



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

January 14, 2014

Mr. Mano Nazar
Executive Vice President and
Chief Nuclear Officer
Florida Power & Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

SUBJECT: TURKEY POINT NUCLEAR GENERATING UNIT NOS. 3 AND 4 - SAFETY EVALUATION FOR RELIEF REQUEST NO. 11 FOR FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL – ALTERNATIVE THROUGH-WALL SIZING REQUIREMENTS FOR IMPLEMENTATION OF ASME CODE, SECTION XI, APPENDIX VIII, SUPPLEMENT 10 (TAC NOS. MF1391 AND MF1392)

Dear Mr. Nazar:

By letter to the U.S. Nuclear Regulatory Commission (NRC or the Commission) dated April 5, 2013, as supplemented by letter dated October 9, 2013, Florida Power & Light Company (the licensee) submitted Relief Request No. 11. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Paragraph 50.55a(g)(5)(iii), the licensee requested relief from the depth-sizing requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Case N-695, "Qualification Requirements for Dissimilar Metal Piping Welds." The licensee requested to use an alternate root mean square error criteria for sizing any flaws in the reactor vessel elbow-to-nozzle and nozzle-to- pipe dissimilar metal butt end welds at the Turkey Point Nuclear Generating Unit Nos. 3 and 4 (Turkey Point 3 and 4).

Pursuant to 10 CFR 50.55a(g)(6)(i), the NRC staff reviewed the subject request and concludes, as set forth in the enclosed safety evaluation, that the licensee adequately addressed all regulatory requirements in 10 CFR 50.55a(g)(6)(i). Therefore, the NRC staff grants Relief Request No. 11 at Turkey Point 3 and 4 for the remainder of the fourth 10-year inservice inspection (ISI) intervals of Turkey Point 3 and 4, which are currently scheduled to end on February 21 and April 14, 2014, respectively. The licensee may invoke the provision of the ASME Code, Section XI, paragraph IWA-2430, which allows the licensee to extend the fourth 10-year ISI intervals by 1 year. The licensee may perform the proposed alternative in the 1-year extension periods.

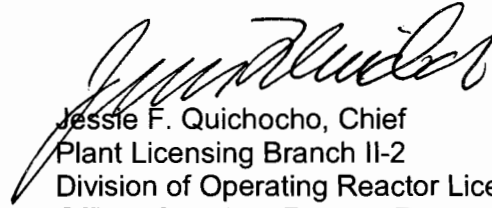
All other ASME Code, Section XI requirements for which the request was not specifically requested and approved remains applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

M. Nazar

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If you have any questions regarding this issue, please feel free to contact Ms. Audrey Klett at (301) 415-0489.

Sincerely,



Jessie F. Quichocho, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-250 and 50-251

Enclosure:
Safety Evaluation

cc w/enclosure: Listserv



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST NO. 11

FOR THE FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL

FLORIDA POWER & LIGHT COMPANY

TURKEY POINT NUCLEAR GENERATING UNIT NOS. 3 AND 4

DOCKET NOS. 50-250 AND 50-251

1.0 INTRODUCTION

By letter to the U.S. Nuclear Regulatory Commission (NRC or the Commission) dated April 5, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13114A294), as supplemented by letter dated October 9, 2013 (ADAMS Accession No. ML13294A026), Florida Power & Light Company (the licensee) submitted Relief Request No. 11 (RR 11) for NRC review and approval. The licensee submitted RR 11 for the fourth 10-year inservice inspection (ISI) interval of the Turkey Point Nuclear Generating Unit Nos. 3 and 4 (Turkey Point 3 and 4). Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Paragraph 50.55a(g)(5)(iii), the licensee requested relief and to use alternative requirements for ISI items identified in RR 11 on the basis that the ASME Code requirement is impractical. The licensee requested relief from the depth-sizing requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Case N-695, "Qualification Requirements for Dissimilar Metal Piping Welds." The licensee requested relief from the 0.125-inch root mean square error (RMSE) criteria for the dissimilar metal (DM) butt weld examinations performed from the inner diameter (ID) surface.

By electronic mail dated September 9, 2013 (ADAMS Accession No. ML13281A647), the NRC requested additional information regarding the relief request. By letter dated October 9, 2013, the licensee responded to this request.

The licensee requested relief and to use the alternative for Turkey Point 3 and 4 until the end of the fourth 10-year ISI intervals. The Turkey Point 3 fourth 10-year ISI interval is scheduled to end on February 21, 2014, and the Turkey Point 4 fourth 10-year ISI interval is scheduled to end on April 14, 2014. However, the licensee may invoke the provision of the ASME Code, Section XI, Paragraph IWA-2430, which allows the licensee to extend the fourth 10-year ISI intervals by 1 year. Extending the fourth 10-year ISI intervals would be necessary because the licensee extended previous refueling outages to install power uprate modifications.

