March 30, 2020
L-2020-056
10 CFR 50.55a

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

Re: Turkey Point Unit 3
Docket Nos. 50-250
Subsequent Renewed License No. DPR-31
Fifth Ten-Year Inservice Inspection Interval Relief Request No. 6

Pursuant to 10 CFR 50.55a(z)(2), Florida Power & Light Company (FPL) requests the Nuclear Regulatory Commission (NRC) for relief from the applicable American Society of Mechanical Engineers Section XI Code (ASME Code) requirements for the repair/replacement activity identified in this request. This relief requests to repair certain sections of the degraded Unit 3 Component Cooling Water supply and return piping by installing a welded proprietary repair device, PMCap Restoration Method – US Patent 6,860,297to these moderate energy Class 3 pressure boundary piping with new pressure boundary material without removing the sections of degraded piping. The basis for the relief is that compliance with the specified ASME Code repairs would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The details of the Turkey Point Unit 3 Relief Request No. 6 are enclosed herein.

As discussed during the March 24, 2020 telephone with NRC's Ms. Eva Brown, the extent of degradation due to corrosion is unknown at this time. The degraded area of piping will be characterized using NDE techniques during the Turkey Point Unit 3 refueling outage, which started on March 30, 2020. The attached relief request includes two potential options that represent the worst possible degraded piping conditions classified as:

1. Option 1: If a through-wall leak is discovered.

2. Option 2: If a thinning beyond code allowable minimum is discovered.

In addition, per our discussion on March 24, 2020, due to the unknown circumstances surrounding this relief request, FPL is requesting approval of these options, as applicable and as needed, prior to Mode 2, after the Unit 3 refueling outage.

It should be noted, that upon discovery of the actual conditions of the degraded piping, FPL will promptly provide supplemental information with sufficient details to support NRC's review and approval of this relief request.

If you have any questions or require additional information, please contact Robert J. Hess, Licensing Manager, at (305) 246-4112.

Sincerely,

/Signature on file/

Robert J. Hess
Licensing Manager
Turkey Point Nuclear Plant

Enclosure
Attachment

cc: USNRC Regional Administrator, Region II, USNRC
USNRC Senior Resident Inspector, USNRC, Turkey Point Nuclear Plant
USNRC Project Manager, Turkey Point Nuclear Plant

L-2020-056

Enclosure

TURKEY POINT UNIT 3

RELIEF REQUEST No. 6

Turkey Point, Unit 3
Fifth 10-Year Interval Relief Request No. 6
Component Cooling Water Welded Repairs for External Corrosion

In Accordance with 10 CFR 50.55a(z)(2)
--Hardship or Unusual difficulty
without a compensating increase in the level of quality and Safety--

1.0 ASME CODE COMPONENT(S) AFFECTED

The affected components are the Turkey Point Unit 3 Component Cooling Water (CCW) Train B supply piping and Train A & B return piping.

The 18-inch carbon steel supply and return piping are located outside of the Turkey Point Unit 3 containment. The locations of interest are in the vicinity of the floor penetration in the CCW heat exchanger room.

The supply and return CCW piping was constructed to construction code for pressure piping USAS B31.1-1955 and was later reconciled to code of record ANSI B31.1 1973 Edition through Winter 1976 Addenda. For the purpose of this relief request, the safety significance and quality class of the code of record ANSI B31.1 1973, is considered equivalent to ASME Code Section III, Class 3 piping (References 4 and 5). Accordingly, this piping is subject to repair/replacement requirements of ASME Code, Section XI, IWA 4000.

The following design data pertains to these moderate energy Class 3 CCW supply and return pressure boundary piping:

- Pipe Schedule: 18-inch Sch. STD (t_{nom} = 0.375-inch)
- Design Pressure: 150 psig
- Design Temperature: 200°F
- Material Specification: Carbon Steel, ASME SA-53 Grade A welded

The CCW System loop is the heat sink for the residual heat removal System, the Chemical and Volume Control System, the spent fuel cooling loop and various Reactor Coolant System components. The design basis of the CCW System is to provide sufficient heat removal from the Engineered Safety Features to the ultimate heat sink, post-accident. The system, which is normally operated in an open configuration, is designed with sufficient capability to accommodate the failure of any single, active component without resulting in undue risk to the health and safety of the public following a Maximum Hypothetical Accident.

