August 26, 2022
L-2022-110
10 CFR 50.90

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington D C 20555-0001

RE: Turkey Point Nuclear Generating Station, Units 3 and 4
Docket Nos. 50-250 and 50-251
Subsequent Renewed Facility Operating Licenses DPR-31 and DPR-41

License Amendment Request 276, Revise Fire Protection Program in Support of Reactor Coolant Pump Seal Replacement Project

Pursuant to 10 CFR Part 50.90, Florida Power & Light Company (FPL) hereby requests amendments to Subsequent Renewed Facility Operating License (SRFOL) Nos. DPR-31 and DPR-41 for Turkey Point Nuclear Generating Station, Units 3 and 4 (Turkey Point), respectively. The proposed license amendment is requested in accordance with the Turkey Point Units 3 and 4 SRFOL Paragraph 3.D, Fire Protection, for fire protection program changes that may be made without prior NRC approval. One of the criteria for such a change is that the risk increase resulting from the change is less than 1x10-7/year (yr) for Core Damage Frequency (CDF) and less than 1 x 10-8/yr for Large Early Release Frequency (LERF).

The plant change to be evaluated is the replacement of the currently installed reactor coolant pump (RCP) seals with the Framatome RCP hydrostatic seal package equipped with the Passive Shutdown Seal (PSDS). RG 1.205 (ADAMS Accession No. ML21048A448) states that an engineering change evaluation should be performed to demonstrate the acceptability of the change in terms of the plant change evaluation criteria and compliance with the fire protection requirements of 10 CFR 50.48(a) and NFPA 805. FPL's evaluation of the proposed RCP seal replacement against the criteria of SRFOL Paragraph 3.D, concluded that the threshold for self-approval is exceeded and therefore, prior NRC approval is sought.

The enclosure to this letter provides FPL's evaluation of the proposed change. Attachment 1 to the enclosure provides the Fire PRA analysis. Attachments 3, 5 and 7 contain information used to derive the Fire PRA failure probabilities for use in the Fire PRA analysis.

Attachments 1, 3, 5 and 7 contain information that is proprietary to Framatome, Incorporated. Pursuant to 10 CFR 2.390(a)(4), FPL requests that the proprietary information be withheld from public disclosure. The request is supported by an affidavit signed by Framatome, Incorporated, the owner of the information. The affidavit, provided in Attachment 9, sets forth the basis on which the information may be withheld from public disclosure by the NRC and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR 2.390, "Public inspections, exemptions, requests for withholding." Correspondence with respect to the proprietary aspects of this information or the supporting Framatome, Incorporated affidavit should be addressed to Mr. Phillip Opsal, Manager, Product Licensing for Framatome, 3315 Old Forest Road, Lynchburg, Virginia, 24501. Attachments 2, 4, 6 and 8 provide the non-proprietary versions of the information.

FPL has determined that the proposed change does not involve a significant hazards consideration pursuant to 10 CFR 50.92(c), and there are no significant environmental impacts associated with the change. The Turkey Point Onsite Review Group has reviewed the proposed license amendment. In accordance with 10 CFR 50.91(b)(1), a copy of the proposed license amendment is being forwarded to the State designee for the State of Florida.

FPL requests that the proposed change be processed within one year. The RCP seal replacement is scheduled to occur during the Unit 4 2023 Fall refueling outage, currently scheduled for September 2023. Approval of this request is needed to support startup following the Unit 4 2023 Fall refueling outage.

This letter contains no new regulatory commitments.

Should you have any questions regarding this submittal, please contact Mr. Kenneth Mack, Fleet Licensing Manager at 561-904-3635.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on the 26 day of August 2022.

Sincerely,

/S/ Dianne Strand

Dianne Strand
General Manager, Regulatory Affairs

Enclosure
Attachments (9)

cc: USNRC Regional Administrator, Region II
USNRC Project Manager, Turkey Point Nuclear Generating Station
USNRC Senior Resident Inspector, Turkey Point Nuclear Generating Station
Ms. Cindy Becker, Florida Department of Health (Enclosure and Attachments 2, 4, 6, 8, and 9 only)

Turkey Point Nuclear Plant Unit 3 and Unit 4
License Amendment Request 276, Revise Fire Protection Program in Support of Reactor Coolant Pump Seal Replacement Project

EVALUATION OF THE PROPOSED CHANGE

Turkey Point Nuclear Plant Unit 3 and Unit 4
License Amendment Request 276, Revise Fire Protection Program in Support of Reactor Coolant Pump Seal Replacement Project

Attachment 1 – Application Specific Fire PRA Model to Support LAR Amendment for Replacement of RCP Seals at Turkey Point Units 3 and 4 (proprietary version)

Attachment 2 - Application Specific Fire PRA Model to Support LAR Amendment for Replacement of RCP Seals at Turkey Point Units 3 and 4 (non-proprietary version)

Attachment 3 – Passive Shutdown Seal – Evaluation of Failure to Actuate for Framatome RCP Seals (proprietary version)

Attachment 4 – Passive Shutdown Seal – Evaluation of Failure to Actuate for Framatome RCP Seals (non-proprietary version)

Attachment 5 – Passive Shutdown Seal – Evaluation of Failure to Remain Sealed (proprietary version)

