

State of Florida



Public Service Commission

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-M-E-M-O-R-A-N-D-U-M-

DATE: June 3, 2021

TO: Office of Commission Clerk (Teitzman)

FROM: Division of Economics (Smith II, Barrett, Galloway, Kunkler, McNulty, Shrum) *JGH*
Division of Accounting and Finance (Brown, Buys, Cicchetti, Higgins, Mathis, *ALM*
Osorio)
Office of the General Counsel (Brownless, Crawford) *JSC*

RE: Docket No. 20200257-EI – Petition for approval of 2020 nuclear decommissioning study, by Florida Power & Light Company.

AGENDA: 06/15/21 – Regular Agenda – Proposed Agency Action - Interested Persons May Participate

COMMISSIONERS ASSIGNED: All Commissioners

PREHEARING OFFICER: Fay

CRITICAL DATES: None

SPECIAL INSTRUCTIONS: None

Case Background

On December 14, 2020, Florida Power & Light Company (FPL or company) filed its 2020 Nuclear Decommissioning Cost Study (2020 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. An explanation of the basic concepts follows.

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 the retirement of a 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 contributions to its nuclear decommissioning trust (NDT) funds. As discussed later, the company's currently authorized annual base rate decommissioning contribution (Accrual) is set at zero dollars per year.¹ Thus, financial assurance standards have been satisfied solely by fund growth since 2005.

In 1989, the Commission 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 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.

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.³ The imposed minimum

¹ 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)

² Order No. 21928, issued September 21, 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.

³ *Id.*

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.⁴ 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 2020 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,⁵ as well as the costs of unburned nuclear fuel (Last Core)⁶ 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.⁷ However, the Commission recognized that these costs do not meet the intent of nuclear decommissioning because they do not involve 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 span⁸ 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

⁴ 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*.

⁵ 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).

⁶ 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.

⁷ Order No. PSC-02-0055-PAA-EI, issued January 7, 2002, in 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*.

⁸ Remaining life span for each nuclear unit is the period of years from the decommissioning study date to the nuclear license expiration date.

that the amortization should be recorded as a base rate fuel expense with a credit to an unfunded Account 228 reserve.⁹ 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.¹⁰ 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 2015. The company's cost analysis and continuation of a zero annual accrual was approved by Order No. PSC-16-0250-PAA-EI.¹¹ FPL's current study is similar to its 2015 Decommissioning Study (2015 study or prior study) 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.¹²

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.

⁹ Order No. PSC-02-0055-PAA-EI.

¹⁰ Order No. PSC-05-0902-S-EI.

¹¹ Order No. PSC-16-0250-PAA-EI, issued June 29, 2016, in Docket No. 20150265-EI, *In re: Petition for approval of 2015 nuclear decommissioning study*, by Florida Power & Light Company.

¹² 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 & Light Company's Turkey Point Nuclear Units 3 and 4, and St. Lucie Nuclear Units 1 and 2, valued in 2020 dollar terms?

Recommendation: Staff recommends the Commission find that FPL's total current estimated cost valued in 2020 dollars for decommissioning Turkey Point Nuclear Units 3 and 4 of \$1,361,192,000, and for St. Lucie Nuclear Units 1 and 2 of \$1,745,462,000 is reasonable. (Smith II, Kunkler, Barrett, Shrum)

Staff Analysis: FPL filed an updated site-specific decommissioning cost study on December 14, 2020, in accordance with Rule 25-6.04365, F.A.C. 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 improvements in technology, regulatory changes that have transpired since FPL's last nuclear decommissioning study and review in 2015, and any relevant additional updates and information.

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. In 2018, FPL filed a second application to extend the operating license for TP3 and TP4 an additional twenty years.¹³ That extension was granted by the NRC in 2019. Accordingly, all four units' investment amounts will continue to be included in rate base until expiration of their respective extended operating licenses, or until such time as FPL decides to retire the units. The operating license expiration dates for TP3 and TP4 are July 2052 and April 2053, 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 2015 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

¹³ David Drucker, U.S Nuclear Regulatory Commission, letter to Mr. Mano Nazar, Florida Power & Light Company, December 4, 2019, Adams Ascension No. ML19305C879
<https://www.nrc.gov/docs/ML1930/ML19305C879.pdf>

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 that the SNF will 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 2073, and by 2071 for St. Lucie.

Towards the end of the decommissioning process, or at least two years prior to the expected license termination dates of approximately 2074 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.¹⁴ Staff notes that FPL's current decommissioning study assumes site remediation to the level of unrestricted use. At this point, the nuclear license will be terminated, thus concluding NRC oversight.

Decommissioning Cost Estimates

FPL commissioned *EnergySolutions, LLC* (*EnergySolutions*) to develop the decommissioning cost estimates for its 2020 study. To produce its decommissioning cost estimates, *EnergySolutions* utilizes the decommissioning cost model based on the fundamentals laid out in the Atomic Industrial Forum/National Environmental Studies Project Report AIF/NESP-036, "Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates." The report was prepared in accordance with the NRC Regulatory Guide 1.202, "Standard Format and Content of Decommissioning Cost Estimates for Nuclear Power Reactors." *EnergySolutions* states that they based their estimates on proven decommissioning technologies. *EnergySolutions* further states that their cost estimates are in compliance with current regulatory requirements.

