



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

SAFETY EVALUATION
BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SECOND 10-YEAR INTERVAL INSERVICE INSPECTION PLAN
REQUEST FOR RELIEF NO. 25 FOR
FLORIDA POWER AND LIGHT COMPANY
ST. LUCIE PLANT, UNIT 2
DOCKET NUMBER 50-389

1.0 INTRODUCTION

By letters dated April 5, 1999, and July 22, 1999, Florida Power and Light (FPL) Company, (the licensee), requested relief from certain ultrasonic testing (UT) examination requirements at St. Lucie Plant, Unit 2 (St. Lucie). The licensee proposed implementing the criteria from the American Society of Mechanical Engineers (ASME) Code Case (CC) N-613, "Ultrasonic Examination of Full Penetration Nozzles in Vessels, Examination Category B-D, Item Nos. B3.10 and B3.90, Reactor Vessel-To-Nozzle Welds, Figure IWB-2500-7(a), (b), and (c), Section XI, Division 1," as an alternative to the examination volume that is required in the ASME Boiling and Pressure Vessel Code (Code). The CC N-613 reduces the volume adjacent to the weld that must be examined with UT techniques.

2.0 BACKGROUND

It is stated in Title 10 of the Code of Federal Regulation (10 CFR), Section 50.55a(g)(4) that ASME Code Class 1, 2, and 3 components (including supports) must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of editions of the Code and Addenda that become effective subsequent to the editions specified in paragraphs (g)(2) and (g)(3) of this section and that are incorporated by reference in 50.55a(b), to the extent practical within the limitations of design, geometry and materials of construction of the components.

2.1 Code Requirements

The applicable edition of Section XI of the Code for St. Lucie for the second ten-year interval is the 1989 Edition with no addenda. St. Lucie is required to perform volumetric examinations of the pressure-retaining welds in the reactor vessels according to IWB-2500-1, Examination Category B-D. Examination Category B-D states that examination volumes shall apply to the applicable Figures IWB-2500-7(a) through (d).

When using UT for volumetric examinations, IWA-2232 states that UT examinations shall be conducted in accordance with the rules in Appendix I to Section XI of the Code. The UT examination requirements are contained in Article I-2000 of Appendix I, which states that

9910080055 991004
PDR ADOCK 05000389
P PDR

ultrasonic examination of vessel welds greater than two inches thickness shall be conducted in accordance with Article 4 of Section V as supplemented by Appendix I.

2.2 Request for Approval of an Alternative

It is stated in 10 CFR 50.55a(a)(3) that proposed alternatives to the requirements of paragraphs (c), (d), (e), (f), (g), and (h) of this section, or portions thereof, may be used when authorized by the U.S. Nuclear Regulatory Commission (NRC). The applicant shall demonstrate that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.3 Basis for Alternative

In letters dated April 5, 1999, and July 22, 1999, the licensee explained the basis for their request as follows. St. Lucie is currently required to perform inservice examinations of selected welds to nuclear power plant components in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 1989 Edition of Section XI of the Code. This edition of the Code invokes the examination volume requirements of Figures IWB-2500-7(a) and IWB-2500-7(b). This edition of the Code also invokes the examination requirements of Article I-2000 to Appendix I which references Article 4 to Section V of the Code. Article 4 of Section V essentially prescribes 20-year-old examination methodology.

Starting with the 1989 Edition with 1989 Addenda of the Code, performance-based UT examination methodology was added to the Code. For the reasons presented in St. Lucie's Relief Request 22, dated February 18, 1999, as supplemented May 24, 1999, St. Lucie believes that the performance-based UT methodology in Code Case N-622 "Ultrasonic Examinations of RPV and Piping and Bolts and Studs, Section XI, Division 1," will provide assurance that the reactor vessel welds are free of service-related flaws thus enhancing quality and ensuring plant safety and reliability.

The examination volume for the reactor vessel nozzle-to-vessel welds extends far beyond the weld itself, and is unnecessarily large. This extends the time for examination significantly, and results in no net increase in safety. The area being examined is simply a base metal region which is not prone to inservice cracking. This region is extensively examined before the vessel is put into service and during the first inservice examination.

3.0 EVALUATION

3.1 Proposed Alternative Examination

The licensee proposed the use of CC N-613 in lieu of the requirements of Figures IWB-2500-7(a) and IWB-2500-7 (b) to the 1989 Edition of Section XI of the Code. The licensee also requested to use CC N-613 in lieu of the requirements of Article 4 of Section V of the Code for the performance of the required volumetric examinations as specified in Table-IWB 2500-1, Examination Category B-D, of the 1989 Edition of Section XI of the Code. The proposal is for the second inspection interval.

