October 25, 2021

L-2021-207
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
Response to Request for Additional Information for ISI Relief Request No. 10

1. Florida Power & Light Company letter L-2021-183, Fifth Ten-year Inservice Inspection Interval Relief Request Number 10, September 30, 2021 (ADAMS Accession Nos. ML21273A240, ML21273A241)

2. NRC Email from Ms. Eva Brown, Senior Project Manager Turkey Point to Ms. Stavroula Mihalakea, Turkey Point Licensing Engineer, Request for Additional Information Fifth Ten-Year Inspection Interval Relief Request No.10 - Extension EPID: L-2021-LLR-0077, dated October 14, 2021.

3. Florida Power & Light Company letter L-2021-197, Response to Request for Additional Information for ISI Relief Request No. 10 Dated October 15, 2021 (ADAMS Accession ML21288A544)

4. NRC Email from Ms. Eva Brown, Senior Project Manager Turkey Point to Ms. Stavroula Mihalakea, Turkey Point Licensing Engineer, TPN Request for Additional Information-Round 2 Concerning Relief Request 10- Extension EPID: L-2021-LLR-0077, October 25, 2021

In Reference 1, Florida Power & Light Company (FPL) submitted Relief Request (RR) No. 10 from the American Society of Mechanical Engineers Section XI Code (ASME Section XI Code) for the Turkey Point Unit 3 Fifth 10-Year Inservice Inspection (ISI) Interval. RR 10 requested in part, an extension to the time to repair a through-wall leak in the intake cooling water spool piece under the provisions of Section 50.55a(z)(2) to Title 10 to the Code of Federal Regulations.

In Reference 2, NRC Staff requested additional information determined necessary for completing their review, and FPL provided responses in Reference 3.

Following the October 19, 2021 Public Meeting, NRC requested additional information in Reference 4. Enclosure 1 contains the NRC's request for additional information, and Enclosure 2 provides FPL's response.

Florida Power & Light Company

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

Sincerely,

Robert J. Hess
Licensing Manager
Turkey Point Nuclear Plant

Enclosures

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

REQUEST FOR ADDITIONAL INFORMATION

ALTERNATIVE RELATED TO

INTAKE COOLING WATER SPOOL PIECE REPAIR

TURKEY POINT NUCLEAR PLANT, UNIT 3

DOCKET NO. 50-250

Paragraph 50.55a(z)(2) to Title 10 to the Code of Federal Regulations (10 CFR) authorizes the Director, Office of Nuclear Reactor Regulation, to approve alternatives to the requirements of paragraphs (b) through (h) of 10 CFR 50.55a. In a letter dated September 30, 2021, as supplement by a letter dated October 15, 2021 (Agencywide Document and Management System (ADAMS) Nos. ML21273A240 and ML21288A544, respectively), Florida Power and Light (FPL, or the licensee) requested an alternative based on hardship without a compensating increase in quality and safety. For Class 3 components, American Society of Mechanical Engineers Boiler and Pressure Vessel (ASME BPV) Code Section XI provides specific criteria for determining whether a component is "acceptable for service." Consistent with Code Case N 513-4, "Evaluation of Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping, Section XI, Division 1" (N-513) the integrity and therefore the operability of the intake cooling water (ICW) system must be restored prior to the Unit 3 emerging from the next refueling outage, unless approval of an alternative is approved by the NRC staff.

1) In the submittal and the supplement dated October 15, 2021 (the supplement), the licensee described several ASME Code compliant repair options for the through-wall leak in the ICW piping. Based on the unusual configurations identified, discuss how replacing the spool piece represents a challenge. Specifically, address the operational and logistical challenges for the repair activity. This discussion should include some detail associated with providing a temporary heat exchanger and flow paths for the ICW and component cooling water (CCW) systems, additional back up plans and coordination of onsite resources associated with temporary tie ins to existing plant equipment in order to maintain the required systems operable for the applicable modes of operation.

2) Paragraphs 2(e) and 3.2(c) of ASME Code Case N-513 requires that the flaw growth analysis shall consider all relevant growth mechanisms. However, based on the thinned wall area next to the valve, it is not certain that only general corrosion is relevant. Since FPL has not confirmed a definitive degradation mechanisms for this area to be used in the flaw growth analysis, ASME Code Case N-513 paragraph 2(e) specifies frequent periodic inspections to measure wall thickness to occur at least every 30 days.