The major decommissioning cost drivers/centers in FPL's 2020 study are: program management (staffing/labor), insurance and regulatory fees, site security, spent fuel management, waste packaging, transportation, and disposal, site characterization and license termination surveys, energy costs, decontamination and removal-related activities (engineering, demolition, and support equipment), and low-level radioactive waste inspection fees. Consequently, these cost drivers, with the exception of decontamination and removal-related activities, also reflect the greatest dollar value changes from the 2015 study. These specific cost drivers and the changes from the 2015 study are discussed individually further in staff's recommendation.

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 cooling period (in fuel pool) for the SNF once plant operations have ceased and the reactors are permanently de-fueled.

¹⁴ 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.

After the cooling period has concluded, the SNF will be transferred directly to DOE or 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.

Site-specific plant systems and building inventories were used to develop the decommissioning cost estimates. These plant systems and building inventories are the same as those used in the 2015 Study, because EnergySolutions determined that no major installations or removals had taken place since 2015. EnergySolutions utilizes proprietary unit cost factors, historical data, and project execution strategies to produce several outputs. These outputs include waste volumes and classification, required man-hours, and estimated costs.¹⁵ Unit factors for concrete removal, steel removal, and cutting costs were developed and valued using local labor rates.

The total estimated cost to decommission Turkey Point has decreased by approximately 23.4 percent from the 2015 study. The total estimated costs to decommission St. Lucie decreased by 3.4 percent during the same timeframe. Tables 1-1 and 1-2 below present the cost comparisons from 2015 to 2020 by major category using the selected methods of decommissioning. The large decrease in License Termination costs are explained in more detail in the Site Characterization and License Termination Surveys section and the Florida Low Level Radioactive Waste Inspection Fee section 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 2015 dollars and 2020 dollars, respectively.

Table 1-1
Turkey Point Decommissioning Cost Comparison 2015-2020

Plant Turkey Point Units 3 and 4	2015 Study (\$1000s)**	2020 Study (\$1000s)	Percent Difference	Annual Percent Difference***
License Termination	1,204,251	1,018,355	-15.4	-3.3
Spent Fuel Management	478,765	282,949	-40.9	-10
Site Restoration	94,289	59,888	-36.5	-8.7
Total*	1,777,305	1,361,192	-23.4	-5.2

Source: Order No.PSC-2016-0250-PAA-EI and FPL’s 2020 Decommissioning Study

*May not add due to rounding

**Amounts are different than those reflected in the 2020 study. Staff has used the costs that were approved in Order No. PSC-16-0250-PAA-EI.

*** Represents the annual percentage increase over 5 years

¹⁵ 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.

**Table 1-2
 St. Lucie Decommissioning Cost Comparison 2015-2020**

Plant St Lucie Units 1 and 2	2015 Study (\$1000s)	2020 Study (\$1000s)	Percent Difference	Annual Percent Difference**
License Termination	1,208,237	1,254,740	3.8	0.8
Spent Fuel Management	486,705	427,313	-12.2	-2.6
Site Restoration	111,537	63,409	-43.1	-10.7
Total*	1,806,479	1,745,462	-3.4	-0.7

Source: FPL’s 2015 and 2020 Decommissioning Studies

*May not add due to rounding

**Represents the annual percentage increase over 5 years

On an individual unit basis, the current estimated costs in 2020 dollars for the decommissioning of FPL’s nuclear plants are as follows: TP3 equals \$652,645,000, TP4 equals \$708,547,000, SL1 equals \$923,401,000, and SL2 equals \$822,060,000. 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 86.45 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 March 25, 2019 are sufficiently above the NRC’s required minimum.¹⁶

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 2015 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 decreased by approximately 27.3 percent, or \$156.2 million for Turkey Point, and 9.5 percent, or \$53.3 million for St. Lucie from the company’s prior study in 2015. A change in the staffing plan models is the primary factor for the lower costs.

Insurance and Regulatory Fees

In the 2015 study, TLG assumed a large one-time reduction to the Nuclear Property Insurance premiums at the time the plant shutdown.¹⁷ EnergySolutions however, assumes several smaller reductions to the premiums at specific milestones that take place throughout the

¹⁶ Responses to Staff’s First Data Request, No. 81.

¹⁷ TLG was the consultant hired by FPL to conduct the 2015 Study.

decommissioning process. Due to the timing differences in these milestone-specific reductions of premiums, the comparative insurance and regulatory fees category costs increased by \$29.0 million, or 62.5 percent for Turkey Point and \$54.4 million, or 115.2 percent for St. Lucie from the company's 2015 study.

Security

The 2020 study assumes lower security staffing levels than those in the 2015 Study. These reduced levels are due, in part, to a reduction in staffing once the SNF is removed from the spent fuel pool. Further, due to the 20-year subsequent license extension at the Turkey Point site, it is assumed that the DOE will begin to pick up the fuel before the decommissioning process begins. As a result, *EnergySolutions* projects that the ISFSI will be in operation for a shorter period of time which reduces the need for security personnel. Security costs have decreased by approximately \$125.5 million, or 54.3 percent for Turkey Point, and by \$32.3 million, or by 17.8 percent for St. Lucie from the company's 2015 study.

Spent Fuel Management (Direct Expenditures)¹⁸

The Nuclear Waste Policy Act of 1982 (NWPAA) 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 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.¹⁹ As part of its resumed review, the NRC published the final volumes of its formal Safety Evaluation Report (SER) of the project in January 2015, as well as an Environmental Impact Statement supplement in May 2016.²⁰ However, facing funding issues and strong state and regional opposition, the adjudicatory process remains unclear. 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.

¹⁸ Direct spent fuel management expenditures exclude program management costs but include costs for dry shielded storage canisters and horizontal storage modules, spent fuel loading/transfer/spent fuel pool O&M fees.