Attachment 6 – Passive Shutdown Seal – Evaluation of Failure to Remain Sealed (non-proprietary version)

Attachment 7 – Spurious Actuation Probability (proprietary version)

Attachment 8 – Spurious Actuation Probability (non-proprietary version)

Attachment 9 – Framatome, Incorporated Affidavit

Turkey Point Nuclear Plant Unit 3 and Unit 4
License Amendment Request 276, Revise Fire Protection Program in Support of Reactor Coolant Pump Seal Replacement Project

1.0 SUMMARY DESCRIPTION

Pursuant to 10 CFR Part 50.90, Florida Power & Light Company (FPL) hereby requests amendments to Subsequent Renewed Facility Operating License (SRFOL) Nos. DPR-31 and DPR-41 for Turkey Point Nuclear Generating Station, Units 3 and 4 (Turkey Point), respectively. The proposed license amendment is requested in accordance with the Turkey Point Units 3 and 4 SRFOL Paragraph 3.D, Fire Protection, for plant changes that may be made without prior NRC approval. One of the criteria for such a change is that the risk increase resulting from the change is less than 1x10-7/year for Core Damage Frequency (CDF) and less than 1x10-8/year for Large Early Release Frequency (LERF).

The plant change to be evaluated is the replacement of the currently installed reactor coolant pump (RCP) seals with the Framatome RCP hydrostatic seal package equipped with the Passive Shutdown Seal (PSDS). RG 1.205 (Reference 1) states that an engineering change evaluation should be performed to demonstrate the acceptability of the change in terms of the plant change evaluation criteria and compliance with the fire protection requirements of 10 CFR 50.48(a) and NFPA 805 (Reference 2). FPL's evaluation of the proposed RCP seal replacement against the criteria of SRFOL, Paragraph 3.D, concluded that the threshold for self-approval is exceeded and therefore, prior NRC approval is sought.

This request is made, considering RG 1.205, Section 3.2, as a change to the Fire Protection Program (FPP) after transition to a 10 CFR 50.48(c) licensing basis is complete. Turkey Point has completed transition to a 10 CFR 50.48(c) licensing basis. This is not a risk-informed plant-specific change to the licensing basis as described by RG 1.174 (Reference 3). Figure 1 of RG 1.174 shows that RG 1.205 is the appropriate application specific RG for 10 CFR 50.48(c) changes such as this one. RG 1.205 refers to RG 1.174 for acceptance criteria and nuclear safety defense-in-depth. Other aspects of RG 1.174 are not included in this license amendment request.

2.0 DETAILED DESCRIPTION

2.1 System Description and Operation

Westinghouse Model 93 RCPs are installed at Turkey Point.

An RCP seal prevents reactor coolant from exiting the RCP body along the pump's impeller shaft. Turkey Point currently has a three-stage RCP seal design installed on Unit 3 and Unit 4. These seal types were first installed during the Unit 3 fall 2015 and Unit 4 spring 2016 refueling outages. The current seal has three identical hydrodynamic mechanical stages in series, plus an abeyance seal designed to be installed on the Westinghouse RCPs.

Prior to installation of the current RCP seals, AREVA RCP seals were installed. The replacement of the existing AREVA RCP seals with the current RCP seals was necessary to reduce seal leakage to allow the Turkey Point Units to cope with a beyond design basis event with an extended loss of AC power (ELAP).

Turkey Point also transitioned to NFPA 805 as the basis for its Fire Protection Program in 2015. Similar to the effect on the beyond design basis event, a reduction in seal leakage increases the operator response time for fire damage scenarios and reduces the risk evaluated in the Fire PRA.

Approval of Turkey Point's transition to NFPA 805 for the Fire Protection Program was documented in Turkey Point Amendments 262 and 257 (Reference 4). Included in this approval is the use of a

PRA model specific to the current RCP seal design. This implementation item was changed in 2019.

In Turkey Point Amendments 286 and 280 (Reference 5), the NRC approved a revision to use the guidance from WCAP-16175-P-A to model the RCP seals. The Fire PRA was updated with selected data, specifically, the Human Error Probability (HEP) values associated with reduced time to trip the RCPs on loss of seal cooling. The time to trip the RCPs following a loss of seal cooling was established as 20 minutes from WCAP-16175-P-A, and the RCP seal failure probabilities in the PRA model were adjusted to be consistent with those presented in WCAP-16175-P-A appropriate for the current RCP seals.

2.2 Framatome RCP Hydrostatic Seal with PSDS

The Framatome RCP hydrostatic seals have three seal stages, and the Framatome seal package includes a fourth seal that is referred to as the PSDS. Leakage from the RCPs along the RCP shaft is controlled by a seal package that consists of three mechanical shaft seals arranged in series and referred to as seal No. 1, No. 2 and No. 3. During normal operation, high pressure seal water is injected (~8 gpm) by the Chemical and Volume Control System into the seal chamber to cool the seals and prevent the leakage of high temperature reactor coolant into the seal chamber. The injection water, which overcomes the normal RCS operating pressure, enters the pump through a connection on the thermal barrier flange.