Enclosure

2.0 REGULATORY EVALUATION

Paragraph 10 CFR 50.55a(g)(4) states that ASME Code Class 1, 2, and 3 components (including supports) must meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code, incorporated by reference in 10 CFR 50.55a(b), 12 months prior to the start of the 120-month interval, subject to the conditions listed therein.

Paragraph 10 CFR 50.55a(b)(2)(xv) states in part that licensees using Appendix VIII in the 1995 Edition through the 2001 Edition of the ASME Boiler and Pressure Vessel Code may elect to comply with all of the provisions in paragraphs (b)(2)(xv)(A) through (b)(2)(xv)(M), except for paragraph (b)(2)(xv)(F), which may be used at the licensee's option.

Paragraph 10 CFR 50.55a(g)(5)(iii) states that if the licensee has determined that conformance with certain ASME Code requirements is impractical for its facility, the licensee shall notify the Commission and submit, as specified in §50.4, information to support the determinations. Determinations of impracticality in accordance with this section must be based on the demonstrated limitations experienced when attempting to comply with the code requirements during the inservice inspection interval for which the request is being submitted.

Paragraph 10 CFR 50.55a(g)(6)(i) states that the Commission will evaluate determinations under paragraph (g)(5) of 10 CFR 50.55a that ASME Code requirements are impractical. The Commission may grant such relief and may impose such alternative requirements as it determines is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request and the NRC to grant the relief requested by the licensee.

The code of record for the Turkey Point 3 and 4 fourth 10-year ISI interval is the 1998 Edition with Addenda through 2000 of the ASME Code, Section XI, as modified by 10 CFR 50.55a(b)(2)(xv)(A) through (b)(2)(xv)(M) of this section, except for paragraph (b)(2)(xv)(F).

3.0 TECHNICAL EVALUATION

3.1 Licensee's Proposed Alternative

The ASME Code components affected by this request are the Class 1 reactor pressure vessel cold legs elbow-to-nozzle and hot legs nozzle-to-pipe DM butt welds in the reactor coolant system. Section 1 of RR 11 lists the 12 components (i.e., six DM welds per unit) for which the licensee requested relief. The subject cold leg elbow to nozzle joints are made of carbon steel

nozzle buttered with stainless steel, field welded to cast stainless steel elbow with stainless steel weld material. The subject hot leg nozzle to pipe joints are made of carbon steel nozzle buttered with stainless steel, field welded to forged stainless steel pipe with stainless steel weld material.

The subject DM welds are part of the Turkey Point risk informed (RI)-ISI program. The NRC approved the RI-ISI program by letter dated October 27, 2008 (ADAMS Accession No. ML082960550). The RI-ISI program listed these DM welds in the ISI schedule as Category R-A, Item No. R1.11. The Turkey Point RI-ISI program requires the subject DM welds to be examined by ultrasonic testing (UT). Paragraph IWA-2232 of Section XI of the ASME Code requires UT to be conducted in accordance with Appendix I. Paragraph I-2220 of Appendix I requires ultrasonic examination procedures, equipment, and personnel used to detect and size flaws in piping welds to be qualified by performance demonstration in accordance with Appendix VIII of the ASME Code, Section XI. In its letter dated October 9, 2013, the licensee clarified that the requirements of the 1998 Edition through 2000 Addenda of the ASME Code, Section XI, Appendix VIII, are used for the UT performance demonstration in accordance with 10 CFR 50.55a(b)(2)(xv). In addition, the licensee implements the requirements of the ASME Code, Appendix III, Supplement 1 when examining the weld from the cast stainless steel elbow side.

For the examination of the subject DM welds, the UT qualification requirements of Supplement 10 of Appendix VIII apply. The licensee adopted ASME Code Case N-695 as an alternative to Supplement 10. The NRC accepted ASME Code Case N-695 in Revision 16 of NRC Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1" (ADAMS Accession No. ML093340041). According to ASME Code Case N-695, the UT procedures, equipment, and personnel are qualified for depth-sizing when the flaw depths estimated by the UT as compared with the true depths do not exceed an RMSE of 0.125 inches.