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

²⁰ The NRC's Yucca Mountain Repository SER details the evaluation of 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). The NRC's Environmental Impact Statement supplement examines the potential environmental impacts with respect to potential contaminant releases from the geologic repository for spent nuclear fuel and high-level radioactive waste at Yucca Mountain, Nye County, Nevada.

Date: June 3, 2021

Separate and apart from the Yucca Mountain project and NRC reviews, in January 2013, the DOE released its “Strategy for Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste,” which serves as a statement of Administration policy regarding the disposition of used nuclear fuel and high-level radioactive waste.²¹ Under this strategy, the DOE plans to make “demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048.”²² Staff understands that the ultimate purpose of this policy direction and approach is to 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.²³ 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.²⁴ 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 2017 equal \$282,255,686.²⁵ Reimbursement amounts for calendar years 2018 and 2019 are currently pending as the DOE has rejected an estimated \$4.8 million in costs incurred by FPL in those years. FPL is disputing DOE’s determination.²⁶

Assumptions relating to FPL’s spent fuel management plan in its current decommissioning study include: (1) a DOE repository for disposing of commercial SNF will be operational and available in 2030, (2) SNF transfers to a federal facility will begin in 2031 for Turkey Point and 2033 for St. Lucie, and (3) the spent fuel acceptance rate is consistent with the 2004 “Acceptance Priority Ranking & Annual Capacity Report.”²⁷ Accounting for the aforementioned assumptions, transfer of all SNF from Turkey Point to the DOE would be completed by the end of 2073. Transfer of all SNF from St. Lucie to the DOE would be completed by 2071.

²¹ U.S. Department of Energy, “Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste,” January 2013.

²² *Id.*

²³ U.S. Code of Federal Regulations, Title 10, Part 50 – Domestic Licensing of Production and Utilization Facilities, Subpart 54 (bb), “Conditions of Licenses”.

²⁴ Order No. PSC-16-0560-AS-EI, issued December 15, 2016, in Docket No. 160021-EI, *In re: Petition for rate increase by Florida Power & Light Company*, Docket No. 160061-EI, *In re: Petition for approval of 2016-2018 storm hardening plan, by Florida Power & Light Company*, Docket No. 160062-EI, *In re: 2016 depreciation and dismantlement study by Florida Power & Light Company*, and Docket No. 160088-EI *In re: Petition for limited proceeding to modify and continue incentive mechanism, by Florida Power & Light Company*.

²⁵ Responses to Staff’s First Data Request, No. 71.d.

²⁶ *Id.*

²⁷ U.S. Department of Energy, “Acceptance Priority Ranking & Annual Capacity Report,” DOE/RW-0567, July 2004.

Total estimated direct costs for spent fuel management decreased by 67.0 percent, or \$193.8 million, for Turkey Point and 49.2 percent, or \$138.3 million, for St. Lucie from the company's 2015 study. This decrease is primarily due to the 20-year reduction of the ISFSI Operating Period post shutdown of Turkey Point Unit 4, a reduction in the quantity of spent fuel canisters required to be purchased, as well as a 25 percent savings for container material and equipment due to bulk purchasing. Staff notes that the 2015 study included costs for an ISFSI expansion, whereas the 2020 study does not.²⁸

Waste Packaging, Transportation, and Disposal

The contaminated and activated material generated during a nuclear reactor decontamination and dismantling process is classified as low-level radioactive waste (LLRW). LLRW is further classified based on levels of radioactivity (lowest-to-highest) as either Class A, B, C, or Greater than Class C (GTCC). The majority of LLRW assumed for disposal in FPL's analysis, in terms of both volume and mass, is Class A waste.²⁹

For LLRW disposal cost estimation and planning purposes, FPL has a Life of Plant Agreement with EnergySolutions to dispose of Class A nuclear waste at EnergySolutions' facility in Clive, Utah. EnergySolutions' facility in Clive does not have a license to dispose of Class B or C radioactive waste, which is more highly radioactive than Class A. 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 2020 study, Classes B and C waste are assumed to be shipped and disposed of at the WCS facility.

The total estimated cost of Waste Packaging, Transportation & Disposal (Class A, B, & C) increased by \$35.7 million, or 14.4 percent for Turkey Point, and \$155.1 million, or 54.4 percent for St. Lucie, from the company's 2015 study. These increases are primarily due to the additional debris/storm drain added as a result of the methodology change discussed below in the Site Characterization section.

The total estimated cost of Waste Packaging, Transportation & Disposal (GTCC) increased by \$5.4 million, or 16.7 percent for Turkey Point, and \$22.2 million, or 69.4 percent for St. Lucie from the company's 2015 study. These increases are primarily due to the assumed escalation of the 2015 disposal costs, as well as differing methodologies in how the transportation and associated packaging costs of the GTCC material are accounted for between TLG and EnergySolutions.³⁰

²⁸ Responses to Staff's First Data Request, No. 79.

²⁹ Waste disposal volumes and costs, itemized by packaging, transportation, surcharges and disposal costs by waste class and facility, are provided in Appendix E of FPL's 2020 Decommissioning Study, for both Turkey Point and St. Lucie.

³⁰ Transportation cost of the GTCC material is included in the disposal cost in the Company's 2015 study, whereas the Company's 2020 study includes approximately \$4.3M (including contingency) in transportation costs for GTCC in addition to the disposal cost. The Company's 2015 study included approximately \$2.8M (excluding contingency) in packaging costs, whereas the Company's 2020 study includes approximately \$14.1M (excluding contingency) in packaging costs. FPL attributes this difference to some portion of the packaging costs being included in other cost categories in the 2015 study.