2.0 APPLICABLE CODE EDITION AND ADDENDA

The Turkey Point, Unit 3 applicable Code for the fifth 10-year Inservice inspection (ISI) Interval is the ASME Code Section XI 2007 Edition with 2008 Addenda (Reference 1). The Turkey Point Unit 3 Fifth ISI 10-Year interval started on February 22, 2014 and ends on February 21, 2024.

3.0 APPLICABLE CODE REQUIREMENTS

The applicable Code sections for which the relief is requested are ASME Code, Section XI, 2007 Edition, with 2008 Addenda. Article IWA-4421, General requirements, of Section XI of the ASME Code, requires that defects be removed in accordance with IWA-4340, IWA-4411, IWA-4412, IWA-4461 or IWA-4462.

It should be noted that use of IWA-4340 is prohibited by 10 CFR 50.55a(b)(2)(xxv), which it states: "The use of the provisions of IWA-4340, Mitigation of Defects by Modification, Section XI, 2001 Edition through the latest edition and addenda incorporated by reference in paragraph (a)(1)(ii) of this section are prohibited."

4.0 REASON FOR REQUEST

The subject piping degradation has not yet been characterized using ISI non-destructive examination (NDE) techniques. Upon discovery of the actual degraded piping conditions during the Turkey Point Unit 3 refueling outage, which started March 30, 2020, additional evaluation will be performed and additional information will be provided to NRC to supplement this relief request. Hence, this relief request contains two potential options which are deemed to be the two worst possible degraded piping conditions. These options are:

1. Option 1: A through-wall leak.

2. Option 2: Thinning beyond code allowable minimum.

10 CFR 50.55a(z) authorizes the Director, Office of Nuclear Reactor Regulation, to approve alternatives to the requirements of paragraphs (b) through (h) of 10 CFR 50.55a, including relief from the prohibition on IWA-4340 specified in 10 CFR 50.55a(b)(2)(xxv).

Relief is requested from the requirements of IWA-4421 to remove defects in accordance with IWA-4411, IWA-4461, or IWA-4462 on the subject piping identified in this request, prior to performing repair/replacement activities.

Relief is also requested from the prohibition of IWA-4340 in 10 CFR 50.55a(b)(2)(xxv).

This request is submitted to allow the installation of pressure retaining parts that will be used to restore areas with unacceptable wall thickness loss or through wall leakage caused by corrosion. Installation of replacement pressure retaining parts without first removing the degraded portions of the subject CCW supply and return piping does not comply with the requirements of IWA-4421.

The proposed alternative has been developed because other repair/replacement options that would fully comply with IWA-4421 create a hardship or unusual difficulty without a compensating increase in the level of quality and safety for reasons detailed in this request.

5.0 PROPOSED ALTERNATIVE AND BASIS FOR USE

Proposed Alternative

In lieu of the requirement of IWA-4421 to remove the defective portion of the component
prior to performing repair/replacement activities by welding, unacceptable wall thickness
loss or through-wall leakage caused by localized general or pitting corrosion shall be corrected by installation of replacement pressure retaining parts that fully restore the degraded piping. Accordingly,

- In the case of a through-wall leakage in the subject components, an IWA-4340 modification/repair is needed to be installed around the circumference of the degraded piping without removal of the degraded area. The through-wall leak is to be first sealed using a housekeeping repair, to enable additional welding activities on a dry surface. ASME Code Case N-513-3 will be used to justify the structural stability of the CCW piping for past operability, as well as continued operation during the outage, prior to installation of the IWA-4340 modification /repair.

- In the case of localized thinning that results in stresses that exceed the Code allowable stresses in the subject components, an IWA-4340 modification/repair is to be installed around the circumference of the degraded piping without removal or local repair of the degraded area.

- The modification/repair is a welded proprietary repair device, PMCap Restoration Method – US Patent 6,860,297, hereafter referred to as PMCap, installed on the outside of the pipe, and is designed in accordance with ASME B31.1, 1973 edition w/Addenda through Winter 1976, to replace the pressure boundary and to maintain the structural integrity of the degraded piping. The proposed repair is to restore the entire sections of 18-inch CCW piping containing the degradation (pipe/elbow external wall loss due to corrosion) with 20” OD PMCaps. The modification shall provide for the structural integrity of the pipe, such that it no longer relies on the defective area, including projected growth.