The PSDS was specifically designed to improve the ability of the RCP seal package to control RCS leakage during ELAP and station blackout (SBO) events, when the seal cooling normally provided by the thermal barrier and the seal injection flow is unavailable for an extended period of time. After seal cooling is lost, the fluid temperature upstream of the shaft seals will rise rapidly and the leakage of reactor coolant through the RCP seals will increase. The PSDS is a fourth seal within the Framatome RCP hydrostatic seal package that remains inactive during normal operation of the RCP. It actuates automatically in response to the temperature rise that takes place within the seal assembly which results from a loss of cooling to the RCP seals. After the PSDS has actuated, it seals the reactor coolant leak path that exists between the pump shaft and the lower seal housing.

The PSDS is a passively actuated mechanical seal that is designed to provide very low leakage through the installed RCP seals in the event of an ELAP. The PSDS is pre-assembled into the No.1 seal insert. The PSDS will remain in the inactive state until an event causes the PSDS to be exposed to temperatures above its actuation temperature.

During the April 26, 2022, pre-submittal meeting with the NRC Staff concerning this license amendment request (Reference 6), a question was raised concerning the applicability of a 2015 Staff audit of the Framatome RCP hydrostatic seals with the PSDS device. Several questions were raised during the 2015 audit regarding the PSDS design. Framatome has reviewed the audit questions and responses to determine if changes were made to the PSDS design that would impact the Turkey Point installation. The review determined that the majority of the audit items were specific to the design under review and none of the audit items affect the current Framatome RCP hydrostatic seal package with PSDS to be installed at Turkey Point.

The replacement Framatome RCP hydrostatic seal package with PSDS has been evaluated for installation in Turkey Point under the criteria of 10 CFR 50.59 to determine if any attribute requires prior NRC approval and no attribute for the installation of the replacement seals has been identified as requiring prior NRC approval. Therefore, this license amendment only addresses the change in the Fire PRA supporting the FPP due to the installation of the Framatome RCP hydrostatic seal

with PSDS as described below. Operating procedures and operator training will be reviewed for consistency with the conditions and timing evaluated in site-specific analyses and will be revised as necessary to support installation of the Framatome RCP hydrostatic seals with a PSDS device. Any required procedure changes needed as part of the installation of the Framatome RCP hydrostatic seal with the PSDS device will be evaluated under 10 CFR 50.59.

2.3 Current Requirements /Description of Proposed Change

The license condition related to the FPP established at Turkey Point Units 3 and 4 is shown below. This condition allows some risk informed changes to be made to the FPP without prior NRC approval, provided certain limits are met.

> D. Fire Protection
>
> Risk-Informed Changes that May Be Made Without Prior NRC Approval
> A risk assessment of the change must demonstrate that the acceptance criteria below are met…
>
> (b) Prior NRC review and approval is not required for individual changes that result in a risk increase less than 1x10-7/year (yr) for CDF and less than 1x10-8/yr for LERF. The proposed change must also be consistent with the defense-in-depth philosophy and must maintain sufficient safety margins. The change may be implemented following completion of the plant change evaluation.

As described below, FPL proposes to change the Fire PRA treatment of RCP seals due to a physical change of RCP seals in each Unit. The conclusions of the Fire PRA evaluation of the new RCP seal design provide results that exceed the increase in CDF and LERF limits in the Fire Protection license condition (SRFOL Condition D) that define risk-informed changes that may be implemented without prior NRC approval. Therefore, prior NRC approval for this risk-informed change is being sought in this license amendment request.

2.4 Reason for Proposed Change

FPL plans to change the currently installed RCP seals to a three stage Framatome RCP hydrostatic seal with a PSDS device. The change in RCP seal design results in a change to the Fire PRA treatment of the RCP seal leakage. The Fire PRA methods for evaluating the new RCP seal design are described below.

3.0 TECHNICAL EVALUATION

NFPA 805 includes provisions for licensees to make changes to their approved FPPs, once the transition to a 10 CFR 50.48(c) license is complete.

Regulatory Guide 1.205 states that an engineering evaluation should be performed to address the acceptability of the change in terms of the plant change evaluation criteria and compliance with the fire protection requirements of 10 CFR 50.48(a). The plant change evaluation process includes an integrated assessment of the acceptability of the change in risk, defense-in-depth, and safety margins, regardless of the methods or approaches used to evaluate the change. RG 1.174 provides acceptance guidance applicable to NFPA 805 plant change evaluations.

The proposed change addresses the change in risk associated with the replacement of the current RCP seal with the Framatome RCP hydrostatic seal that includes the PSDS. Attachments 1 and 2

provide the risk method and analysis. Additional information related to the risk methods and analysis are available for NRC audit. Attachments 3 through 8 include the PSDS failure probability information needed to support the Fire PRA analysis. Attachments 2, 4, 6 and 8 are the non-proprietary (redacted) versions of Attachments 1, 3, 5 and 7.

3.1 Fire Probabilistic Risk Assessment

In accordance with Section 2.4.3.3 of NFPA 805, prior to implementation, the NRC must find the PRA approach, methods, and data acceptable. The PRA approach and methods are described below. The PRA supporting data is described in Section 3.2.