Decontamination & Removal

Removal costs primarily capture costs related to the disassembly of plant components and the placement of those components into 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 19.3 percent, or \$39.7 million for Turkey Point, and 3.8 percent, or \$9.3 million for St. Lucie from the company's prior 2015 study. Escalation is the main reason for this increase.³¹ However, the increase is mitigated by a change in methodology from the 2015 Study.

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, EnergySolutions applied specific contingency allowances to each individual unit's 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 costs for each unit respectively results in the proposed weighted average contingency percentages for the 2020 study. The contingency values for all four nuclear units have been reduced from FPL's prior study as displayed in the table below:

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

Nuclear Unit	2015 Study³²	2020 Study
TP3	17.46%	14.26%
TP4	17.41%	14.54%
SL1	17.37%	14.16%
SL2	18.04%	14.45%

Source: FPL's 2015 and 2020 Decommissioning Studies

Due to the number of large-scale decommissioning projects conducted by EnergySolutions and the industry as a whole, the costs involved are more well-known. Therefore, the 2020 study reflects lower contingency values than were reflected in the 2015 study. Staff believes the

³¹ EnergySolutions assumes that future decommissioning costs will grow at a rate of 3.15 percent per year.

³² Order No. PSC-16-0250-PAA-EI.

contingency provisions presented in FPL's 2020 Decommissioning Study, which are based on industry standards and guidelines, as discussed above, are reasonable.

Site Characterization and License Termination Surveys

Site characterization and survey cost estimates have decreased substantially from the prior study.³³ Site characterization and survey costs decreased 46.0 percent, or \$17.2 million, at Turkey Point, and 52.4 percent, or \$22.6 million at St. Lucie. The primary driver of the cost decrease is a change in methodology that *EnergySolutions* employs regarding the removal of certain buildings as radiological instead of clean. *EnergySolutions'* methodology minimizes inefficient decontamination activities, as well as reducing personal exposure, increases schedule certainty and general site safety. While this change in methodology does cause an increase in assumed debris removal, those additional costs are more than offset by this methodology change.

Energy Costs

Energy costs have been reduced significantly from the 2015 study. These costs represent electricity usage at the decommissioning site to support decommissioning activities. The 2020 study bases the energy costs on the natural gas cost rather than the heavy oil energy usage cost used in the 2015 study. This results in a decrease of 75.9 percent, or \$30.8 million at Turkey Point, and 77.2 percent, or \$36.1 million at St. Lucie.

Florida Low Level Radioactive Waste Inspection Fee

Florida Low Level Radioactive Waste Inspection Fee estimates have increased since the 2015 cost study. This increase is driven by the methodology change discussed above in the Site Characterization section. The change in methodology generates a larger volume of low level radioactive debris, consequently causing an increase in the amount of the inspection fee. This results in an increase of 407.7 percent, or \$4.4 million for Turkey Point, and 103.3 percent, or \$5.3 million for St. Lucie.

Conclusion

Staff believes FPL, 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 2020 Decommissioning Study and the associated data request responses, staff recommends the Commission find that FPL's total current estimated cost valued in 2020 dollars for decommissioning TP3 and TP4 of \$1,361,192,000, and for SL1 and SL2 of \$1,745,462,000 is reasonable.

³³ 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 & Light Company's St. Lucie Nuclear Units 1 and 2, and Turkey Point Nuclear Units 3 and 4?

Recommendation: Staff recommends the appropriate jurisdictional accrual amounts necessary to recover future decommissioning costs over the remaining life of each nuclear power plant remain at the currently-authorized zero dollars per year as last approved by Order No. PSC-16-0250-PAA-EI. (Higgins)

Staff Analysis: The purpose of this issue is to determine the appropriate annual accrual amounts to be charged to customers for satisfying the future cost of decommissioning FPL's nuclear power plants. As mentioned in staff's recommendation statement, the currently-authorized overall annual decommissioning accrual is set to zero dollars per year (suspended) as last approved by Order No. PSC-16-0250-PAA-EI.³⁴ Staff notes the annual decommissioning accrual has been continuously suspended since September of 2005.³⁵

In general, to determine the annual accrual, the cost of decommissioning is first estimated in current dollars and then escalated to its future value using specific cost escalation assumptions. The question becomes how much revenue needs to be collected from current ratepayers in equal monthly payments, earning at a given rate, to equal the future value of decommissioning costs. The determination of the annual accrual then resembles an annuity calculation. The specific cost escalation rates and the assumed funds earning rate are discussed in greater detail later in this issue. However, in considering current or "on hand" funding levels, the very need for an annual decommissioning accrual is determined by a similar process. To determine the need for an annual decommissioning accrual, the assumed funds earnings rate is used to develop the present value of the future funding requirement. A comparison is then made between the present value of the future funding requirement and the current funds on hand including certain assumed future tax implications. The results of this analysis will be the present value of the net funding requirement (which includes the scenario/result of no current additional ratepayer funding being required).

The results of the annual accrual analysis presented with FPL's 2020 study indicates that no new funding from customers (positive annual accrual for nuclear plant decommissioning) is required at this time. Staff notes that unless ordered otherwise, the continued adequacy of FPL's decommissioning accrual will be reviewed by the Commission at least once every five years as required by Rule 25-6.04365(3), F.A.C.