    - The PMCaps are ASME Code compliant components that replace existing Code pressure boundary components with new Code pressure boundary components.

- The PMCaps are constructed of carbon steel and will be protected from future external corrosion by coating the PMCaps per FPL Protective Coatings for Areas Outside the Reactor Containment requirements and use of a redesigned boot seal to prevent exposure to corrosive environments and/or flood water.

- The PMCaps are constructed with all welds being full penetration and are configured to be full penetration to the existing 18" piping. Existing piping locations where PMCaps are to be attached will be examined to assure adequate soundness and material thickness.

- The PMCap weld designs are per the requirements of ANSI B31.1-1973, the piping code of construction for the CCW system at Turkey Point Nuclear Units 3 and 4 (Reference 6).

- The fabrication/assembly of the PMCap follows the welding guidelines for Code Class 3 components.

- All welding for the installation of the PMCap is accomplished per requirements of the FPL Welding Control Manual and vendor drawings and qualified as pressure boundary welds.

- The PMCap complies with the NRC proposed conditions for use of IWA-4340 of Section XI, 2011 Addenda through 2017 Edition in the Federal Register (Reference 3), with three conditions.

  1) Cannot be used for crack-leak defects or those associated with flow accelerated corrosion.
  2) Have to include a rate of degradation equal to either two times the actual measured corrosion rate at the location, or four times the estimated maximum corrosion rate for the piping system.
  3) Wall thickness measurements to be taken in the vicinity of the modification and relevant base metal during at least the next two refueling outages.

  The proposed alternative is the installation of PMCap in accordance with IWA-4340 of the 2013 Edition of Section XI (Reference 2), except as noted herein regarding flaw growth and future examinations, with the repair being for extended acceptance. The subject CCW pipe degradation is caused by external corrosion (not cracking), and since the component will be metallized and coated, the degradation mechanism is mitigated. Because external corrosion is no longer a valid degradation mechanism, future wall thickness examinations are not required.

- Applicable only for the case that a through-wall leak is discovered, prior to installation of the modification/repair, the through-wall leakage will be stopped with a seal. Stopping the leakage is only necessary to enable installation of the PMCap. This repair is anticipated to involve covering the through-wall hole with

epoxy pipe repair tape. Once the PMCap is installed, the seal is no longer needed, but will be left in place. At some point, the seal provided by the pipe repair tape is expected to no longer hold and the PMCap will become the pressure boundary. During plant operation, even when the pipe repair tape is preventing leakage, the PMCap will be the credited pressure boundary. Finally, if leakage is such that a seal other than pipe repair tape is required, additional information will be provided to facilitate the review of this relief request.

- The PMCap is to be installed around the circumference of the degraded piping without removal of the degraded area. The localized flaw appears to be due to external corrosion caused by drainage water in a salt air environment contacting the outside surface of the piping. The localized wall thickness in the degraded area of piping will be further characterized using ultrasonic (UT) examination techniques, and a PMCap will be applied which covers the degraded area and accounts for any future wall loss.

- Where the PMCap is to be welded to the 18-inch pipe, a UT thickness measurement shall also be performed to confirm that material thickness is adequate for the repair design.

- The locations where the PMCap is to be welded to the system pressure boundary shall be located sufficiently far from locations of identified wall thinning to preclude the growth of identified corrosion from challenging the integrity of the repair for the remaining life of the component to which the PMCap is welded.

- The PMCap repair is designed such that it shall not rely on the existing pipe wall. After installation, an aluminum coating will be applied to the outer surface of the component in order to prevent any future external degradation. Therefore, future external wall loss will not be considered.

- Restoration of the defective or locally thinned area(s) at each location shall be performed only once.

- Welding of the PMCap to the CCW pipe and all required non-destructive examination (NDE) are per FPL controlled processes for ASME Class 3 components.

- The PMCaps will include ports to perform post-installation pressure testing.

