160021-EI. FPL should address the costs associated with the Last Core in subsequent decommissioning studies so the related annual accruals can be revised, if warranted. (Wu)

**Staff Analysis:** Last Core is the unburned nuclear fuel that will remain in the fuel assemblies at the end of the last operating cycle of each nuclear unit when it ceases operation. According to FPL, no feasible solution currently exists to allow the company to burn all the nuclear fuel by the time each nuclear unit ceases operation, or, to move the unburned fuel remaining at any nuclear unit at the time of unit shutdown to another unit.<sup>47</sup> Recognizing that the Last Core is associated with the final shut down of a nuclear unit and equates to an unrecovered cost at the end of each nuclear unit's life, the Commission authorized FPL to amortize the cost of the Last Core over the remaining life span of each nuclear unit to ratably allocate costs to those receiving the benefit of the nuclear generated power.<sup>48</sup> Further, the Commission required FPL, for administrative ease, to address the amortization status of the Last Core expense in the company's subsequent updated nuclear decommissioning cost studies so the related annual amortization expense could be revised, if necessary.

In accordance with Order No. PSC-02-0055-PAA-EI, effective May 2002, FPL began recording the annual amortization expense associated with the Last Core as a debit to nuclear maintenance expense with a credit to an unfunded Account 228 reserve. Similar to its EOL M&S, FPL's current level of annual amortization expense was required in its 2010 study and approved by the Commission with Order No. PSC-11-0381-PAA-EI. Because the Commission previously found that the recovery of the cost associated with the Last Core should be considered as a base rate component,<sup>49</sup> it ordered that changes in amortization of the Last Core-related expense shall be considered in conjunction with changes in other base rate costs and revenue requirement determinations at the time of FPL's base rate proceeding. Consequently, FPL's authorized annual amortization determined in its 2010 study became effective in January 2013, consistent with the Stipulation and Settlement Agreement approved by the Commission in Order No. PSC-13-0023-S-EI.

In a decommissioning study, a company's required Last Core-related annual amortization is determined by dividing the difference between the estimated EOL value of the Last Core of nuclear fuel and the cumulative amortization balance at a point in time, by the remaining amortization period which is usually assumed to be at the end of operating license of the nuclear unit. In its 2015 study, FPL estimated the remaining net unrecovered cost associated with each

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<sup>47</sup> FPL's Responses to Staff's First Data Request, No. 48.

<sup>48</sup> Order No. PSC-02-0055-PAA-EI, Order No. PSC-05-0902-S-EI, Order No. PSC-11-0381-PAA-EI, and Order No. PSC-13-0023-S-EI.

<sup>49</sup> Order No. PSC-02-0055-PAA-EI.

nuclear unit at both of its St. Lucie and Turkey Point nuclear plants, as of December 31, 2015, resulting in a total of approximately \$229.3 million.

In its 2015 decommissioning study, FPL proposed that any change in amortization accruals relating to the Last Core expense should be addressed in FPL's next base rate proceeding. Thus, the company updated its analysis associated with its EOL nuclear fuel-related expense to align with the effective date of FPL's 2016 base rate case.<sup>50</sup> FPL's estimate of remaining net unrecovered cost associated with the Last Core, as of January 1, 2017, is approximately \$217.6 million in total. The resulting annual amortization expense is estimated to be \$11.1 million, a decrease of \$0.7 million annually from the current level. Details of the estimated Last Core-related costs, reserve balances, remaining amounts to be recovered, and annual amortization amounts, as of January 1, 2017, are presented in Table 4-1.

**Table 4-1**  
**Last Core-Associated Amortization Expenses**  
**(\$1000s)**

Plant Unit	Last Core Costs as of 1/1/2017	Reserve Balance as of 1/1/2017	Remaining Amounts to be Recovered	Current Amortization	Revised Amortization	Change in Amortization <sup>51</sup>
TP3	67,500	28,093	39,407	3,032	2,536	(496)
TP4	62,700	24,165	38,535	3,117	2,365	(752)
SL1	89,300	27,841	61,459	2,933	3,200	267
SL2	98,700	20,550	78,150	2,672	2,972	300
<b>Total</b>	<b>318,200</b>	<b>100,649</b>	<b>217,551</b>	<b>11,754</b>	<b>11,073</b>	<b>(681)</b>

Data Source: FPL's responses to Staff's First Data Request, No. 52; FPL's Responses to Staff's Second Data Request, No. 6; FPL 2015 Decommissioning Study, Schedule F; and Order No. PSC-11-0381-PAA-EI, Pages 21-22.

