UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 28, 2022

Mr. Bob Coffey
Executive Vice President, Nuclear
and Chief Nuclear Officer
Florida Power & Light Company
700 Universe Blvd.
Mail Stop: EX/JB
Juno Beach, FL 33408

SUBJECT: TURKEY POINT NUCLEAR GENERATING UNIT NO. 3 - AUTHORIZATION OF RELIEF REQUEST NO. 10 PART II RELATED TO REPAIR OF INTAKE COOLING WATER DISCHARGE PIPING (EPID L-2022-LLR-0032)

Dear Mr. Coffey:

By letter dated March 10, 2022, and supplemented by letters dated March 29, 2022, and March 31, 2022, (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML22069B127, ML22088A319, and ML22091A309, respectively), Florida Power & Light Company (FPL, the licensee) proposed an alternative (Relief Request No. 10 Part II) to requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, IWA-4421 and Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(b)(2)(xxv), at Turkey Point Nuclear Generating (Turkey Point), Unit 3.

Specifically, pursuant to 10 CFR 50.55a(z)(2), the licensee submitted Relief Request No. 10 Part II which requested to install a proprietary repair device (restoration hardware assembly (RHA)) that will become the permanent pressure boundary on the affected ASME Code pipe without removal of the degraded portion of piping. Relief Request No. 10 Part II is a supplemental request to the initial request, Relief Request No. 10, dated September 30, 2021, which was verbally authorized by the U.S. Nuclear Regulatory Commission (NRC) on October 29, 2021 (ML21302A090), and approved by the NRC on March 16, 2022 (ML22069A711), to extend the use of ASME Code Case N-513-4 beyond the allowed single operating cycle and until the completion and installation of the subject RHA on the unit's Intake Cooling Water (ICW) discharge spool piece.

Enclosure 2 to this letter contains proprietary information. When separated from Enclosure 2, this document is decontrolled.

On April 4, 2022, the NRC verbally authorized the use of Relief Request No. 10 Part II (ML22095A016) to install the RHA to become the pressure boundary on the affected ASME Code pipe without removal of the degraded portion of piping. The NRC staff determined that the proposed alternative is technically justified and provides an acceptable level of quality and safety. The enclosed safety evaluation documents the technical basis for the NRC's verbal authorization.

The NRC staff concludes that the proposed alternative to install a proprietary repair device, RHA, that will become the permanent pressure boundary on the affected ASME Code pipe without removal of the degraded portion of piping will provide reasonable assurance of the ICW piping structural integrity. The NRC staff finds that complying with the requirements of the ASME Code, Section XI would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2). Therefore, the NRC authorizes the use of the proposed alternative in Relief Request No. 10 Part II for Turkey Point, Unit 3 for installing the RHA that will become the pressure boundary on the affected ASME Code pipe without removal of the degraded portion of ICW piping.

All other requirements in ASME Code, Section XI for which relief was not specifically requested and approved in this relief request remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

If you have any questions, please contact Michael Mahoney at 301-415-3867 or via email at Michael.Mahoney@nrc.gov.

Sincerely,

/RA/

David J. Wrona, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-250

Enclosures:
1. Safety Evaluation (Non-Proprietary)
2. Safety Evaluation (Proprietary)

cc: Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE NUCLEAR REACTOR REGULATION

RELIEF REQUEST NO. 10 PART II

RELATED TO REPAIR OF INTAKE COOLING WATER DISCHARGE PIPING

FLORIDA POWER AND LIGHT COMPANY

TURKEY POINT NUCLEAR GENERATING UNIT NO. 3

DOCKET NO. 50-250

1.0 INTRODUCTION

By letter dated March 10, 2022, and supplemented by letters dated March 29, 2022, and March 31, 2022, (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML22069B127, ML22088A319, and ML22091A309, respectively), Florida Power & Light Company (FPL, the licensee) proposed an alternative (Relief Request No.10 Part II) to requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, IWA-4421 and Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(b)(2)(xxv), at Turkey Point Nuclear Generating (Turkey Point), Unit 3.

Specifically, pursuant to 10 CFR 50.55a(z)(2), the licensee submitted Relief Request No. 10 Part II which requested to install a proprietary repair device (restoration hardware assembly (RHA)) that will become the permanent pressure boundary on the affected ASME Code pipe without removal of the degraded portion of piping. Relief Request No. 10 Part II is a supplemental request to the initial request, Relief Request No. 10, dated September 30, 2021, which was verbally authorized by the U.S. Nuclear Regulatory Commission (NRC) on October 29, 2021, and approved by the NRC on March 16, 2022, to extend the use of ASME Code Case N-513-4 beyond the allowed single operating cycle and until the completion and installation of the subject RHA on the unit's Intake Cooling Water (ICW) discharge spool piece. The verbal authorization and NRC approval of Relief Request No. 10 are documented in ADAMS (ML21302A090 and ML22069A711), respectively. The licensee has determined that performing an ASME Code-compliant repair/replacement on the degraded portion of ICW piping in accordance with ASME Code, Section XI, IWA-4000 represents a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

On April 4, 2022, the NRC verbally authorized the use of Relief Request No. 10 Part II to install the RHA to become the pressure boundary on the affected ASME Code pipe without removal of the degraded portion of piping. The NRC staff determined that the proposed alternative is technically justified and provides an acceptable level of quality and safety. Details of the verbal

authorization are documented in ADAMS (ML22095A016). This safety evaluation documents the technical basis for the NRC's verbal authorization.

