



JUN 1 2 2017

L-2017-112
10 CFR 50.4
10 CFR 50.55a

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Re: St. Lucie Unit 1
Docket No. 50-335
Inservise Inspection Plan
Fourth Ten-Year Interval Unit 1 Relief Request No. 17, Revision 0

Pursuant to 10 CFR 50.55a(z)(1), as an alternative to the requirements specified in ASME Section XI, Appendix I, Article I-2110(b), Florida Power & Light (FPL) proposes to use procedures, personnel, and equipment qualified to the requirements of ASME Section XI, Appendix VIII, Supplements 4 and 6 of the 2001 Edition with No Addenda, as administered by the Electric Power Research Institute's (EPRI) PDI program to conduct the reactor vessel upper Shell-to-Flange weld examination. The details and justification for this request are provided in the attachment to this letter.

Please contact Ken Frehafer at (772) 467-7748 if there are any questions about this submittal.

Sincerely,

A handwritten signature in black ink, appearing to read 'Michael J. Snyder'.

Michael J Snyder
Licensing Manager
St. Lucie Plant

Attachment
MJS/KWF

cc: USNRC Regional Administrator, Region II
USNRC Senior Resident Inspector, St. Lucie Units 1 and 2

**St. Lucie Unit 1
Fourth Inservice Inspection Interval
Relief Request Number 17 Revision 0**

**Proposed Alternative
In Accordance with 10 CFR 50.55a(z)(1)**

--Alternative Provides Acceptable Level of Quality and Safety--

“Alternative Ultrasonic Examination of the Reactor Pressure Vessel Flange-to-Upper Shell Weld using ASME Section XI, Appendix VIII Demonstrated Techniques”

1. ASME Code Component(s) Affected

Class 1 Reactor Pressure Vessel (RPV) upper Shell-to-Flange weld (Weld Number 7-203) subject to Ultrasonic (UT) examination.

2. Applicable Code Edition and Addenda

St. Lucie Unit 1 is currently in the 4th 10-year Inservice Inspection (ISI) interval. The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) of record for the current 10-year ISI interval is Section XI, is 2001 Edition with Addenda through 2003. The code of record for ASME Section XI, Appendix VIII is the 2001 Edition with No Addenda.

3. Applicable Code Requirement

ASME Code Class 1, Table IWB-2500-1, “Pressure Retaining in Reactor Vessel,” Examination Category B-A, Item Number B1.30, “Shell-to-Flange Weld”. ASME Section XI, Paragraph IWA-2232 states, “Ultrasonic examinations shall be conducted in accordance with Appendix I.” Appendix I, Article I-2110(b), requires “Ultrasonic examination of reactor vessel-to-flange welds, closure head-to-flange welds, and integral attachment welds shall be conducted in accordance with Article 4 of Section V, except that alternative beam angles may be used. These examinations shall be further supplemented by Table I-2000-1. ”

Exam Cat.	Item No.	Examination Description
B-A	B1.30	Essentially 100% volumetric examination of the reactor vessel-to-flange weld in accordance with Appendix I, Article I-2000

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4. Reason for Request

FPL is performing volumetric examinations of all Reactor Pressure Vessel (RPV) welds during the upcoming 10-year Inservice Inspection (ISI). FPL is required to perform the 10-year RPV ISI pursuant to 10CFR50.55a. The Code requires that Ultrasonic (UT) examination of RPV welds, excluding the reactor vessel upper shell-to-flange weld, shall be with techniques that have been demonstrated in accordance with ASME Section XI, Appendix VIII.

Examination from the inside surface provides the best access for examination of the reactor vessel upper shell-to-flange weld. The outside surface of the RPV is inaccessible due to its' placement inside the biological-shield wall and the installed insulation.

Although the reactor vessel upper Shell-to-Flange weld is specifically excluded from the requirement to utilize ASME Section XI, Appendix VIII qualified UT techniques by the referenced Code, FPL believes that performing the UT examination with Appendix VIII/PDI qualified personnel and procedures from the inside surface will provide an acceptable level of quality and safety.