3.1.1 Summary of Fire PRA Approach

The Fire PRA is updated to incorporate a model of the Framatome PSDS seal in conjunction with Fire PRA model refinements to incorporate recent Fire PRA realism NUREGs. Section 3.6.2 of Attachments 1 and 2 provides a detailed discussion of the Fire PRA model logic changes incorporated to address the PSDS design configuration. Additional refinements to the Fire PRA have been performed to provide a more realistic assessment of the plant risk and the delta risk associated with this modification. These refinements include the interruptible fire modeling defined in NUREG-2230 (Reference 7), updated transient heat release rates defined in NUREG-2233 (Reference 8) as well as guidance provided in NUREG-2178, Volume 2 (Reference 9) regarding a more realistic assessment of the impact of fires near walls and corners.

The criteria for NFPA 805 post transition fire protection program changes requiring NRC review is specific to the Fire PRA results. However, to estimate the impact on total plant risk, the Full Power Internal Events/Internal Flood (FPIE/IF) risk numbers are reviewed with respect to the potential impact of the seal modification. A conservative estimate of the impact of the seal modification on the internal events and flooding models can be made by assuming that the delta risk for the Fire PRA as a fraction of total fire risk can be applied to the FPIE/IF risk values. This estimate is conservative since the FPIE/IF models are not as sensitive to seal failure given that the scenarios for which the RCP PSDS seal would actuate are limited to blackout scenarios and random failures of the thermal barrier cooling and seal injection systems which are far less likely than fire induced failures of these systems. A discussion of these impacts is contained in Appendix A of Attachments 1 and 2.

3.1.2 Acceptability of Fire PRA Approach

The changes performed to model the Framatome PSDS configuration are considered updates to the Fire PRA model given that they use the existing logic and refine it to allow assessment of PSDS model specific failure modes. The use of NUREG-2230, NUREG-2233 and NUREG-2178, Volume 2 as discussed in the previous section are also considered to be Fire PRA model updates and not new methods or upgrades given their application of methodologies similar to those applied in the original model. Primary changes are associated with fire suppression event tree structure, heat release rate applicability and wall and corner impact criteria relaxation.

Based on the above, the replacement of the RCP seal is considered a Fire PRA maintenance level update not an upgrade.

The Fire PRA models have been assessed against RG 1.200, Revision 2 (Reference 10). Details concerning the assessment are contained in Appendix B of Attachments 1 and 2.

3.1.3 Cumulative Risk of Changes

Cumulative risk incurred subsequent to the final NFPA 805 model is primarily associated with reductions in risk associated with model refinements. No plant modifications exceeding a no-more-than-minimal/negligible risk increase have been implemented since the final NFPA 805 post transition model.

3.1.4 Summary of PRA Methods and Modeling

The primary input data, other than the fault tree logic changes are the Framatome RCP seal failure probabilities and the system time window for operator action to trip the RCPs.

Plant Partitioning/Ignition Frequency Changes
No plant partitioning or ignition frequency changes were incorporated in the Fire PRA model update for the replacement of the RCP seals.

Component/Cable Changes
The modified fault tree added 20 basic events and removed 45. The scope and concerns addressed by the changes are limited. The changes to the modified fault tree centers around a few distinct areas as detailed in Attachments 1 and 2.

Multi Compartment Analysis/Hot Gas Layer Scenario Changes
Changes to hot gas layer and multi-compartment analysis results are associated with incorporation of NUREG-2230 for interruptible fires, and NUREG-2233 for transient fire heat release rates and combining the methods of NUREG-2230 and NUREG-2180 (Reference 11) for the cable spreading room in-panel detection systems. These changes are described in Attachments 1 and 2.

NUREG-2230 Incorporation into the Fire PRA
The scenario report is updated to reflect the changes made for updating the non-suppression probability calculation. Appendix D of Attachments 1 and 2 describes the changes made to implement the Fire Modeling Workbook and the NUREG-2230 interruptible fire scenario refinements.

NUREG -2230/2180 Methodology
The incipient detection credited in the cable spreading room is modified to include NUREG-2230 along with NUREG-2180. This has been done for the cable spreading room which is provided with an in-panel incipient detection system for many of the high-risk contribution panels. Appendix E of Attachments 1 and 2 describes the approach used for crediting these incipient detection systems.

The switchgear rooms are provided with area wide incipient detection systems, which were not previously credited in the Fire PRA. A review of the risk benefit of incorporation of the switchgear room area-wide incipient detection system indicated that the resultant risk decrease would be small. Therefore, no credit for the switchgear area-wide incipient detection system is taken.

New and Modified Scenarios
New scenarios have been added in the cable spreading room, the switchgear rooms and the Control Room. A scenario containing all cubicles was added in the “A” switchgear rooms to account for the severe portion of the fire defined as that portion of the cubicle fires that impact targets up to but excluding cables impacting diesel dynamic loading failure. High-energy arcing fault scenarios were refined by pulling the high-energy arcing fault portion of the ignition frequency from the individual cubicle scenarios and merging them into one high-energy arcing fault scenario for each room. This scenario incorporated the targets associated with the highest risk individual cubicle scenario

The cable spreading room added new scenarios. Severe panel scenarios were created which included all targets except the closest tray that contained RCP, component cooling water or containment isolation pressure switch cables, which, if damaged, could result in a loss of RCP seal cooling. These trays were excluded, and non-suppression probabilities associated with them were created using the distance to the nearest associated tray. Unit specific non-suppression probabilities were assigned based on the location of that Unit with respect to high-risk ignition sources.