This safety evaluation contains proprietary information, which is marked with double brackets and bold font such as **[[This is an example.]]**.

2.0 REGULATORY EVALUATION

Adherence to Section XI of the ASME BPV Code is mandated by 10 CFR 50.55a(g)(4), which states, in part, that ASME BPV Code Class 1, 2, and 3 components must meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME BPV Code, Section XI.

Paragraph 50.55a(z) of 10 CFR states, in part, that alternatives to the requirements of 10 CFR 50.55a(b)-(h) may be used, when authorized by the Director, Office of Nuclear Reactor Regulation, if (1) the proposed alternatives would provide an acceptable level of quality and safety or (2) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The licensee has submitted the request on the basis that compliance with the specified requirements of 10 CFR 50.55a would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

3.0 TECHNICAL EVALUATION

3.1 Relief Request No. 10 Part II

3.1.1 ASME Code Components Affected

The ASME Code, Section III, Class 3 ICW system return piping is located outside of the Turkey Point, Unit 3 containment in the Component Cooling Water (CCW) room. The subject piping segment is a 24-inch cast iron, concrete lined bolted pipe spool piece with an operating pressure of 25 pounds-per-square-inch gauge (psig), and a maximum operating temperature of 120 °F (49 °C). The ICW system is the heat sink for the safety-related CCW heat exchangers during accident conditions to support both reactor heat removal and containment heat removal requirements.

3.1.2 Applicable Code Edition and Addenda

The ICW system piping was constructed to the construction code for pressure piping United States of America Standards Institute (USAS) B31.1-1955 and was later reconciled to the code of record American National Standards Institute (ANSI) B31.1, 1973 Edition through Winter 1976 Addenda. Based on the safety significance and the construction code of record, the piping system is considered to be equivalent to ASME Code, Section III, Class 3. The current inservice inspection (ISI) code of record for Turkey Point, Unit 3 is the ASME Code, Section XI, 2007 Edition with the 2008 Addenda. Turkey Point, Unit 3 is in its fifth 10-year ISI interval, which began on February 22, 2014, and will end on February 21, 2024.

3.1.3 Applicable Code Requirement

For ASME Code, Section III, Class 3 components, the repair/replacement activity and reexamination shall comply with the requirements of Article IWA-4000 of ASME Code, Section XI. ASME Code, Section XI, Article IWA-4421 requires that defects be removed in accordance with IWA-4411, IWA-4412, IWA-4461 or IWA-4462.

3.1.4 Reason for Request

The licensee found a through-wall leak in the ASME Code, Section III, Class 3 ICW system return piping at Turkey Point, Unit 3. The licensee performed a flaw evaluation in accordance with NRC-approved ASME Code Case N-513-3, “Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1,” when the through-wall leak was initially discovered on March 30, 2020. The Code Case N-513-3 evaluation was performed to validate the structural integrity of the as-found condition and continued system operation until a repair could be performed. This proposed alternative has been developed because repair/replacement options that would involve removing the degraded portions of piping in accordance with IWA-4421 creates a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The safety significance of this section of the pipe is considered low since the heat removal function is completed as the ICW fluid exits the CCW heat exchangers. The degraded piping is downstream of the CCW heat exchangers. The licensee stated that to perform the required ASME Code repair, removal of defective portions of the subject 24-inch piping would require that the piping be isolated and depressurized which would create significant hardship for the following reasons: (1) the isolation valves may not provide adequate isolation of the ICW system piping to be able to perform piping repair work; (2) ICW system isolation to allow maintenance work on the leaking piping would require temporary heat exchanger equipment and cooling medium of a significant volume to satisfy the cooling requirements for the Spent Fuel Pool (SFP) heat exchangers (prior to reactor spent fuel offload to the SFP during a refueling outage); (3) temporary safety related inlet and outlet piping tie-ins would be required onto existing safety code equipment, which adds to potential adverse field events; and (4) installation of a mechanical stop or freeze seal to isolate the 24-inch ICW system piping would affect the cooling of the SFP and may damage the concrete lined cast iron pipe.