The licensee provided its basis for impracticality and burden caused by compliance with the ASME Code Case N-695 requirements. To date, the examination vendors have not met the ASME Code required RMSE (i.e., 0.125 inches) for depth-sizing when examining the weld from the ID. The licensee's latest qualification attempt in early 2008 and its prior attempts for achieving the 0.125-inch RMSE were unsuccessful. The attempts involved multiple vendors, ultrasonic instruments, personnel, and flaw depth sizing methodologies, all of which have been incapable of achieving the 0.125-inch RMSE value. The inability of examination procedures to achieve the required RMSE value is primarily caused by a combination of factors, such as surface condition (e.g., roughness), scan access, base materials, and the dendritic structure in the welds.

The licensee proposed alternatives for detecting flaws in its letters dated April 5, 2013, and October 9, 2013. The licensee proposed an alternative depth-sizing RMSE value greater than the 0.125-inch RMSE stated in ASME Code Case N-695 for the examination of the welds identified in RR 11. The licensee proposed to evaluate the vendor's depth-sizing performance of 0.224-inch RMSE against the flaw depth-sizing tolerance for the DM welds of 0.125-inch RMSE stated in ASME Code Case N-695. The licensee proposed that flaw(s) detected and measured as less than 50 percent through-wall in depth will be adjusted by adding a correction factor of the RMSE achieved by the vendor (0.224 inch) - 0.125 inch to the depth of the flaw. If the licensee's vendor demonstrates an improved depth-sizing RMSE prior to the examination, the licensee stated that the excess of that improved RMSE over the 0.125-inch RMSE

requirement, if any, will be added to the measured value for comparison with applicable acceptance criteria. In addition, the licensee proposed to use eddy current testing to determine if the flaw is ID surface-breaking. If a flaw is detected and depth-sizing is required, the inner profile of the weld, pipe, and nozzle in the region of and surrounding the flaw will be provided along with an estimate of the percentage of potential surface areas with the UT probe lift-off.

For flaw(s) detected and measured as 50 percent or greater through-wall depth, and to remain in service without mitigation or repair, the licensee stated in its letters dated April 5, 2013, and October 9, 2013, that it will submit flaw evaluations to the NRC for review and approval prior to reactor startup. Such flaw evaluations submitted to the NRC will include information regarding the flaw degradation mechanism, the surface roughness/profile in the area of the pipe/weld, and an estimate of the percentage of potential surface areas with UT probe lift-off.

The licensee submitted RR 11 for the fourth 10-year ISI interval of Turkey Point 3, which began on February 22, 2004, and will end on February 21, 2014, and Turkey Point 4, which began on April 15, 2004, and will end on April 14, 2014. Because of the extended refueling outage for the extended power uprate (EPU) Turkey Point plant modifications, if necessary, the licensee may invoke the provision of Paragraph IWA-2430, allowing extension of the fourth 10-year ISI interval by one year. Should there be a need, the licensee stated that it may perform these proposed reactor vessel nozzle butt weld examinations during the extension period.

3.2 NRC Staff's Evaluation

The NRC staff evaluated RR 11 pursuant to 10 CFR 50.55a(g)(6)(i). The NRC staff focused on whether the licensee's technical justification supported a determination that the ASME Code requirement is impractical, imposing the requirements could result a burden upon the facility, and the structural integrity and leak tightness of component is reasonably assured.

The NRC staff determined that the licensee provided an adequate description and technical information to support the basis for impracticality. The NRC staff confirmed that the industry made attempts to qualify the ID ultrasonic inspection procedures since 2002. Enhancements in examinations, such as use of commercially available advanced UT systems, transducers, and software, have not resulted in the desired improvements in performance to meet the ASME Code acceptable RMSE criteria for the ID ultrasonic inspection. To date, inspection vendors have not been able to meet the qualification requirement of not having greater than 0.125-inch RMSE, as established by the ASME Code for the UT inspection procedure for examining from the ID surface.

The NRC staff determined that the licensee considered an alternative approach, such as examining the subject welds from the outer diameter (OD) surface, as described in the licensee's letter dated October 9, 2013. The qualification requirement of not having greater than 0.125inch RMSE, as established by the ASME Code for the OD ultrasonic inspection procedures, have been successful. However, the licensee determined that the reactor vessel shield wall and the reactor cavity sand plugs restrict access to the subject welds from the OD. There is a 2-inch air gap between the bottom of the sand plug wall and the reactor coolant pipe insulation that limits examination from the OD. The licensee estimated that approximately 10 inches of the top OD surface can only be accessed from the sand plug and examined. Therefore, the NRC staff finds that a technical justification exists to support the determination that the ASME Code required RMSE of 0.125 inch for the ID ultrasonic inspection qualification is

impractical, and if the ASME Code requirement was imposed on the facility, these welds would require major design modifications and replacement, which would be a burden on the licensee.