The original Control Room main control board scenarios were based on one scenario with all cabinets impacted. This scenario was split into 4 scenarios that included failure of each combination of adjacent panels.

These scenarios are described in Attachments 1 and 2.

3.1.5 Operator Action

The PSDS was specifically designed to actuate during an ELAP or SBO event to limit the leakage of reactor coolant past the RCP shaft. A loss of seal cooling (LOSC) during normal plant operation is a plant event which can result in PSDS actuation, and which requires the corresponding RCP seal leakage reduction to be credited. The LOSC event is different from the ELAP and SBO in that at the time cooling to the RCP seals is lost, the RCPs will continue to operate until they are manually tripped. Therefore, the LOSC event must consider the time available for the operator to manually trip the RCPs. The current time to trip the RCPs following a loss of seal cooling was established as 20 minutes. The change in RCP seal design reduces the time available to verify the RCPs are tripped in the event of a complete loss of RCP seal cooling to 16 minutes. The change in human error probabilities associated with failure to trip the RCPs within the allowed time is addressed in Attachments 1 and 2.

Turkey Point has off-normal operating procedures (Procedure 3/4-ONOP-041.1, Reactor Coolant Pump Off Normal) [Reference 12] that address abnormal operating conditions for the reactor coolant pumps. The procedures provide different operator actions which depend on plant conditions indicated by alarms and other indications. Some of these conditions are related to RCP seal cooling. Responses to abnormal RCP seal cooling indications include efforts to restore RCP seal cooling, manual RCP trips and reactor trips. Any changes to this procedure and others required by changes in the RCP seal design will be made with the installation of the new RCP seals. These procedure changes will be evaluated using the criteria in 10 CFR 50.59.

3.2 Summary of Data Used to Support the PRA

Testing of the PSDS included actuation of the PSDS and testing of the seal's ability to remain sealed after actuation. To calculate the failure probabilities for spurious actuation, failure to actuate and failure to remain sealed, detailed engineering analyses were performed. An appropriate failure modes and effects analysis (FMEA) was performed for each type of failure to help identify possible component failure modes and effects. Attachments 3 through 8 provide the details of the engineering analysis that determined the failure probabilities used in the Fire PRA analysis.

Attachments 3 and 4 provide the results of an evaluation of the failure of the PSDS to actuate during an accident scenario. The evaluation is not based on the application of the PSDS in the seal package for a particular RCP type. A fault tree was developed to determine the failure to actuate probability.

Attachments 5 and 6 present the results of an evaluation of the failure of the PSDS to remain sealed after successful actuation. The evaluation is not based on the application of the PSDS in the seal package for a particular RCP type. Failure mechanisms were determined using a failure modes and effects analysis. These failures are quantified using the fault tree included in Attachments 5 and 6.

Attachments 7 and 8 present the results of an evaluation of a spurious actuation of the PSDS. The evaluation is based on the application of the PSDS in the seal package for a Westinghouse Model 93 RCP. Spurious actuation events were evaluated using appropriate engineering analyses and testing. The results of these efforts are contained in Attachments 7 and 8.

3.3 Risk Analysis Results

The results of the Fire PRA analysis are shown below. The CDF and LERF values post-modification are those calculated assuming the installation of the Framatome hydrostatic RCP seal with the PSDS insert. The delta CDF and delta LERF values compare the current (pre-modification) CDF and LERF to the post-modification CDF and LERF. More details about the analyses and results and contained in Attachments 1 and 2.

	CDF post mod	Delta CDF	% Increase	LERF post mod	Delta LERF	% Increase
U3	7.99E-05	5.20E-06	7%	1.86E-06	2.00E-07	12%
U4	7.80E-05	4.30E-06	6%	1.88E-06	1.80E-07	11%

The CDF and LERF results fall within the RG 1.174 Region II acceptance guidelines for combinations of CDF and delta CDF in Figure 4 of the RG and LERF and delta LERF combinations in Figure 5 of the RG. For results in Region II of RG 1.174, the RG states that applications will be considered only if it can reasonably be shown that the total CDF is less than 1E-04 per reactor year. The total CDF has been determined using a conservative method as described in Appendix A of Attachments 1 and 2. The total CDF includes Full Power Internal Events, Internal Flood and Fire PRA results. The results are 8.01E-05 for Unit 3 and 7.82E-05 for Unit 4. These results meet the RG 1.174 criteria of being less than 1E-04.

3.4 Performance Monitoring

The Framatome RCP hydrostatic seals with the PSDS have a 12-year operating life with a 6-year inspection period. This mid-service PSDS inspection ensures that the PSDS has not inadvertently actuated and is in normal condition. During seal replacement, the PSDS may be inspected for scoring, scratches, raised metal, pits, or chips. Any unusual wear, or changes in operational characteristics will be addressed in the station’s corrective action program. With these inspections, FPL will be capable of identifying inadvertent actuation and unexpected debris, wear, or corrosion products.