The submittal currently specifies walkdowns once per day, consistent with ASME Code Case N-513, for leakage rate monitoring. To extend the use of ASME Code Case N-513 for a period of six months beyond what is currently allowed by ASME Code Case N 513 (current refueling outage), the NRC staff notes that the supplement provided additional compensatory actions beyond those required by ASME Code Case N-513 by increasing the frequency for leakage rate monitoring walkdowns by a factor of two (i.e., twice per day).

Justify why a similar increase in frequency (factor of two) should not be applied for the compensatory action of periodic inspections to measure wall thickness to extend the use of ASME Code Case N-513 for a period of six months beyond this current refueling outage to provide assurance regarding the integrity of the component.

3. As discussed in the supplement, the licensee identified leakage monitoring related activities. For these activities, provide the criteria and time frames for operational decision-making relating to ensuring the operability of the ICW piping during the proposed extended period.

REQUEST FOR ADDITIONAL INFORMATION
ALTERNATIVE RELATED TO
INTAKE COOLING WATER SPOOL PIECE REPAIR
TURKEY POINT NUCLEAR PLANT, UNIT 3
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Response to RAI-1

FPL considered a Code repair consisting of replacement of the spool piece with a through wall leak. However, there are a number of complicating issues that make such a repair not feasible. The following discussion lists those complications in an effort to answer the NRC staff question.

The Code repair option to replace the pipe spool section would require the entire Unit 3 Intake Cooling Water (ICW) system and subsequently the Component Cooling Water (CCW) system to be removed from service. The leak location is in a non-isolable section of the ICW system, in the common discharge piping downstream of the CCW heat exchangers. The ICW system must be shutdown to establish the conditions required to replace the spool piece. This poses a logistical challenge because ICW cooling is relied upon during all modes of operation, including refueling operations and defueled mode. The ICW system serves as the heat sink for the CCW system, which cools multiple components including RCP motors and bearings, Emergency Core Cooling System pump seal coolers, containment coolers, and Residual Heat Removal cooling. Based on these conditions, the work would need to be performed while in the defueled mode window of a Unit 3 Refueling outage. With no CCW flow to the Spent Fuel Pool (SFP) cooling system heat exchangers available, a temporary spent fuel cooling system would need to be evaluated, designed and built to support the affected ICW spoolpiece replacement.

At defueled conditions, SFP cooling is normally provided through the two SFP heat exchangers (3E208A and 3E208B), and the heat load is transferred to the CCW system. To proceed with the spool piece replacement, an interim/temporary heat exchanging system, such as chillers, would be placed in service to continue to provide the SFP cooling function.

Currently, it is possible to isolate only one of the two SFP heat exchangers to connect an external chiller system. However, the heat load from the SFP is greater than the capacity of one SFP heat exchanger. There is currently no capability to isolate and connect to the shell side (CCW) of the second U3 SFP heat exchanger. Modifications to this piping system are needed to add the isolation valves and the pipe fittings where a chiller system can be connected similar to the configuration of the 3E208B SFP heat exchanger.

Preliminary evaluation of such a modification indicates that installation would need to be performed in a window where the SFP can be cooled by only one SFP heat exchanger. During Mode 6, prior to moving fuel from the reactor, CCW can be isolated to the SFP heat exchanger needing the modification, assuming an alternate source of cooling is provided to the Charging Pump Oil coolers (when CCW is isolated) to ensure a boration flowpath is available. This modification would also likely require a freeze seal to the affected piping to obtain complete isolation from any CCW isolation valve seat leakage. Given the size of the piping (10” diameter) and the large amount of water volume in the piping segment, it could be difficult to form and maintain a freeze seal.

Once an interim chiller system is designed, procured, and the tie-in's installed, this temporary cooling configuration can potentially impact satisfying the requirements for uninterrupted cooling to the SFP and ensuring sufficient cooling capacity. For the current refueling outage, the limiting time to boil after core offload is 3.5 hours, based on an initial temperature of 140°F and 120 hours after shutdown. The limiting time to uncover fuel after core offload, provided as a function of time after shutdown is 41 hours, based on 120 hours after shutdown. The expected duration for this temporary plant configuration is approximately 4 days. The degree of risk associated with abnormal operating conditions is a factor of the length of time the system is operating in this temporary configuration. The spool piece replacement could encounter difficulties in disassembling and reassembling this section of original construction piping which could result in extended reliance on the temporary heat removal system.