³⁴ Order No. PSC-16-0250-PAA-EI, Issued June 29, 2016, in Docket No. 150265-EI, *In re: Petition for approval of 2015 nuclear decommissioning study*, by Florida Power & Light Company.

³⁵ 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*.

Current Cost of Decommissioning

As discussed in detail in Issue 1, the current overall system decommissioning cost estimates included in FPL’s 2020 study are shown in Table 2-1. The estimated costs are as of December 31, 2020.

**Table 2-1
 Current Decommissioning Cost Estimates by Plant**

Nuclear Unit	Estimated Decommissioning Costs (2020 Dollars)
St. Lucie Unit No. 1	\$923,401,492
St. Lucie Unit No. 2	\$822,060,215
Turkey Point Unit No. 3	\$652,645,521
Turkey Point Unit No. 4	\$708,546,759
Total	\$3,106,653,987

Source: FPL’s 2020 Decommissioning Study, Support Schedule G.

Cost Escalation Rates

Specific cost escalation rates are used to convert the current estimated decommissioning cost to the future decommissioning cost for each nuclear unit. The current decommissioning cost estimates are delineated into five summary cost categories. These categories are: labor, equipment/materials, transportation, LLRW disposal, and other. The current decommissioning cost estimates are escalated to future values at the respective license termination dates for each nuclear unit using separate inflation forecasts applicable to the aforelisted cost categories. With the exception of burial rates, FPL relied upon “The U.S. Economy, The 30-Year Outlook, August 2020,” published by Global Insight (a Division of IHS Markit, Ltd.) as the source for its specific escalation forecasts. FPL’s escalation rate for burial is based on company-specific data. Staff notes the estimated burial costs contained in the 2020 study are assumed to escalate at an annual rate of 2.0 percent. The specific year-by-year escalation rates for all cost categories are shown on page one of Schedule G (for both St. Lucie and Turkey Point) of the 2020 study.³⁶

The methodology used by FPL in the 2020 study to determine the assumed average escalation rates is consistent with the methodology used in its prior or 2015 study. The plant-specific average annual escalation rates used in the 2015 study and the 2020 study to convert the current decommissioning costs to the future decommissioning costs for each nuclear unit are shown in Table 2-2 below:

**Table 2-2
 Average Annual Escalation Rate Comparison**

Nuclear Unit	2015 Study	2020 Study
St. Lucie Unit No. 1	3.11%	3.15%
St. Lucie Unit No. 2	3.21%	3.19%
Turkey Point Unit No. 3	3.23%	3.15%
Turkey Point Unit No. 4	3.20%	3.13%

Sources: FPL’s 2015 and 2020 Decommissioning Studies, Support Schedule G.

³⁶ Document No. 13466-2020, filed December 14, 2020.

Future Cost of Decommissioning

The estimates of the total future cost to decommission each nuclear unit are based on the current costs to decommission, operating license termination and release dates, and the specific cost escalation rates. The estimated future costs to decommission each nuclear unit at their respective assumed license release dates are listed in Table 2-3. Staff notes the cost figures listed below are on a system basis and net of the estimated U.S. Department of Energy reimbursements for costs incurred related to the on-site storage of spent nuclear fuel as previously discussed in Issue 1.

**Table 2-3
 Future Cost of Decommissioning**

Nuclear Unit	Future Net Decommissioning Costs (Nominal)
St. Lucie Unit No. 1	\$1,699,371,718
St. Lucie Unit No. 2	\$1,661,014,402
Turkey Point Unit No. 3	\$1,860,206,656
Turkey Point Unit No. 4	\$2,039,087,009
Total	\$7,259,679,785

Source: FPL’s 2020 Decommissioning Study, Support Schedule G.

Current Funding

The NRC requires that licensees provide reasonable financial assurance that funds will be available for decommissioning through one of three methods: (a) prepayment prior to the start of operation, (b) an external sinking fund, or (c) surety, insurance or other guarantee method.³⁷ The company provides for financial assurance for plant decommissioning through its nuclear decommissioning trust funds which are held in trust with The Bank of New York Mellon Corporation (BNY Mellon) as trustee. This financial provisioning and trust arrangement constitutes an external sinking fund. 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 licensee’s administrative control in which the total amount of funds would be sufficient to pay decommissioning cost at the time termination of operation is expected.”³⁸

The current projected nuclear decommissioning trust (NDT) balances and the estimated present values of funding requirements on a jurisdictional basis are shown in Table 2-4 below. Due to the 2020 study’s preparation and filing timeframe, the last two months of fund earnings data presented in the analysis were estimated. The NDT balances represent actual data through October 2020, and projected data for the last two months of the year, or November and December of 2020. Staff notes that generally for the purposes of an annual decommissioning accrual, a fund balance greater than or equal to the estimated present value of the future funding requirement at the date of study indicates the current funding level is sufficient, and that no new ratepayer money is presently required.

³⁷ Nuclear Regulatory Commission Rule 10 C.F.R. § 50.75, *Reporting and recordkeeping for decommissioning planning.*

³⁸ *Id.*

**Table 2-4
 Current Total Fund Balances and Estimated Present Values of Future Funding Requirements**

Nuclear Unit	Projected Fund Balance at 12/31/2020 (Jurisdictional)	Estimated Present Value of Future Funding Requirements at 12/31/2020 (Jurisdictional)
St. Lucie Unit No. 1	\$833,351,306	\$477,805,889
St. Lucie Unit No. 2	\$685,049,470	\$397,792,046
Turkey Point Unit No. 3	\$704,175,236	\$343,479,870
Turkey Point Unit No. 4	\$791,939,364	\$370,793,989
Total	\$3,014,515,376	\$1,589,871,794

Source: FPL's 2020 Decommissioning Study, Support Schedule G.