The NRC staff determined that the licensee's proposed alternative to use an RSME correction factor for flow depths is acceptable. In July 2012, the NRC staff reviewed the proprietary Performance Demonstration Initiative (PDI) program (administered by the Electric Power Research Institute (EPRI)) data used in blind tests. This review was conducted to verify the information and analysis presented by the industry in the public meeting held among the NRC, PDI, EPRI, and industry on March 16, 2012 (ADAMS Accession No. ML12097A071), and June 19, 2012 (ADAMS Accession Nos. ML12173A517 and ML12173A522). The NRC staff determined that adding the industry-proposed correction factor (procedure RMSE - 0.125 inches) to the depths of any flaw found by the UT prior to the flaw evaluation for flaws less than 50 percent through-wall satisfactorily reduces the effect of the increased sizing error associated with not meeting the ASME Code required 0.125-inch RMSE.

The NRC staff finds that the RMSE acceptance criteria of ASME Code Case N-695 need not be met to provide reasonable assurance of structural integrity or leak tightness of the subject components provided that the following alternative requirements, which are imposed by the NRC staff in accordance with 10 CFR 50.55a(g)(6)(i), are met. If any cracks are detected and measured by the UT as 50 percent through-wall depth or greater and to remain in service without mitigation or repair, the licensee shall perform and submit a flaw evaluation for the NRC review and approval prior to the reactor startup. The flaw evaluations shall include: a) the inner profile of the weld, pipe, and nozzle in the region at and surrounding the flaw, b) an estimate of the percentage of potential surface areas with the UT probe lift-off, and c) information on the degradation mechanism that caused the crack. Requiring the NRC approval for restart when a flaw greater than 50 percent through-wall is discovered and is to be left in service without mitigation or repair provides additional assurance of preventing potential large undersizing errors in deep flaws.

Therefore, the NRC staff finds that for flaws measured at 50 percent or less through-wall depth, adding the licensee's proposed correction factor (procedure RMSE - 0.125 inch) to the depths of any flaw found by the inspections and obtaining the NRC review and approval prior to startup for any flaws measured as greater than 50 percent through-wall depth provides reasonable assurance of structural integrity and leak tightness of the subject components. On the basis of the above evaluation, the NRC staff grants RR 11 for the remainder of the fourth 10-year ISI interval of Turkey Point 3, which will end on February 21, 2014, and Turkey Point 4 which will end on April 14, 2014. The licensee may invoke the provision of the ASME Code, Section XI, Paragraph IWA-2430, which allows the licensee to extend the fourth 10-year ISI intervals by 1 year. The licensee may perform the proposed alternative in the 1-year extension periods.

4.0 REGULATORY COMMITMENTS

In its letter dated April 5, 2013, the licensee included a regulatory commitment that for flaws detected and measured as 50 percent through-wall depth or greater, and to remain in service without mitigation or repair, the licensee will submit flaw evaluations to the NRC for review and approval prior to reactor startup. The NRC staff considers the granting of the relief request to be subject to such flaw evaluation submittals and the associated NRC review and approval of the flaw evaluation submittals prior to startup. Therefore, the licensee's flaw evaluation

submittals, should they be required in accordance with this relief request, are obligations that are not changeable in accordance with the licensee's commitment management program.

5.0 CONCLUSION

As set forth in the aforementioned evaluation, the NRC staff determines that it is impractical for the licensee to comply with the ASME Code Case N-695 requirements. The NRC staff also determines that the proposed alternative provides reasonable assurance of structural integrity and leak tightness of the subject welds. Granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i) and is in compliance with the requirements of the ASME Code for which relief was not requested. Therefore, the NRC staff grants RR 11 for the remainder of the fourth 10-year ISI interval of Turkey Point, Unit 3, which will end on February 21, 2014, and Unit 4 which will end on April 14, 2014. The licensee may invoke the provision of the ASME Code, Section XI, Paragraph IWA-2430, which allows the licensee to extend the fourth 10-year ISI intervals by 1 year. The licensee may perform the proposed alternative in the 1-year extension periods.

All other ASME Code, Section XI, requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including the third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: Ali Rezai

Date: January 14, 2014

M. Nazar

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If you have any questions regarding this issue, please feel free to contact Ms. Audrey Klett at (301) 415-0489.

Sincerely,

/RA/

Jessie F. Quichocho, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-250 and 50-251

Enclosure:
Safety Evaluation

cc w/enclosure: Listserv

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***By e-mail**

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