5. Proposed Alternative and Basis for Use

Proposed Alternative:

As an alternative to the requirements specified in ASME Section XI, Appendix I, Article I-2110(b), FPL proposes to use procedures, personnel, and equipment qualified to the requirements of ASME Section XI, Appendix VIII, Supplements 4 and 6 of the 2001 Edition with No Addenda, as administered by the Electric Power Research Institute's (EPRI) PDI program to conduct the reactor vessel upper Shell-to-Flange weld examination. The examinations from the inside surface will be implemented to achieve the maximum coverage possible utilizing procedures and personnel qualified by the PDI program. The proposed alternative represents the best techniques, procedures, and qualifications available to perform UT examinations of RPV welds. The PDI program addresses qualification requirements for each of the supplements that are defined in ASME Section XI, Appendix VIII. The applicable vendor procedure has been qualified in accordance with PDI's implementation of Supplements 4 and 6 of ASME Section XI, Appendix VIII.

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Basis for Use:

The listed weld is the only circumferential shell weld in the reactor vessel that is not examined with ASME Section XI, Appendix VIII techniques, as mandated by 10CFR50.55a. 10CFR50.55a mandates the use of ASME Section XI, Appendix VIII, Supplements 4 and 6 for the conduct of all other reactor vessel weld examinations. ASME Section XI, Appendix I, Article I-2110(b) identifies that ASME Section V, Article 4 techniques be utilized for the examination of the reactor upper Shell-to-Flange weld. The calibration techniques, recording criteria, and flaw sizing methods are based upon the use of a distance-amplitude-correction (DAC) curve derived from the ultrasonic responses to machined reflectors in a basic calibration block. Reflectors detected in the field require investigation only if they exceed 20% of the amplitude response of the DAC curve obtained from the machined reflectors in the basic calibration block. Indications detected in the designated examination volume with amplitudes below this threshold are therefore, not required to be recorded. The amplitude based recording threshold is generic and does not take factors into consideration such as flaw orientation, which can influence the amplitude of the UT response. Use of the ASME Section XI, Appendix VIII, qualified techniques enhance the quality of the examination. The detection criterion is more conservative because the qualified procedure requires examiners to measure and evaluate all indications determined to be flaws, regardless of their amplitude response, in accordance with the applicable criteria.

EPRI Report NP-6273, "Accuracy of Ultrasonic Flaw Sizing Techniques for Reactor Vessels", dated March 1989, contains a comparative analysis of sizing accuracy for several different techniques. The results show that the UT flaw sizing techniques based upon tip diffraction are the most accurate. ASME Section XI, Appendix VIII qualified detection and sizing methodologies use analysis tools based upon echo dynamics and tip diffraction. This methodology is considered more sensitive and accurate than amplitude only based comparisons.

For the RPV upper shell-to-flange weld examinations using ASME Section XI, Appendix VIII, qualified techniques, FPL anticipates obtaining essentially 100% code volume coverage. However, if limitations are encountered that preclude obtaining essentially 100% examination coverage of the required volume, individual relief requests will be submitted.

Procedures, equipment, and personnel qualified via the PDI Appendix VIII, Supplement 4 and 6 programs have been demonstrated to have a high probability of detection and are generally considered superior to the techniques employed during previous ASME Section V, Article 4, reactor vessel weld examinations. Accordingly, approval of this alternative examination and evaluation process is requested pursuant to 10CFR50.55a

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(z)(1).

6. Duration of Proposed Alternative

FPL will implement the proposed alternative Ultrasonic examination of the RPV upper Shell-to-Flange weld using PDI Demonstrated Techniques during the St. Lucie Unit 1 fourth inservice inspection interval.

7. Precedents

Similar Relief Requests have been granted to the following plants:

NRC Safety Evaluation dated November 29, 2013, "Turkey Point Units 3 and 4 – Safety Evaluation for Relief Request Nos. 10, Associated with (TAC Nos. MF0086 and MF0087)," (ML13260A493).

NRC Safety Evaluation dated March 23, 2012, "St. Lucie Unit No. 2, Relief from the Requirements of the ASME Code, Relief Request No. 12 (TAC No. ME6745)."

NRC Safety Evaluation dated August 1, 2007, "St. Lucie Nuclear Plant Unit 1, Safety Evaluation for Relief Request No. 27 Regarding Examination Methodology of Reactor Pressure Vessel Flange-to-Upper Weld (TAC No. MD2955)."

8. Attachment to Relief Request 17

Upper Shell-to-Flange Weld Illustration

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Upper Shell-to-Flange Weld Illustration