Funding Period

The funding period is the period over which revenues are collected from customers for purposes of decommissioning the nuclear units. Plant-specific funding periods are assumed to expire on the last day of the month preceding the month in which the plant's operating license is due to expire. The operating license expiration dates for the nuclear units are listed in Table 2-5 below:

**Table 2-5
 Current NRC Operating License Expiration Dates**

Nuclear Unit	Expiration Date
St. Lucie Unit No. 1	March 1, 2036
St. Lucie Unit No. 2	April 6, 2043
Turkey Point Unit No. 3	July 19, 2052
Turkey Point Unit No. 4	April 10, 2053

Source: FPL's 2020 Decommissioning Study, Section 2.

Years of Fund Expenditures

The years in which the accumulated NDT funds will be expended for purposes of plant decommissioning are listed in Table 2-6 below:

**Table 2-6
 Years of Fund Expenditures**

Nuclear Unit	Period
St. Lucie Unit No. 1	2036-2073
St. Lucie Unit No. 2	2043-2073
Turkey Point Unit No. 3	2052-2074
Turkey Point Unit No. 4	2053-2074

Source: FPL's 2020 Decommissioning Study, Support Schedule G.

Fund Earnings Rate

The fundamental purpose of the Commission's review of a decommissioning study is to ensure there will be adequate funding on hand at the time the nuclear unit is decommissioned. An

assumed fund earnings rate is integral to this process. 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.

The annual accrual amount moves inversely to the fund earnings rate. In other words, the higher the assumed fund earnings rate, the lower the annual accrual and vice versa. In its 2020 study, FPL used an assumed fund earnings rate of 4.0 percent, which is applicable to all four of its nuclear decommissioning trust funds. This assumed fund earnings rate is based on a Consumer Price Index (CPI) rate of 2.0 percent, plus a projected real long-term, after-tax, and net-of-fees earnings rate (or spread) of 2.0 percent.

This is the same approach FPL used in its approved 2015 study where the assumed earnings rate is compared to the CPI to assure that the overall return remains above CPI.³⁹ The assumed fund earnings rate of 4.0 percent, as compared to a CPI of 2.0 percent reflects the projection of continued adequacy of the funds. This projection assumes an investment strategy where the funds are moved from a current mix of 50 percent equity/growth assets and 50 percent income-oriented assets, to 100 percent fixed-income assets prior to the first year of decommissioning.⁴⁰ For the final years of decommissioning, all funds are assumed to be conservatively invested/held in a mix of bonds and cash.

As demonstrated by the range of earnings displayed in Table 2-7, the total fund returns have experienced some volatility from period to period. However, since inception, the NDT has returned an overall level of 7.1 percent. Given the projected long-term CPI of 2.0 percent, and the actual returns since inception, staff believes FPL’s estimated fund earnings rate of 4.0 percent is reasonable for the purposes of determining the appropriate annual accrual amounts.

Table 2-7
Period NDT Time-Weighted Returns

Period	Fund Return	CPI	Spread
1-Year	11.90%	1.20%	10.70%
2-Year	15.10%	1.70%	13.40%
3-Year	8.80%	1.80%	7.00%
5-Year	9.20%	1.90%	7.30%
10-Year	7.70%	1.70%	6.00%
Since Fund Inception	7.10%	2.60%	4.50%

Source: FPL’s Responses to Staff’s First Data Request, No. 1.

Given the parameters discussed above, the funding analysis indicates the current funding position as of December 31, 2020, is more than sufficient to satisfy the present value of future

³⁹ Order No. PSC-16-0250-PAA-EI.

⁴⁰ FPL’s Responses to Staff’s First Data Request, No. 3, filed March 4, 2021, and FPL’s 2020 Study, Section 2.

Date: June 3, 2021

nuclear plant decommissioning cost requirements and that no new customer monies are required at this time.

Minimum Fund Earnings Rate

Separate from the issue of the assumed fund earnings rate is the matter of whether the Commission should impose a prospective minimum fund earnings rate. In Order No. 21928, the Commission declined to identify a specific prospective growth value, but as a safeguard, determined that a minimum fund earnings rate equivalent to the level of inflation over each previous five-year review period would be appropriate.⁴¹ The Commission reaffirmed this approach in FPL's 1994 and 1998 Decommissioning Studies. In those orders 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.⁴²

FPL believes a distinct prospective minimum funds earnings rate should not be imposed and the current approach, as approved by the Commission, should remain in effect.⁴³ 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, as it believes the Commission's current approach of periodically evaluating the adequacy of fund return levels

⁴¹ Order No. 21928, Issued September 21, 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*.

⁴² Order No. PSC-95-1531A-FOF-EI, issued December 19, 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*, and 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. 001835-EI, *In re: Petition for approval of revised annual accrual for nuclear decommissioning costs by Florida Power Corporation*; 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*.

⁴³ FPL's Responses to Staff's First Data Request, No. 2, filed March 4, 2021.

(i.e., minimum fund returns equivalent to the level of inflation over the previous five-year review period) is appropriate.

Conclusion

The current annual expense requirements to satisfy the estimated future nuclear decommissioning costs presented in the 2020 study support a zero accrual as of December 31, 2020. Based on the current estimated cost to decommission each nuclear unit, the assumed escalation rates to derive future cost values, current funding levels, and the assumed fund earnings rate of 4.0 percent, staff believes the continued suspension of any decommissioning accruals is reasonable. Thus, staff recommends the appropriate jurisdictional accrual amounts necessary to recover future decommissioning costs over the remaining life of each nuclear power plant remain at the currently-authorized zero dollars per year as last approved by Order No. PSC-16-0250-PAA-EI.