Potential issues that could develop during this replacement activity include pipe spring when the spool piece is removed. Realigning the piping would require an imparting force on the piping components that could damage or crack the cast iron pipe and/or cement lining. The piping components attached to the removed pipe spool piece include a butterfly valve and an elbow. Another potential issue that could develop during the replacement activity is damage to the gasket sealing surfaces requiring repair. Since the pipe material is cast iron, damage to these surfaces is problematic to repair, potentially increasing the amount of time using the temporary SFP cooling system.

To avoid a configuration that would degrade the performance or their function to an unacceptable level, risk reduction measures would need to be established in order to offset any potential negative impact created by this interim configuration. The measures would include rigorous contingency plans to ensure adequate, uninterrupted cooling to the SFP system, minimizing the duration of the temporary configuration and scheduling support for the installation and maintenance of the system to ensure operability throughout the replacement of the spool piece.

Prior to the installation of the chillers, a comprehensive maintenance check would be required to ensure all subsystem controls and various monitoring sub-components are checked for performance.

The design of this temporary system would also specify a degree of redundancy built in. A temporary back up power feed must be supplied and installed to provide backup power in the event of a power failure in the primary power feed. The chillers would not be serviced by the Emergency Diesel Generators, which makes the temporary cooling system's electrical power supply less reliable. The chiller power supplies would need to be protected for the entire distance from their location to the established power source.

Flexible hoses used to provide the temporary cooling flow to SFP heat exchangers must have readily available spares. In the event of a failure of these hoses, replacement hoses must be available to be installed in a timely manner in order to avoid challenging the SFP inventory administrative temperature limits established for the refueling outages. In addition, vendor recommended spare parts must be ready at the site in case they are required.

Finally, maintenance crews from the vendor of the chillers would need to be staffed at the site to provide a quick response to any malfunctions that could affect the performance of chillers.

Operating personnel for the backup chiller company must also be staffed at the site and ready to put the back-up chillers in operation as soon as it is needed to address any malfunctions without exceeding the established SFP temperature limits.

In conclusion, the ICW leak cannot be isolated to perform this Code repair option during a unit shutdown without both operational and logistical challenges. Attempting to perform this repair will result in an unusual plant configuration which presents a substantial risk to the SFP cooling system for being completely reliant on supplemental chiller units, flexible hoses, and temporary power. Further, the repair cannot be completed while operating, because of the support function of ICW for many systems required during power operation.

Response to RAI-2

FPL has considered the NRC staff proposal for increasing frequency of ultrasonic inspections and concurs that increasing the frequency by a factor of two is appropriate. The ultrasonic inspections will be performed at a frequency of 15 days during the extended period until a repair/replacement activity is performed.

The initial flaw evaluation was performed assuming the mechanism to be general corrosion due to degradation of the internal cement lining based on previous ICW system inspections. Mechanisms such as fatigue and stress corrosion cracking have been dismissed based on the characteristics of the flaw, and the service conditions. Since the mechanism and the cause of liner degradation cannot be confirmed at this time, the flaw evaluation performed accounts for uncertainty by utilizing a significant amount of conservatism which includes the following:

- The flaw growth projection utilizes a degradation rate from a location that has had ultrasonic measurements performed for approximately 18 months and applies the measured wall loss to the edge of a bounding flaw size. Currently, the rate of wall loss is very low, as it is measured at or above nominal wall thickness.
- The average wall thickness across the circumference of the piping was not used as the starting thickness for the flaw growth projection, as allowed by ASME XI. The difference between the adjacent thickness and the average thickness is 20-30%.
- The initial flaw projection utilized flaw growth data that spanned approximately 13 months, and the most recent projection utilized data that spanned approximately 18 months. This period is significantly more than what would typically be used when performing a projection for Code Case N-513 and provides assurance that the rate of degradation is consistent and predictable.

To provide further assurance regarding the structural integrity of the subject piping during the extended application of ASME Code Case N-513 of up to six months beyond the completion of the current refueling, ultrasonic thickness measurements will be performed every 15 days until the repair/replacement activity of the piping is completed.

Response to RAI-3

Under the FPL Corrective Action Program, the Operability of the ICW system was determined to be Operable But Degraded. The leakage and Flaw Growth Monitoring activities identified in

Reference 3, are additional measures intended to monitor the structural integrity of the ICW system during the six months extension following the end of the current Unit 3 Refueling Outage in order to have ongoing validation that the system remains in that condition. These measures are discussed further herein to provide details describing criteria and thresholds for operational decision-making actions associated with flaw and leakage conditions while ensuring the operability of the ICW piping during the proposed extended period.