Turkey Point will maintain communication with the seal vendor and industry groups regarding the seal design, failure mechanisms, maintenance, operational controls, and industry operating experience. During operation with the new Framatome RCP hydrostatic seals with PSDS, performance parameters including the seal No. 1 leak-off flow and temperature are monitored. These actions along with inspection results will inform future PSDS inspection intervals.

3.5 Defense-in-Depth

NFPA 805, Section 2.4.4.2, states that the defense-in-depth concept should be maintained as it relates to fire protection and nuclear safety. Under NFPA 805, Section 1.2, fire protection defense-in-depth is achieved when an adequate balance of each of the following elements is provided: (1) preventing fires from starting; (2) rapidly detecting fires and controlling and extinguishing promptly those fires that do occur, thereby limiting fire damage; and (3) providing an adequate level of fire protection for structures, systems, and components important to safety, so that a fire that is not promptly extinguished will not prevent essential plant safety functions from being performed. The philosophy of nuclear safety defense-in-depth is maintained when a reasonable balance is preserved among prevention of core damage, prevention of containment failure, and mitigation of consequences.

The update to the Fire PRA does not impact the ability to prevent fires from starting, nor does it impact the ability to rapidly detect, control, and promptly extinguish fires that do occur. The only aspect of the defense-in-depth approach that is altered is the timing associated with actions to stop RCPs to mitigate seal damage due to a total loss of RCP seal cooling. In the event of a complete loss of RCP seal cooling due to a fire, the previously identified recovery actions for defense-in-depth were determined to be sufficient and are being retained. No new recovery actions for defense-in-depth or for risk were determined necessary.

The update to the Fire PRA does not change the physical condition of the plant or its operations. The update to the Fire PRA reflects a plant modification that is evaluated under 10 CFR 50.59. The plant modification does not require prior NRC approval. The update to the Fire PRA addresses core damage frequency and containment failure via the large early release frequency. These increases in frequency are found to be small in accordance with the acceptance criteria of RG 1.174. Mitigating operator actions were also considered in the Fire PRA and performance of these actions will provide the required mitigation of consequences.

3.6 Safety Margin

RG 1.174, Section 2.1.2, "Safety Margins," lists two specific criteria that should be addressed when considering the impact of plant changes on safety margins:

- Codes and standards or their alternatives accepted for use by the NRC are met; and,
- Safety analysis acceptance criteria in the licensing basis (e.g., FSAR [Final Safety Analysis Report], supporting analyses, etc.) are met, or provide sufficient margin to account for analysis and data uncertainty.

Consistent with the use of fire risk evaluations and change evaluations for the NFPA 805 performance-based approach, implementation of the following guidelines ensures the bases for maintaining safety margin:

- The risk-informed, performance-based processes utilized are based upon NFPA 805, 2001 Edition, incorporated by reference into 10 CFR 50.48(c).
- The fire risk evaluation process is in accordance with Regulatory Guide 1.205.
- The Fire PRA is developed with guidance from NUREGs 2169 (Reference 13), 2178, 2230, 2233 and NUREG/CR-6850 (Reference 14). These NUREGs reflect the most recent guidance for performing a Fire PRA.
- The Fire PRA (and the Internal Events PRA upon which it is based) have undergone formal industry peer reviews conducted by a diverse group of PRA practitioners from other plants and industry.

Review of Turkey Point's Updated Final Safety Analysis Report Chapter 14 safety analysis has determined that two Loss of Reactor Coolant Flow scenarios (Sections 14.1.9 and 14.1.12) rely on the ability of the RCPs to coast-down which is followed by natural circulation of the reactor coolant fluid to remove residual and decay heat from the core. RCP coast-down is independent of RCP seal operation and therefore unaffected. The safety analyses acceptance criteria are not affected by this change.

Therefore, the proposed change continues to maintain adequate safety margins, in part, because the changes do not impact any codes and standards or their alternatives accepted for use by the NRC, and the changes do not impact any safety analysis acceptance criteria used in the licensing basis

3.7 Conclusion

In consideration of the discussions above, it is concluded that using the Framatome RCP hydrostatic seal with the PSDS instead of the current RCP seal in the Fire PRA model results in a small increase in risk as defined by RG 1.174. Additionally, it has no impact on the defense-in-depth relative to fire protection described by NFPA 805 and that adequate safety margin continues to be maintained.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

- 10 CFR 50.48(a) states, "Each holder of an operating license issued under this part or a combined license issued under part 52 of this chapter must have a fire protection plan that satisfies Criterion 3 of appendix A to this part." The plan must also satisfy specific requirements in that section.
- 10 CFR 50.48(c)(3)(ii) states, "The licensee shall complete its implementation of the methodology in Chapter 2 of NFPA 805 (including all required evaluations and analyses), and upon completion, modify its fire protection plan required by paragraph (a) of this section to reflect the licensee's decision to comply with NFPA 805, before changing its fire protection program or the nuclear power plant as permitted by NFPA 805."
- General Design Criteria (GDC) 3, Fire Protection, of Appendix A to 10 CFR 50 states, "Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and control room. Fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety. Firefighting systems shall be designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems, and components."
- Regulatory Guide 1.205 provides guidance for licensees to use in complying with the requirements of 10 CFR 50.48(c) for performance-based fire protection programs.

