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September 5, 2024

-VIA ELECTRONIC FILING -

Adam Teitzman
Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, FL 32399-0850

Re: Docket No. 20240001-EI

Dear Mr. Teitzman:

Attached for electronic filing in the above docket is the prepared testimony of Florida Power & Light Company (“FPL”) witness Dan DeBoer. This testimony is submitted in support of FPL’s Petition for Approval of its Levelized Fuel Cost Recovery Factors and Capacity Cost Recovery Factors for January 2025 through December 2025.

Please contact me if you have or your Staff has any questions regarding this filing.

Sincerely,

s/ Maria Jose Moncada

Maria Jose Moncada

Attachments

cc: Counsel for Parties of Record (w/ attachments)

CERTIFICATE OF SERVICE

Docket No. 20230001-EI

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished by electronic service on this 5th day of September 2024 to the following:

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By: s/ Maria Jose Moncada
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1 **BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION**

2 **FLORIDA POWER & LIGHT COMPANY**

3 **TESTIMONY OF DANIEL DeBOER**

4 **DOCKET NO. 20240001-EI**

5 **SEPTEMBER 5, 2024**

6

7 **Q. Please state your name and address.**

8 A. My name is Daniel DeBoer. My work business address is 15430 Endeavor Drive,
9 Jupiter, Florida 33478.

10 **Q. By whom are you employed and what is your position?**

11 A. I am employed by Florida Power & Light Company (“FPL or the Company”) as
12 Vice President, Nuclear.

13 **Q. Have you previously filed testimony in this docket?**

14 A. Yes.

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

16 A. My testimony presents and explains FPL’s projections of nuclear fuel costs for the
17 thermal energy to be produced by our nuclear units measured in Million British
18 Thermal Units or (“MMBtu”) for 2025. Nuclear fuel costs were input values to the
19 GenTrader model that is used to calculate the costs included in the proposed fuel
20 cost recovery factors for the period January 2025 through December 2025. I am
21 also supporting FPL’s projected 2025 incremental plant security and Fukushima-
22 related costs. Additionally, my testimony discusses unplanned outages that
23 occurred at the St. Lucie nuclear power plants over the period from June through
24 July 2024.

1 **Q. Aside from planned maintenance outages, does FPL project that its nuclear**
2 **units will achieve 100% availability?**

3 A. No, it does not. No nuclear plant in the industry projects 100% availability. Nuclear
4 plants are complex industrial facilities that consist of dozens of interdependent
5 systems, hundreds of major components, tens of thousands of sub-components,
6 tens of thousands of tubes, miles of piping and many redundant safety features.
7 FPL continuously improves the physical plant, procedures, and processes to
8 improve reliability and maintain nuclear safety. However, even when prudent
9 actions are taken, FPL's nuclear units – like all nuclear units in the industry –
10 experience equipment failures and unplanned outages. My testimony describes
11 outages that warrant further explanation for the Florida Public Service
12 Commission.

13

14 **Nuclear Fuel Costs**

15 **Q. What is the basis for FPL's projections of nuclear fuel costs?**

16 A. FPL's nuclear fuel cost projections are developed using projected energy
17 production at its nuclear units and current operating schedules for the period
18 January 2025 through December 2025.

19 **Q. Please provide FPL's projection for nuclear fuel unit costs and energy for the**
20 **period January 2025 through December 2025.**

21 A. FPL projects the nuclear units will burn 301,570,988 MMBtu of energy at a cost
22 of \$0.4740 per MMBtu for the period January 2025 through December 2025.
23 Projections by nuclear unit and by month are listed in Schedule E-4 of Exhibit AM-
24 5, which is attached to FPL witness Mohamed's testimony.

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Nuclear Plant Incremental Security Costs

Q. What is FPL’s projection of incremental security costs at its nuclear power plants for the period January 2025 through December 2025?

A. FPL projects that it will incur \$36.0 million in incremental nuclear power plant security costs in 2025. The costs consist of \$5.1 million of capital expenditures and \$30.9 million of O&M expenses.

Q. Please provide a brief description of the items included in incremental nuclear power plant security costs.

A. The projection includes the additional costs incurred in maintaining a security force as a result of implementing the NRC’s fitness-for-duty rule under 10 CFR Part 26, which strictly limits the number of hours that nuclear security personnel may work; additional personnel training; maintenance of the physical upgrades resulting from implementing the NRC’s physical security rule under 10 CFR Part 73; and impacts of implementing the NRC’s cyber security rule under 10 CFR Part 73. It also includes force-on-force modifications at the St. Lucie and Turkey Point nuclear sites to effectively mitigate new adversary tactics and capabilities employed by the NRC’s Composite Adversary Force, as required by NRC inspection procedures.

Fukushima-Related Costs

Q. What is FPL’s projection of Fukushima-related costs at its nuclear power plants for the period January 2025 through December 2025?

A. FPL’s current projection of Fukushima-related costs for 2025 is approximately \$944 thousand in O&M expenses.

1 **Q. Please provide a brief description of the items included in this projection of**
2 **Fukushima-related costs.**

3 A. The projection includes FPL’s share of costs incurred for equipment, storage,
4 and transportation, to support the shared Regional Response Centers (a
5 warehouse of off-site portable equipment shared by the industry).

6

7 **2024 Unplanned Outage or Downpower Events**

8 **Q. Please describe the unplanned outages or downpower at FPL’s nuclear**
9 **plants in 2024 for which FPL wishes to provide further information.**

10 A. On June 4, 2024, St. Lucie Unit 2 was manually tripped due to a lowering of
11 condenser vacuum. On June 18, 2024, St. Lucie Unit 2 experienced a tube leak
12 in the condenser waterbox. This resulted in elevated steam generator sodium and
13 chloride concentrations, requiring a forced unit shutdown to address the issue.
14 Additionally, on July 28, 2024, St. Lucie Unit 1 experienced an automatic
15 reactor trip when a main steam isolation valve (“MSIV”) closed unexpectedly.
16 FPL’s responses to the unplanned outage events were prudent and efficient, and
17 the units were returned to service safely. More details are described below.