1. The current daily leak rate check by Operations will be increased to twice daily. The leak rate will continue to be quantified during the checks. Currently, when the rate increases by more than 10% from the previous value, the Unit Supervisor is informed. This threshold and criterion will remain the same. It should be noted that since the discovery of the through wall leak, the leakage rate has remained unchanged and within a range of 0-10 gal/hour based on system conditions. The observed leakage rates do not impact Operability and Engineering will be requested to evaluate any leak rate changes which are not attributed to changes in ICW system conditions.

2. Drains in the vicinity of the leak will be checked daily to ensure they are not clogged.

3. Sump pumps are available to be used as needed if the leak rate increases and water level in the CCW pit below increases from ICW pipe leakage. No equipment is expected to be impacted if the water level increase in CCW pit, or if it overflows.

4. If the leak rate increases above 20 gal/hour, Operations would adjust leak mitigation measures, ensuring leakage is properly routed to the floor drains, and ensuring floor drains in the area are not clogged. Should the leakage rate exceed drainage capabilities Operations will reassess Operability.

5. Engineering will also inspect the flaw when the 20 gal/hour threshold is reached. If the flaw is verified as increased based on size (flaw dimensions) or other physical appearance change, the flaw area will be examined by NDE personnel. Following an NDE exam, the flaw growth evaluation will be reviewed and revised as necessary within 12hrs of the exam to determine change in degrading conditions.

6. NDE examination will be performed on a 15-day frequency. Following the NDE examination, the flaw growth evaluation will be updated as necessary within the next 12 hours. If the flaw evaluation results conclude that structural integrity is compromised, the ICW system will be declared inoperable for not meeting the acceptance criteria established in the flaw analysis.

7. If an unexpected increase in leakage through the through-wall flaw reduces the ICW header pressure to a predetermined system operability limit, off-normal operating procedures mandate response and mitigation of the system malfunction with appropriate operator actions.

As discussed in References 1 and 3, the defect is in the common discharge piping downstream of the CCW Heat Exchangers and as such the heat removal function of the ICW and CCW systems remain intact, even if the defect degrades further. Currently the leak is manageable and remains stable, fluctuating from 0-10 gal/hour. The current condition is of low safety significance. Structural integrity of the piping has been verified by applying the Code Case N-513 procedure. The minimum allowable wall thickness is estimated to occur in January 2023. For the requested extension, the proposed frequency of the monitoring activities for both the flaw growth and leakage will be twice as conservative as the required by Code Case N-513.

As discussed above, the additional measures include criteria and thresholds for operational decision-making to ensure operability of the ICW piping during the proposed extended period. The piping with the through-wall leak is in the open CCW pump room with a gated doorway that allows water to flow to an area outside the Auxiliary Building. External flooding concerns in the CCW Pump Room have been evaluated in the plant's design basis and credit is given to design features such as berms, drains, and pump (CCW pump) pedestals to protect safety related equipment. Area walkdowns have confirmed that there is no critical equipment that could be impacted with increased leakage from this flaw. Mitigating the condition of increased leakage beyond the capacity of the drains can be accomplished with portable sump pumps, yard storm drains, and other proceduralized mitigating measures for external flooding events that would ensure equipment in the area are not impacted. Estimated leak rates corresponding to the flaw diameter are listed below as a reference to provide a perspective on the amount of leakage that corresponds to various flaw (hole) sizes.

Flaw (Hole) diameter [in]	Leakage Flow [gpm]
0.25	3.2
0.5	15
0.75	35.2
1	63.4
1.5	144
3	573
4	1003

In the event that leakage increases unexpectedly causing the ICW system header pressure to decrease below 10 psig, Control Room operators per alarm response procedures, will enter the appropriate Off-Normal operating procedures to check local conditions for ICW and CCW pipe leaks and/or ICW system malfunctions. Operations as directed by procedures will take appropriate actions to reduce risk to the ICW system.

It should also be noted that an ICW leakage increase would not adversely impact ICW pump operation and would not challenge the capacity of the ICW pumps. The safety function of the ICW system is to remove the heat load from the component cooling water (CCW) system during accident conditions to support both reactor heat removal and containment heat removal requirements. The ICW leak is downstream of the CCW heat exchangers, and therefore would not have any direct adverse impact on the ability of the CCW heat exchangers to remove the design basis heat load. If the flaw reaches its allowable criteria, the ICW system would not meet its operability criteria. Actions would be taken in accordance with the corresponding Technical Specifications Limiting Conditions for Operation (LCO). Such actions ensure that any adverse conditions that could potentially impact ICW system function are mitigated well in advance, thus maintaining the safety significance of this through-wall leak low.