The proposed license amendment complies with the requirements of 10 CFR 50.48(a) and 10 CFR 50.48(c)(3)(ii); and does not alter the manner in which Turkey Point will be operated and maintained consistent with GDC 3. All applicable regulatory requirements will continue to be satisfied as a result of the proposed change.

4.2 Precedent

None.

4.3 No Significant Hazards Consideration

The proposed license amendment is requested in accordance with the Turkey Point Units 3 and 4 Subsequent Renewed Facility Operating License (SRFOL) Paragraph 3.D, Fire Protection, for plant changes that may be made without prior NRC approval. One of the criteria for such a change is that the risk increase is less than 1x10-7/year (yr) for CDF and less than 1x10-8/yr for LERF. The plant change to be evaluated is the replacement of the currently installed reactor coolant pump (RCP) seal and replacement with the Framatome RCP hydrostatic seal package equipped with the Framatome Passive Shutdown Seal (PSDS). FPL's evaluation of the proposed RCP seal replacement against the criteria of SRFOL Paragraph 3.D, concluded that the threshold for self-approval is exceeded and therefore, prior NRC approval is sought. As required by 10 CFR 50.91(a), Florida Power & Light (FPL) has evaluated the proposed change using the criteria in 10 CFR 50.92 and has determined that the proposed change does not involve a significant hazards consideration.

(1) Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?
Response: No

The proposed change updates the Fire PRA to address a change from the currently installed RCP seal to the Framatome RCP hydrostatic seal equipped with the PSDS. This change revises the Fire PRA model for the RCP seals based on the change in RCP seal design. The RCP seal failure probabilities contribute to the changed Fire PRA risk. The change in RCP seal design also changes the time available to trip the RCPs in the event of a complete loss of RCP seal cooling. The proposed change, when compared to the currently approved Fire PRA model results in a small increase in plant risk. Fire protection defense-in-depth and adequate safety margins are maintained with the change proposed in this LAR.

As such, the proposed change cannot be an initiator of any previously evaluated accident, increase its likelihood or increase the likelihood of a malfunction of equipment required by NFPA 805 or supported equipment. Other than a different time available to trip the RCPs, the proposed change to the way the Fire PRA models RCP seals will not affect how the plants are designed or operated. The plants will continue to operate within the parameters assumed in applicable accident analyses. Hence no impact on the consequences of any previously evaluated accident will result from the proposed change.

Therefore, facility operation in accordance with the proposed changes would not involve a significant increase in the probability or consequences of an accident previously evaluated.

(2) Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?
Response: No

The proposed change updates the Fire PRA to address a change from the currently installed RCP seal to the Framatome RCP hydrostatic seal equipped with the PSDS. This change revises the Fire PRA model for the RCP seals based on the change in RCP seal design. Other than a different time available to trip the RCPs as described above, the proposed changes do not modify the way the plants are designed or operated and thereby cannot introduce new failure modes, impact existing plant equipment in a manner not

previously evaluated or initiate a new type of malfunction or accident. The proposed change results in the revision of certain Fire PRA failure probability values and as such, cannot adversely affect the ability of the plants to perform as originally designed, including their capability to withstand a worst-case single failure.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

(3) Does the proposed amendment involve a significant reduction in a margin of safety?
Response: No

This change revises the Fire PRA credit for RCP seals by using a revised Fire PRA model developed for the Framatome RCP hydrostatic seal equipped with the PSDS. The proposed change has been reviewed using the Fire PRA model that is consistent with the model used as part of the Turkey Point transition to NFPA 805. The results, which showed an increase in plant risk, were found to be acceptable. Fire protection defense-in-depth and adequate safety margins are maintained with the Fire PRA model changes proposed in the license amendment request. The proposed change does not modify any setpoints for which protective actions associated with accident detection or mitigation are initiated. Other than a different time available to trip the RCPs (in the event of a complete loss of RCP seal cooling) the proposed change does not affect the design of plant equipment nor the manner in which the plant is operated. The proposed change cannot adversely impact any Turkey Point safety limits or limiting safety settings.

Therefore, operation of the facility in accordance with the proposed change will not involve a significant reduction in the margin of safety.

Based upon the above analysis, FPL concludes that the proposed license amendment does not involve a significant hazards consideration, under the standards set forth in 10 CFR 50.92, “Issuance of Amendment,” and accordingly, a finding of “no significant hazards consideration” is justified.

4.4 Conclusion

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission’s regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATION

The proposed amendment modifies the RCP seal inputs to the Fire PRA model. Therefore, the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1. Regulatory Guide 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants," Revision 2, May 2021 (ADAMS Accession No. ML21048A448)

2. NFPA Standard 805, "Performance-Based Standard for Fire Protection for Light-Water Reactor Electric Generating Plants, 2001 Edition" [NFPA 805], January 13, 2001

3. Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-specific Changes to the Licensing Basis," Revision 3, January 2018 (ADAMS Accession No. ML17317A256)

4. NRC letter to FPL, "Issuance of Amendments Regarding Transition to a Risk-Informed Performance-Based Fire Protection Program in Accordance with Title 10 of the Code of Federal Regulations Section 50.48(c)," dated May 28, 2015 (ADAMS Accession No. ML15061A237)