Date: June 3, 2021

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 \$1.647 million (system), based on the proposed January 1, 2022 effective date of new customer rates in FPL's current rate case proceeding, Docket No. 20210015-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. (Shrum, Barrett)

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 that are required to ensure safe and reliable operations of the nuclear plant.⁴⁴ These inventories are unique and will have little value other than scrap when the associated nuclear units are decommissioned. Recognizing that a level of EOL M&S inventories will remain at the final shut down of each nuclear plant and therefore equates to an unrecovered cost, the Commission authorized FPL to amortize the cost of EOL M&S inventories over the remaining life span of each nuclear plant in order to ratably allocate the costs to those receiving the benefit of the nuclear generated power.⁴⁵ For administrative ease, the Commission further required FPL 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 2015 Decommissioning Study and approved by the Commission with Order No. PSC-16-0250-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,⁴⁶ 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 2015 Decommissioning

⁴⁴ 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. In FPL's Response to Staff's First Data request, Nos. 25 and 34, FPL stated that valves and electrical switching equipment are the items with the highest value in the respective EOL M&S inventories.

⁴⁵ Order No. PSC-02-0055-PAA-EI; 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*, and Order No. PSC-16-0250-PAA-EI, issued June 29, 2016, in Docket No. 150265-EI, *In re: Petition for approval of 2015 nuclear decommissioning study, by Florida Power & Light Company*.

⁴⁶ Order No. PSC-02-0055-PAA-EI.

Study became effective in January 2017, consistent with the Stipulation and Settlement Agreement approved by the Commission.⁴⁷

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 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 2020 study, FPL estimated the remaining net unrecovered cost associated with the EOL M&S inventories, as of December 31, 2020, was \$43.643 million, with approximately \$21.678 million at St. Lucie (SL)⁴⁸ and \$21.965 million at Turkey Point (TP).

In its 2020 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. On March 12, 2021, FPL filed a Petition for Base Rate Increase and Rate Unification.⁴⁹ After filing its Rate Case petition, the company updated its analysis associated with the EOL M&S inventories in the instant docket in order to align with the proposed effective date identified in FPL's Rate Case, January 1, 2022.⁵⁰ The updated analysis reflects that the total estimated unrecovered cost for EOL M&S inventories, as of January 1, 2022, is \$41.672 million. Approximately \$20.969 million of this total is associated with SL, and the remaining \$20.703 million is associated with TP inventories. The revised annual amortization expense totals \$1.647 million, which is a decrease of \$0.326 million from \$1.973 million. The principle reason for the \$0.326 million reduction is the license extension granted at TP Unit 4 from 2033 to 2053, since it increased the number of months over which the remaining balance is projected to be recovered.⁵¹ Increasing the number of months for this calculation results in a net reduction to the current amortization amount. Details of the estimated EOL M&S-related costs, reserve balances, remaining amounts to be recovered, and annual amortization amounts, as of January 1, 2022, are presented in Table 3-1 below:

⁴⁷ Order No. PSC-16-0560-AS-EI, issued December 15, 2016, in Docket No. 160021-EI, *In re: Petition for rate increase by Florida Power & Light Company*.

⁴⁸ The calculations in the 2020 Decommissioning Study reflect that other parties have small ownership interests in the St. Lucie units. FPL's ownership share for these units is reflected as 92.552245 percent, net of participants. FPL owns all interests in the Turkey Point units.

⁴⁹ See Docket No. 20210015-EI. Pursuant to Order No. PSC-2021-0116-PCO-EI, Order Establishing Procedure, the hearing for the FPL Rate Case is scheduled to begin on August 16, 2021.

⁵⁰ FPL's Response to Staff's First Data request, Nos.18-19, 28-29.

⁵¹ FPL's Response to Staff's First Data request, No. 56.

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

Plant Site/ Unit	(a) EOL M&S Inventories as of 1/1/2022	(b) Reserve Balance as of 1/1/2022	(c) = (a) – (b) Remaining Amounts to be Recovered	(d) Current Annual Amortization	(e) Revised Annual Amortization	(f) = (e) – (d) Change in Annual Amortization ⁵²
SL2*	30,746	9,777	20,969	710	985	275
TP4**	<u>42,881</u>	<u>22,178</u>	<u>20,703</u>	<u>1,263</u>	<u>662</u>	<u>(601)</u>
Total	<u>73,627</u>	<u>31,955</u>	<u>41,672</u>	<u>1,973</u>	<u>1,647</u>	<u>(326)</u>

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

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

Data Source: FPL's response to Staff's First Data Request, Nos. 18-19, 28-29; FPL 2020 Decommissioning Study, Assumptions and Schedule E; and Order No. PSC-16-0250-PAA-EI, Pages 19-21.

Based on reviewing the information contained in FPL's 2020 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 recommends that the updated EOL M&S amortization amount is \$1.647 million. The effective date of this updated amount is addressed in Issue 5.

Conclusion

The amortization expense associated with the unrecovered value of EOL M&S inventories that will exist at these nuclear sites following shut down should be revised. Staff recommends that the Commission approve the revised annual amortization expense associated with EOL M&S inventories for FPL of \$1.647 million (system). The revised amortization represents a decrease of approximately \$0.326 million from the authorized amortization amount from the 2015 Decommissioning Study. The amortization of EOL M&S inventories should be included in subsequent decommissioning studies so the related annual accruals can be revised, if warranted.