18

19 **June 4, 2024 St. Lucie Unit 2**

20 **Q. Please describe the circumstances related to the June 4 event.**

21 A. On June 4, 2024, elevated levels of sodium were detected from one of the St. Lucie
22 condenser hotwells on Unit 2. Operations reduced power to 92% to secure the
23 associated circulating water pump (“CWP”) on the “A” side. After securing the
24 CWP, a false logic signal was developed due to a failed relay that resulted in a trip

1 to another circulating water pump on the “B” side. This condition resulted in
2 lowering condenser vacuum requiring operators to manually trip the unit in
3 accordance with procedures.

4 **Q. What did the investigation of the “B” CWP trip find?**

5 A. The St. Lucie “B” CWP trip was caused by a valve limit switch failure. The original
6 CWP control logic design did not consider the potential for this type of limit switch
7 contact failure and created a system vulnerability. This vulnerability was not
8 visible to the operators and could not have been reasonably detected or prevented.

9 **Q. What actions were taken to address the valve limit switch failure?**

10 A. Prior to restarting the unit, administrative controls were put in to prevent a near-
11 term recurrence of this event. The plant was safely returned to operations in two
12 days and power was maintained at approximately 92% for eight equivalent days
13 for related repairs.

14 **Q. What actions will FPL take to prevent recurrence?**

15 A. A modification to the interlock circuit will be implemented at the next refueling
16 outages for both St. Lucie units to remove this vulnerability. A complete condenser
17 valve limit switch forensics analysis will be performed during the next refueling
18 outage to determine the cause of the limit switch failure.

19

20 **June 18, 2024 St. Lucie Unit 2**

21 **Q. Please describe the circumstances related to the June 18 event.**

22 A. On June 18, 2024, in accordance with FPL procedures operators performed a
23 forced unit shutdown of St. Lucie Unit 2 due to elevated sodium and chloride
24 concentrations in both steam generators as required by FPL’s operating procedures.

1 Elevated measurements of sodium and chloride in the steam generators is typically
2 an indication of a condenser tube leak.

3 **Q. What did the investigation of the condenser tube leak find?**

4 A. After the shell side of the condenser was drained, an internal inspection of the
5 leaking tube revealed that a previously plugged, adjacent tube was severed. In
6 addition, other broken tubes and debris were removed during the inspection.
7 Repeated contact between the severed tube damaged the adjacent tube over time,
8 ultimately leading to the leak. The causal investigation found that there was
9 insufficient industry guidance and no existing standards to assess and mitigate the
10 risks of structural failures of a previously plugged and abandoned condenser tube.

11 **Q. What actions were taken to address the tube failure?**

12 A. During the investigation, the affected and surrounding tubes were plugged to
13 prevent further damage. In addition, FPL conducted leak testing to ensure no other
14 tubes were in a similar condition. The plant was offline for about 6.5 days and
15 subsequently safely returned to operations.

16 **Q. What actions does FPL plan to take to prevent recurrence?**

17 A. A strategy to assess and mitigate the risks of structural failures of a condenser tube,
18 along with the impact on adjacent tubes will be implemented during the next
19 outages. For example, FPL will install tube stakes, stabilizers and remove any
20 damaged components in vulnerable areas for the condenser. This removes the
21 threat of a worn tube severing and impacting adjacent tubes. FPL is updating
22 procedure guidance for securing plugged tubes and will work with the Electric
23 Power Research Institute to develop tube staking industry guidelines.

24

July 28, 2024 St. Lucie Unit 1

1
2 **Q. Please describe the circumstances related to the July 28 event.**

3 A. On July 28, 2024, a MSIV to the ‘A’ steam generator (“SG”) closed unexpectedly
4 resulting in an automatic reactor trip. The cause for the MSIV closure was
5 determined to be a result of a failed relay in the Engineered Safety Features
6 Actuation System (“ESFAS”). The ESFAS system contains a subsystem called the
7 Main Steam Isolation Signal (“MSIS”). The affected relay failed in its designed
8 safety-related position to actuate, resulting in a signal to close the MSIV. With a
9 closed MSIV at full power, the reactor protection system will automatically initiate
10 a trip of the unit due to the imbalance in steam output between the two SGs. The
11 MSIS is a very complex instrument and control radiological accident mitigation
12 system.

13 **Q. What did the investigation of the MSIV malfunction find?**

14 A. The investigation determined the relay failed in its intended safety-related position.
15 The complexity of the ESFAS system required extensive troubleshooting of
16 numerous subcomponents to determine the direct cause of the MSIV closure. The
17 investigation found that a MSIS relay had failed in its safe position due to a
18 malfunction of the relay coil. In addition, the investigation determined that there
19 was no OEM guidance for replacement of these relays and thus, a preventative
20 maintenance plan was not established to replace the relays on a periodic basis.

21 **Q. What actions were taken to address the MSIS relay failure?**

22 A. The failed relay was replaced along with the five additional MSIS relays as part of
23 an extent of condition review to determine and correct similar relay vulnerabilities.
24 The unit was safely returned to service within approximately seven days.

1 **Q. What actions does FPL plan to take to prevent recurrence?**

2 A. FPL plans to implement preventative maintenance for these relays that calls for
3 time-based replacement. An Extent of Condition review was performed and other
4 ESFAS vulnerable relays will be replaced on Unit 2 during the upcoming outage
5 to prevent this malfunction at that unit.

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

7 A. Yes.