- Future NDE will be in accordance with ASME Code, Section XI, Table IWD-2500-1 for Examination Category D-A. The piping internal to the PMCap boundary is inaccessible and will not be examined in the future because credit will no longer be taken for its pressure retaining function, thus, it will be outside the Inservice examination requirements of Section XI of the ASME Code. Since the outer surface is being coated external corrosion will not recur.

Basis for the Request

Complying with IWA-4421 requirements to remove degraded portions of this piping prior to performing a repair/replacement activity represents a hardship or unusual difficulty without a compensating increase in the level of quality and safety for the following reasons:

Removal of defective portions of this piping would require that the piping be isolated and depressurized. The 18-inch piping cannot be isolated for the following reasons:

- The Turkey Point Unit 3 isolation valves that are needed to close are:

    - CCW "A" Train Return Piping – Valves 3-835A, 3-835B;
    - CCW "B" Train Supply Piping – Valves 3-787H, 3-713C;
    - CCW "B" Train Return Piping – Valves 3-835B, MOV-3-749B.

  Previous attempts to close these isolation valves (upstream of the PMCap locations) have not provided adequate isolation of the CCW piping to be able to perform piping repair work. These isolation butterfly valves are leaking by preventing a moisture free environment to allow welding. The proposed weld area for the pipe butt-welds must be dry as required by the FPL Welding Control Manual.

- CCW system isolation to allow maintenance work on the leaking upstream valves, is operationally not possible due to requirements of the CCW system to remain operational at all plant modes (Operable for Modes 1, 2, 3 and 4 per Technical Specification 3.7.2; and functional for Modes 5 and 6 as heat sink for the Spent Fuel pool heat exchangers).

- Installation of a mechanical stop in the 18 inch piping for system isolation is potentially possible. However, installation of a line stop will result in a permanent branch connection on the CCW piping that may require the design of a new support/restraint in an otherwise congested piping area. Also, installation of the new branch line is not entirely desirable because this activity could result in metal shavings due to the boring process and the removed portion of the pipe wall dislodging, entering the system, and becoming debris that could hinder system operation and make it difficult to retrieve the loose FME.

- Use of a freeze seal to isolate the 18-inch CCW pipes in order to replace the degraded piping section presents some complications in establishing a freeze plug on this large bore vertical piping with fluid flow in the pipe. The size of

the pipe presents some problem with this method and situating the freeze seal equipment in the CCW Heat Exchanger Room is a challenge in the congested piping area. The installed freeze seal equipment on the piping will impose new added design loads on the piping and will require the provision of new or temporary pipe supports and re-analysis of the affected piping portion of the CCW system.

In conclusion, the ASME B & PV Code Section XI requirement, IWD-3120(b), is to correct a component containing a flaw(s). The proposed alternative is to relocate the pressure boundary by restoring the area, with a twenty (20) inch diameter PMCap with a full penetration weld at locations previously confirmed to have adequate material thickness and not correct the piping containing the flaw(s) but show by qualitative assessment that the material and the presence of the postulated worst case flaw(s) will not be detrimental to the pressure retaining function of the component cooling water piping system. For these reasons, Turkey Point believes that the proposed alternative discussed herein will provide reasonable assurance of continued structural integrity of the subject CCW components.

6.0 DURATION OF PROPOSED ALTERNATIVE

The licensee requests approval of the proposed alternative for the remaining life of the plant, as supported by the PMCap design documentation, or until such time that further repair/replacement activities are required for the affected portions of the CCW system piping, whichever occurs first.

7.0 PRECENDENT

1. Duke Energy Carolinas, LLC, Oconee Nuclear Station, Units 1 and 2, Relief Request Serial #15-ON-001, ADAMS Accession No. ML15349A453.

8.0 REFERENCES

1) American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code, Section XI, 2007 Edition, 2008 Addenda.
2) American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 2013 Edition.
3) Federal Register, Volume 83, Number 218, November 9, 2018, “Proposed Rules”.
4) Regulatory Guide 1.26, “Quality Group Classifications and Standards for Water-Steam-, and Radioactive-waste-containing Components of Nuclear Power Plants”.
5) NextEra Energy Engineering Design Standard, STD-M-027, Rev. 6, “ASME Section XI Repair and Replacement”.
6) ASME/ANSI B31.1, 1973 Edition w/Addenda through Winter 1976