⁵² FPL's responses to Staff's First Data Request, Nos. 18-19, 28-29; FPL 2020 Decommissioning Study, Assumptions and Schedule E; and Order No. PSC-16-0250-PAA-EI.

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 \$3.564 million (system), based on the proposed January 1, 2022 effective date of new customer rates in FPL's current rate case proceeding, Docket No. 20210015-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. (Shrum, Barrett)

Staff Analysis: Last Core is defined as 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, there are currently no economically feasible solutions to decrease the amount of unburned fuel in the reactor at the end of the last cycle.⁵³ Recognizing that the Last Core is associated with the final shut down of a nuclear unit and therefore equates to an unrecovered cost at the end of each unit's life, the Commission authorized FPL to amortize the cost of the Last Core over the remaining life span of each nuclear unit in order to ratably allocate the costs to those receiving the benefit of the nuclear generated power.⁵⁴ For administrative ease, the Commission also required FPL 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 EOL M&S addressed in Issue 3, FPL's current level of annual amortization expense was required in its 2015 study and approved by the Commission with Order No. PSC-16-0250-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, 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.⁵⁵ Consequently, FPL's authorized annual amortization determined in its 2015 Decommissioning Study became effective in January 2017, consistent with the Stipulation and Settlement Agreement approved by the Commission.⁵⁶

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 the 2020 Decommissioning Study, FPL estimated the remaining net unrecovered cost

⁵³ FPL's Responses to Staff's First Data Request No. 54.

⁵⁴ Order No. PSC-02-0055-PAA-EI, issued January 7, 2002 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*; and Order No. PSC-16-0250-PAA-EI, issued June 29, 2016, in Docket No. 150265-EI, *In re: Petition for approval of 2015 nuclear decommissioning study, by Florida Power & Light Company*.

⁵⁵ Order No. PSC-02-0055-PAA-EI.

⁵⁶ See Footnote 50.

associated with Last Core at the SL and TP nuclear plants, as of December 31, 2020, was approximately \$96.759 million.

Consistent with the approach used with the EOL M&S balances in its 2020 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. After filing its Rate Case petition, the company updated its analysis associated with Last Core to align with the proposed effective date of FPL's 2021 base rate case, January 1, 2022.⁵⁷ The updated analysis reflects that FPL's estimate of remaining net unrecovered cost associated with the Last Core, as of January 1, 2022, is approximately \$85.686 million. The resulting annual amortization expense is estimated to be \$3.564 million, a decrease of \$7.509 million annually from the current level. In data request responses, FPL stated that total nuclear fuel costs have gone down by approximately 35 percent in the five-year period between the 2015 and 2020 Decommissioning Studies.⁵⁸ Details of the estimated Last Core-related costs, reserve balances, remaining amounts to be recovered, and annual amortization amounts, as of January 1, 2022, are presented in Table 4-1 below:

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

	(a)	(b)	(c) = (a) – (b)	(d)	(e)	(f) = (e) – (d)
Plant Site/ Unit	Last Core Costs as of 1/1/2022	Reserve Balance as of 1/1/2022	Remaining Amounts to be Recovered	Current Annual Amortization	Revised Annual Amortization	Change Annual in Amortization ⁵⁹
SL1	56,900	43,839	13,061	3,200	919	(2,281)
SL2	55,700	35,412	20,288	2,972	953	(2,019)
TP3	65,300	40,771	24,529	2,536	803	(1,733)
TP4	63,800	35,992	27,808	2,365	889	(1,476)
Total	241,700	156,014	85,686	11,073	3,564	(7,509)

Data Source: FPL's response to Staff's First Data Request, Nos. 38-39, 42-44, 47-48, 51-53; FPL 2020 Decommissioning Study, Assumptions and Schedule F; and Order No. PSC-16-0250-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 amount is \$3.564 million. The effective date of this updated amount is addressed in Issue 5.

⁵⁷ FPL' Response to Staff's First Data Request, Nos. 38, 48.

⁵⁸ FPL's response to Staff's First Data Request, Nos. 36-37, 45-46.

⁵⁹ FPL's response to Staff's First Data Request, Nos. 38-39, 42-44, 47-48, 51-53; FPL 2020 Decommissioning Study, Assumptions and Schedule F; and Order No. PSC-16-0250-PAA-EI.

Conclusion

The amortization expense associated with the cost of the Last Core of nuclear fuel should be revised. Staff recommends that the Commission approve the revised annual amortization expense associated with the cost of the Last Core for FPL of \$3.564 million (system). This represents a decrease of approximately \$7.509 million from the authorized amortization amount from the 2015 Decommissioning Study. 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.

Date: June 3, 2021

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. (Smith II)

Staff Analysis: By Order No. PSC-16-0250-PAA-EI, issued June 29, 2016, Petition for approval of 2015 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 2020 study indicates that decommissioning base cost estimates have decreased since 2015, along with 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. 20210015-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.⁶⁰

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.

⁶⁰ 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, 2025. (Smith II)

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, 2020, its next study should be filed no later than December 14, 2025.

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, 2025.

Issue 7: Should this docket be closed?

Recommendation: If no protest to this proposed agency action is filed by a substantially affected person within 21 days of the issuance of the order, a consummating order should be issued and the docket should be closed. (Brownless)

Staff Analysis: If no protest to this proposed agency action is filed by a substantially affected person within 21 days of the issuance of the order, a consummating order should be issued and the docket should be closed.