3.1.5 Alternative and Basis for Use

The licensee has requested to encapsulate the degraded ICW spool piece with the RHA, leaving the degraded ICW piping in place while the RHA becomes the pressure boundary of the ASME Code piping. The RHA is designed to the original construction code (ANSI B31.1 1973 Edition through Winter 1976 Addenda) for the ICW system and is classified as an ASME Code, Section III, Class 3 component. It is also designed to withstand system design pressure and temperature. The RHA replaces the ICW pipe portion of the defective spool piece with a new corrosion-resistant, gasketed pressure boundary that distributes all applied loads within the piping system **[[ ]]**. The licensee also provided specific information regarding the design, installation, examination,

testing and monitoring of the RHA to be installed as a permanent repair for the remaining life of the plant.

3.2 NRC Staff Evaluation

3.2.1 Construction Code Design

The ICW system piping was constructed to the construction code for pressure piping USAS B31.1-1955 and was later reconciled to the code of record ANSI/ASME B31.1, 1973 Edition through Winter 1976 Addenda. Based on the safety significance and the construction code of record, the piping system is considered to be equivalent to ASME Code, Section III, Class 3. Accordingly, this piping is subject to repair/replacement requirements of ASME Code, Section XI, IWA-4000, which includes removal of the degraded portion of piping. However, the proposed alternative would install an RHA over the defective spool piece with a new corrosion-resistant, gasketed pressure boundary that distributes all applied loads to the piping system **[[ ]]**. Therefore, the RHA is considered a permanent repair under the construction code of record and is not a clamping device under ASME Code, Section XI, Appendix W for temporary repairs. The RHA meets all the design requirements for Turkey Point, Unit 3 construction code of record, including all design basis loads for this system which has a very low operating pressure of 25 psig. The adjacent piping, elbow, and valve 3-50-406 were evaluated to withstand the additional applied loads from the RHA. Therefore, the RHA provides the pressure boundary and the structural integrity for the ICW piping in lieu of the defective ICW piping spool piece.

However, as noted above, the defective ICW spool piece would not be removed. Based on the licensee's evaluation, the defective straight pipe portion of the spool piece is not credited, does not contribute any structural integrity to the restored section of piping, and therefore does not have to be removed. Upon installation of the RHA, the defective ICW spool piece will be reclassified as non-pressure boundary, non-structural, sacrificial material. All pressure boundary and structural integrity of the piping would be performed by the RHA. In addition, due to the specific operational and repair risks based on the system function and initial materials of construction (concrete lined cast iron pipe) discussed below, removal of the defective spool piece would not provide a compensating increase in the level of quality and safety. Therefore, the NRC staff finds the design of the RHA (with the defective ICW spool piece in place) acceptable for its intended function because the licensee ensures that the structural integrity of the piping system, with the RHA installed, continues to meet the construction code of record.

3.2.2 Material and Examination during Installation

The current bolting of the defective ICW spool piece would be replaced with material resistant to saltwater corrosion and would also be used to attach the RHA. The RHA is constructed from material that is highly resistant to salt water. The RHA gaskets and the full penetration weld on the RHA will provide for primary pressure integrity and leak tightness of the repair. Attachment welds for the **[[ ]]** from the RHA to the existing cast iron flanges. Welding is performed using the requirements of the construction code of record. The internal encapsulated area of degraded cast iron pipe spool piece **[[ ]]**, to protect the encapsulated surfaces of the cast iron pipe spool flange surfaces from saltwater corrosion. **[[**

]] The NRC staff finds that the material used for the construction of the RHA are compatible with the saltwater environment to minimize degradation.

The RHA is inspected and tested in accordance with the construction code of record and includes enhancements such as **[[**

]] The RHA is constructed, examined, and tested (with enhancements) to the construction code of record to ensure structural and pressure boundary integrity of the installed repair. Therefore, the NRC staff considers the RHA materials, construction, and installation examinations to be acceptable since the materials are compatible with the operating environment, and the examinations ensure leak tight and structural integrity while meeting and exceeds the construction code of record requirements.

3.2.3 Inservice Inspection and Monitoring

To ensure inservice pressure boundary and structural integrity, the licensee performed an analysis to determine a corrosion rate of the pipe spool piece flange. Based on this corrosion rate, the licensee determined that the structural integrity will not be impacted for the proposed life of the repair. Enclosure 1 to Relief Request No. 10 Part II provides the corrosion assessment for the cast iron piping which used assumptions from tests with carbon steel. To validate these assumptions, monitoring of the RHA would be necessary to confirm that the assumptions are bounding for the cast iron. In addition, as noted previously, gaskets form part of the pressure boundary, and may be subject to degradation. However, due to past experience of the degraded area, **[[**

]]. Therefore, the licensee proposed that the RHA would be included in a system walkdown monitoring program. The monitoring program would consist of quarterly walkdowns for the first 10 years and monthly walk downs after 10 years. These walkdowns would ensure that corrosion rate, gasket life/degradation, and bolting integrity are monitored and that they are consistent with analysis of the RHA. Additionally, inservice inspections would include leak check of the RHA and a visual examination of all attachment welds every inspection period beyond the requirements of Section XI of the ASME Code. The NRC staff finds the inservice inspection and monitoring of the RHA acceptable since it meets and exceeds the requirements of Section XI of the ASME Code and ensures the structural integrity of the piping system is still bounded by the analysis as a permanent repair.