5. NRC letter to FPL, “Issuance of Amendments Regarding Transition License Conditions for Reactor Coolant Pump Seal,” dated March 27, 2019 (ADAMS Accession No. ML19064A903)

6. NRC announcement for a Pre-Submittal Meeting with NextEra Energy/Florida Power & Light Company to discuss a Planned License Amendment Request to Replace Reactor Coolant Pump Seals for the Turkey Point Generating Unit Nos. 3 & 4, dated April 11, 2022 (ADAMS Accession No. ML 22112A110)

7. NUREG-2230, Methodology for Modeling Fire Growth and Suppression Response for Electrical Cabinet Fires in Nuclear Power Plants, June 2020

8. NUREG-2233, Methodology for Modeling Transient Fires in Nuclear Power Plant Fire Probabilistic Risk Assessment, October 2020

9. NUREG-2178, V2: Refining and Characterizing Heat Release Rates from Electrical Enclosures During Fire, Volume 2: Fire Modeling Guidance for Electrical Cabinets, Electric Motors, Indoor Dry Transformers, and the Main Control Board, June 2020

10. Regulatory Guide 1.200, “Acceptability of Probabilistic Risk Assessment Results for Risk-Informed Activities,” Revision 3, December 2020. (ADAMS Accession No. ML20238B871)

11. NUREG-2180, Determining the Effectiveness, Limitations, and Operator Responses for Very Early Warning Fire Detection Systems in Nuclear Facilities, December 2016

12. Florida Power & Light Procedure, 3-ONOP-041.1 and 4-ONOP-041.1, Reactor Coolant Pump Off Normal, Unit 3 revision 18, Unit 4 Revision 9B

13. NUREG-2169, Nuclear Power Plant Fire Ignition Frequency and Non-Suppression Probability Estimation Using the Updated Fire Events Database: United States Fire Event Experience Through 2009, January 2015

14. NUREG/CR-6850, EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities, Final Report, September 2005

Turkey Point Nuclear Plant Unit 3 and Unit 4
License Amendment Request 276, Revise Fire Protection Program in Support of Reactor Coolant Pump Seal Replacement Project

ATTACHMENT 9

FRAMATOME AFFIDAVIT

(3 pages follow)

A F F I D A V I T

1. My name is Philip A. Opsal. I am Manager, Product Licensing for Framatome Inc. (formally known as AREVA Inc.), and as such I am authorized to execute this Affidavit.

2. I am familiar with the criteria applied by Framatome to determine whether certain Framatome information is proprietary. I am familiar with the policies established by Framatome to ensure the proper application of these criteria.

3. I am familiar with the Framatome information contained in the following Documents:

- "Passive Shutdown Seal – Evaluation of Failure to Actuate for Framatome RCP Seals". Framatome Doc. No. 51-9351505-000
- "Passive Shutdown Seal – Evaluation of Failure to Remain Seated," Framatome Doc. No. 51-9348566-001
- "Passive Shutdown Seal – PRA Evaluation of Spurious Actuation," Framatome Doc. No. 51-9227814-004
- "Application Specific Fire PRA Model to Support LAR Amendment for Replacement of RCP seals, Revision 1" Jensen Hughes Report No. 06S001-RPT-01

Information contained in these Documents has been classified by Framatome as proprietary in accordance with the policies established by Framatome for the control and protection of proprietary and confidential information.

4. These Documents contain information of a proprietary and confidential nature and is of the type customarily held in confidence by Framatome and not made available to the public. Based on my experience, I am aware that other companies regard information of the kind contained in these Documents as proprietary and confidential.

5. These Documents have been made available to the U.S. Nuclear Regulatory Commission in confidence with the request that the information contained in these Documents be withheld from public disclosure. The request for withholding of proprietary information is made in accordance with 10 CFR 2.390. The information for which withholding from disclosure is requested qualifies under 10 CFR 2.390(a)(4) "Trade secrets and commercial or financial information."

6. The following criteria are customarily applied by Framatome to determine whether information should be classified as proprietary:

(a) The information reveals details of Framatome's research and development plans and programs or their results.

(b) Use of the information by a competitor would permit the competitor to significantly reduce its expenditures, in time or resources, to design, produce, or market a similar product or service.

(c) The information includes test data or analytical techniques concerning a process, methodology, or component, the application of which results in a competitive advantage for Framatome.

(d) The information reveals certain distinguishing aspects of a process, methodology, or component, the exclusive use of which provides a competitive advantage for Framatome in product optimization or marketability.

(e) The information is vital to a competitive advantage held by Framatome, would be helpful to competitors to Framatome, and would likely cause substantial harm to the competitive position of Framatome.

The information in these Documents is considered proprietary for the reasons set forth in paragraphs 6(b), 6(d), and 6(e) above.

7. In accordance with Framatome's policies governing the protection and control of information, proprietary information contained in these Documents has been made available,

on a limited basis, to others outside Framatome only as required and under suitable agreement providing for nondisclosure and limited use of the information.

8. Framatome policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.

9. The foregoing statements are true and correct to the best of my knowledge, information, and belief.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on August 24, 2022.

Philip A. Opsal
Manager, Product Licensing
Framatome Inc.