Based on review of information contained in FPL's 2015 Decommissioning Study and associated data request responses as well as prior Commission orders, staff believes that the revised amortization amounts presented in Table 4-1 are appropriate. Staff also believes that the updated Last Core amortization, \$11.073 million, should be addressed in conjunction with changes in other base rate costs and revenue requirement determinations in FPL's current base rate proceeding, Docket No. 160021-EI.

### Conclusion

Staff recommends that the Commission approve the revised annual amortization expense associated with the cost of the Last Core for FPL of \$11.073 million (system), effective with the date of new customer rates in FPL's current rate case proceeding, Docket No. 160021-EI. This represents a decrease of approximately \$0.68 million from the 2010 authorized amortization

<sup>50</sup> FPL's Response to Staff's First Data Request, No. 52.

<sup>51</sup> FPL's responses to Staff's First Data Request, No. 52; FPL's Responses to Staff's Second Data Request, No. 6; FPL 2015 Decommissioning Study, Schedule F; and Order No. PSC-11-0381-PAA-EI.

amount. The amortization of the Last Core-related costs should be included in subsequent decommissioning studies so the related annual accruals can be revised, if warranted.

**Issue 5:** What should be the effective date for adjusting the annual decommissioning accrual amounts for TP3, TP4, SL1, SL2, 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 and 2 are approved, there is no change to the current approved zero decommissioning accrual. Therefore, an effective date for adjusting the annual decommissioning accrual is moot. If the staff recommendations in Issues 3 and 4 are approved, the revised annual amortization amounts relating to EOL M&S inventories (Issue 3) and the Last Core (Issue 4) should be effective at the time new base rates are approved. (Higgins, Wu)

**Staff Analysis:** By Order No. PSC-11-0381-PAA-EI, issued September 12, 2011, Petition for approval of 2010 nuclear decommissioning study, by Florida Power & Light Company, the Commission found that FPL's currently-approved zero annual decommissioning accrual did not warrant revision at that time. A review of FPL's 2015 study indicates that while decommissioning base cost estimates have increased since 2010, assumptions relating to escalation rates and trust fund earnings, as discussed in Issue 2, suggest that FPL's currently approved zero annual decommissioning accrual does not require revision at this time.

As previously discussed in Issues 3 and 4, FPL's current decommissioning study indicates revisions to the amortization of nuclear EOL M&S inventories and amortization of the costs associated with the Last Core are warranted. FPL's position and request is that any change in accrual amounts should be addressed in its next base rate proceeding. Staff notes the Commission is currently reviewing FPL's base rates in Docket No. 160021-EI. Given that the Commission found in the 1998 FPL Nuclear Decommissioning Study review that the amortization expenses associated with the Last Core and EOL M&S should be considered base rate obligations, staff agrees with the company's assessment.<sup>52</sup>

### **Conclusion**

If the staff recommendations in Issues 1 and 2 are approved, there should be no change to the currently-approved zero annual decommissioning accrual. Therefore, the Commission need not establish an effective date at this time. If the staff recommendations in Issues 3 and 4 are approved, the revised annual amortization amounts relating to EOL M&S inventories and the Last Core should be effective at the time new base rates are approved.

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<sup>52</sup> Order No. PSC-02-0055-PAA-EI.

**Issue 6:** When should FPL file its next nuclear decommissioning study?

**Recommendation:** FPL's next decommissioning cost study for the Turkey Point Nuclear Generating Station and the St. Lucie Nuclear Power Plant should be filed no later than December 14, 2020. (Higgins)

**Staff Analysis:** Rule 25-6.04365, F.A.C., requires a utility that owns a nuclear generating plant under Commission jurisdiction to file a site-specific nuclear decommissioning cost study update at least once every five years from the submission date of the previous study unless otherwise required by the Commission. Given that FPL's current study was filed on December 14, 2015, its next study should be filed no later than Monday, December 14, 2020.

**Conclusion**

FPL's next decommissioning cost study for the Turkey Point Nuclear Generating Station and the St. Lucie Nuclear Power Plant should be filed no later than December 14, 2020.

**Issue 7:** Should this docket be closed?

**Recommendation:** If no person whose substantial interests are affected by the Commission's 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. (Mapp)

**Staff Analysis:** If no person whose substantial interests are affected by the Commission's Proposed Agency Action files a timely request for hearing within 21 days of the issuance of the order, no further action will be required and this docket should be closed upon the issuance of a consummating order.