3.2.4 Operational and Repair Risks

In regard to the ability of the degraded piping to perform its safety function, the licensee notes that the degraded spool piece is part of the ICW system, and its safety function is to remove heat load from the CCW heat exchangers during accident conditions to support both reactor heat removal and containment heat removal requirements. The leak is located in piping downstream of the CCW heat exchangers and downstream of the last isolation valve before returning water back to the discharge structure and the ultimate heat sink. Therefore, the leak is located in piping downstream of the fluid having performed its safety function of heat removal from the CCW heat exchangers. Based on this, the NRC staff finds that the risk of the system not being able to perform its intended safety function is low since the location of the degraded piping is after the system has performed its intended safety function.

The licensee has determined that performing an ASME Code-compliant repair/replacement on the degraded portion of ICW piping in accordance with ASME Code, Section XI, IWA-4000 represents a hardship or unusual difficulty without a compensating increase in the level of quality and safety. The hardship cited by the licensee deals with the unusual configurations required to affect a repair and the materials in the ICW system that create both operational and repair risks. The degraded ICW piping is a cast iron spool piece with concrete lining which is un-isolable and would require the entire Turkey Point, Unit 3 ICW system to be placed out of service for repairs. The operational risks associated with the ASME Code-compliant repair options evaluated by the licensee would require removing the CCW heat exchangers from service and providing temporary heat exchangers and temporary flow paths which could impact cooling of the Turkey Point, Unit 3 SFP. The NRC staff finds these operational issues do present a valid hardship.

Additionally, there are repair risks associated with ASME Code-compliant repair/replacement options that are related to the cast iron piping material and the likelihood of further damage caused by drilling and/or welding on the pipe. Because of the cast iron material, drilling or welding could cause cracking of the piping which could increase the leak rate or cause further damage to the concrete lining making the system more susceptible to internal corrosion. In addition, if the flaw is removed by drilling, the size of the flaw would necessitate a plug size which will limit the number of threads that can be cut into the pipe wall and therefore affect the ASME Code-required thread engagement and leak tightness of the plug. The NRC staff finds that these material-related concerns further exacerbate the operational hardships. Therefore, the NRC staff finds that the plant-specific operational issues and repair risks provides a valid basis for establishing hardship without a compensating increase in the level of quality and safety with respect to implementing an ASME Code-compliant repair/replacement.

Based on the review of the information provided above, the NRC staff finds that there is reasonable assurance of adequate protection based on (1) the RHA designed to the construction code of record, (2) the adjacent piping being evaluated to withstand additional loads from the RHA, (3) use of corrosion resistant material and associated coatings to minimize corrosion from saltwater, (4) enhanced inspections and pressure testing of the RHA during construction and installation, (5) enhanced inservice inspections and monitoring ensuring the structural integrity requirements of ASME Code continue to be met, and (6) the very low operating pressure of the system.

Therefore, the NRC finds that Relief Request No. 10, Part II will provide reasonable assurance that structural integrity of the subject Turkey Point, Unit 3 ICW discharge piping and its intended safety function will be maintained in that the licensee will ensure the piping continues to meet the structural integrity requirements of the ASME Code.

4.0 CONCLUSION

The NRC staff concludes that the proposed alternative to install a proprietary repair device, RHA, that will become the permanent pressure boundary on the affected ASME Code pipe without removal of the degraded portion of piping will provide reasonable assurance of the ICW piping structural integrity. The NRC staff finds that complying with the requirements of the ASME Code, Section XI would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2). Therefore, the NRC authorizes the use of the proposed alternative in Relief Request No. 10 Part II for Turkey Point, Unit 3 for installing the RHA that will become the pressure boundary on the affected ASME Code pipe without removal of the degraded portion of ICW piping.

All other requirements in ASME Code, Section XI for which relief was not specifically requested and approved in this relief request remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: J. Honcharik, NRR

Date: November 28, 2022

SUBJECT: TURKEY POINT NUCLEAR GENERATING UNIT NO. 3 - AUTHORIZATION OF RELIEF REQUEST NO. 10 PART II RELATED TO REPAIR OF INTAKE COOLING WATER DISCHARGE PIPING (EPID L-2022-LLR-0032) DATE NOVEMBER 28, 2022

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