3.1.1 Conducting Alternative Examination

The licensee proposed performing the examinations in accordance with CC N-622 (Relief Request No. 22), which was approved by NRC on September 23, 1999.

3.2 Discussion

The code case has two parts. The first part identifies a criterion for conducting the examinations. The criterion states that nozzle examinations may be conducted using techniques designed for detection and sizing of surface and subsurface flaws. The phrase "techniques designed for" does not satisfy the 10 CFR 50.55a(a)(3) criterion "to demonstrate." For this reason, NRC believes CC N-613 may be used only if the UT technique is qualified with a performance demonstration. A UT technique qualified using the performance-based methodology contained in Appendix VIII to Section XI of the Code satisfies the demonstration requirement. However, Appendix VIII or an alternative to Appendix VIII has not yet been referenced in regulation. Appendix VIII with an alternative is in the final stages of rulemaking.

In the licensee's proposal, the alternative examination will be conducted using a UT technique that was demonstrated in accordance with CC N-622, a performance-based alternative to Appendix VIII. CC N-622 has not yet been endorsed by the NRC staff. However, the licensee has submitted Relief Request No. 22 that proposed using selected parts of CC N-622 for UT examinations as an alternative to the Code. The NRC staff authorized Relief Request No. 22 in separate correspondence dated September 23, 1999.

The second part of CC N-613 addresses the area next to the weld that must be volumetrically examined. The code case reduces the examination volume next to the widest part of the weld from half of the vessel wall thickness to one-half inch. The code case removes from examination the base metal that was extensively examined during construction and preservice inspection and that is not in the high residual stress region associated with the weld. Cracks, should they initiate, occur in high-stressed areas of the weld. These high-stressed areas are contained in the volume that is defined by CC N-613 and are subject to examination. Axial inner radius thermal cracks, should they occur, would also be detected because they would pass through the examination area defined by CC N-613.

Based on the above discussion, the staff has determined that the proposed alternative to use CC N-613 in conjunction with the staff's safety evaluation of St. Lucie's Relief Request No. 22 (to use CC N-622) will provide an acceptable level of quality and safety for the reactor vessel-to-nozzle welds.

4.0 CONCLUSION

Based on the above discussion, the staff has determined that the proposed alternative to use CC N-613 in conjunction with the staff's safety evaluation of St. Lucie's Relief Request No. 22 (to use CC N-622) will provide an acceptable level of quality and safety for the reactor vessel-to-nozzle welds. Pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative performed in conjunction with the staff's safety evaluation of St. Lucie's Relief Request No. 22 is authorized for the above identified reactor vessel-to-nozzle examinations during the second 10-year interval of the St. Lucie Plant, Unit 2.

Principal Contributor: D. Naujock, NRR

Date: October 4, 1999

Mr. T. F. Plunkett
Florida Power and Light Company

ST. LUCIE PLANT

cc:
Senior Resident Inspector
St. Lucie Plant
U.S. Nuclear Regulatory Commission
P.O. Box 6090
Jensen Beach, Florida 34957

Mr. R. G. West
Plant General Manager
St. Lucie Nuclear Plant
6351 South Ocean Drive
Jensen Beach, Florida 34957

Joe Myers, Director
Division of Emergency Preparedness
Department of Community Affairs
2740 Centerview Drive
Tallahassee, Florida 32399-2100

E. J. Weinkam
Licensing Manager
St. Lucie Nuclear Plant
6351 South Ocean Drive
Jensen Beach, Florida 34957

M. S. Ross, Attorney
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Mr. John Gianfrancesco
Manager, Administrative Support
and Special Projects
P.O. Box 14000
Juno Beach, FL 33408-0420

Mr. Douglas Anderson
County Administrator
St. Lucie County
2300 Virginia Avenue
Fort Pierce, Florida 34982

Mr. Rajiv S. Kundalkar
Vice President - Nuclear Engineering
Florida Power & Light Company
P.O. Box 14000
Juno Beach, FL 33408-0420

Mr. William A. Passetti, Chief
Department of Health
Bureau of Radiation Control
2020 Capital Circle, SE, Bin #C21
Tallahassee, Florida 32399-1741

Mr. J. Kammel
Radiological Emergency
Planning Administrator
Department of Public Safety
6000 SE. Tower Drive
Stuart, Florida 34997

J. A. Stall, Site Vice President
St. Lucie Nuclear Plant
6351 South Ocean Drive
Jensen Beach, Florida 34957