



September 8, 2005

L-2005-193  
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  
In Service Inspection Plan  
Third Ten-Year Interval  
Relief Request 28

Pursuant to 10 CFR 50.55a (a)(3), Florida Power & Light Company (FPL) requests approval of Unit 1 Third Ten-Year Inservice Inspection Interval Relief Request 28, *Alternative Examination of the Steam Generator Primary Manway Studs*. Relief Request 28 is attached for NRC review and approval.

FPL is required to perform a volumetric examination of the steam generator primary manway studs in accordance with the requirements of 10CFR50.55a, the 1989 Edition, No Addenda of the ASME Section XI, and ASME Section XI Code Case N-307-2. Because of the design of the primary manway bolting, the performance of an ultrasonic examination from either the end of the stud or from the center drilled hole is impractical. Therefore, FPL proposes performing a surface examination in accordance with ASME Section V as an alternative.

Approval of this relief request is requested by January 31, 2007 to support inspections scheduled for the spring 2007 Unit 1 refueling outage (SL1-21).

Please contact George Madden if there are any questions about this submittal.

Very truly yours,

William Jefferson, Jr.  
Vice President  
St. Lucie Plant

WJ/GRM

Attachment

A047

**St. Lucie Unit 1  
Third Inservice Inspection Interval  
Relief Request Number 28**

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**Proposed Alternative  
In Accordance with 10 CFR 50.55a (a)(3)(i)**

**Alternative Examination of the Steam Generator Primary Manway Studs**

**1. ASME Code Component(s) Affected**

Class 1 Steam Generator primary manway studs subject to ultrasonic (UT) examination.

**2. Applicable Code Edition and Addenda**

The code of record for the St. Lucie Unit 1 third 10-year inservice inspection interval is the 1989 Edition, No Addenda, of the American Society of Mechanical Engineers (ASME) Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components."

**3. Applicable Code Requirement**

Pursuant to 10CFR 50.55a (a)(3)(i), Florida Power & Light Company (FPL) requests approval to implement an alternative to the requirements within ASME Section XI, 1989 Edition, No Addenda, Table IWB-2500-1, Category B-G-1. Category B-G-1, Examination Item B6.90 requires a volumetric examination for pressure retaining bolting greater than 2-inch in diameter. For definition of the examination volume, FPL implements ASME Section XI Code Case N-307-2, Revised Ultrasonic Examination Volume for Class 1 Bolting, Table IWB-2500-1, Examination Category B-G-1, When the Examinations Are Conducted From the End of the Bolt or Stud or From the Center-Drilled Hole, without conditions, as approved by USNRC Regulatory Guide 1.147, Revision 13.

Exam Cat.	Item No.	Examination Description
B-G-1	B6.90	volumetric examination of the steam generator bolts and studs greater than 2-inch in diameter

**4. Reason for Request**

FPL is required to perform the volumetric examination, UT, of the steam generator primary manway studs in accordance with the requirements of 10CFR50.55a, plant Technical Specifications, the 1989 Edition, No Addenda of the ASME Section XI, and ASME Section XI Code Case N-307-2. The UT examination is performed from the end of the bolt or stud or the center drilled hole. 10CFR50.55a requires the UT examination method to be qualified by demonstration in accordance with the requirements of the 1995 Edition with 1996 Addenda of Appendix VIII, Supplement 8.

**St. Lucie Unit 1  
Third Inservice Inspection Interval  
Relief Request Number 28**

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Because of the design of the primary manway bolting, the performance of an ultrasonic examination from either the end of the stud or from the center-drilled hole is impractical. Therefore, FPL proposes performing a surface examination in accordance with ASME Section V as an alternative.

**5. Proposed Alternative and Basis for Use**

**Proposed Alternative:**

FPL requests an alternative to the ASME Section XI, Table IWB-2500-1, Category B-G-1, Item No. B6.90 required volumetric examination. FPL proposes performing a surface examination of the steam generator primary manway studs in accordance with ASME Section V, 1989 Edition, No Addenda, in lieu of the UT examination. The acceptance standard applied for flaws identified during the surface examinations will be IWB-3515 as defined by Table IWB-2500-1, Category B-G-1, Item No. B6.90.

**Basis for Use:**

The steam generator primary manway studs (reference attached sketch) include a main non-threaded shank of 1.75 inches diameter that is 9.5 inches long connecting two threaded sections with a thread dimension of 2.25 inches. The lower 2.875-inch long threaded section (2.25-inch diameter) is installed into the manway flange. Below this threaded section are two non-threaded sections that are 0.875 inches long (2.063 inches in diameter) and 0.625-inch long (1.75-inch diameter). The lower end of the stud is tapered for 0.12 inches of its length. The upper 3.3125-inch threaded section (2.25 inches diameter) is the location of the nut engagement when the studs are installed in the steam generator flange. Above the upper threaded section used for nut engagement is approximately 5.625 inches of stud length. This upper stud length consists of a 2.375-inch long non-threaded section (1.75 inches diameter), a 2.25-inch long non-threaded section (2.25-inch diameter) and a 1.0 inch long non-threaded section (1.82 inches in diameter that is square with a 1.50-inch dimension across the machined flats). A 0.25-inch diameter center-drilled hole is present for the entire length of the stud.

ASME Section XI, Table IWB-2500-1, Category B-G-1, currently contains the requirement for a volumetric examination of this Class 1 bolting. Typically, the ultrasonic (UT) method is employed for this examination. An alternative examination volume is identified in ASME Section XI Code Case N-307-2 (acceptable for use by Regulatory Guide 1.147 without conditions). Code Case N-307-2 identifies the UT examination volume for Class 1 bolting when the examinations are conducted from the end of the bolt or stud or from the center-drilled hole. The examination volume, as defined by N-307-2, is the cylindrical region 0.25 inches deep from the base of the threads, from the edge of the nut in the bolted position to the bottom of the threaded section in the flange. The UT examination volume illustrated in ASME Code Case N-307-2 requires the technique deployed to detect surface breaking flaws. Implementation of a surface examination technique as an alternative to the UT technique will detect surface breaking flaws.

**St. Lucie Unit 1  
Third Inservice Inspection Interval  
Relief Request Number 28**

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The September 1999 revision of 10CFR50.55a required an expedited implementation of the ASME Section XI, 1995 Edition with 1996 Addenda, Appendix VIII, Supplement 8 for the qualification of UT procedures and personnel used for examination for bolts and studs. The qualified procedures utilize either an examination technique deployed from the end of the stud or from the center-drilled hole. It is impractical to perform a UT from either the end of the studs or the center-drilled hole because of the following:

- a) The threaded sections of the studs are 0.25 inches greater in radius than the unthreaded sections. The maximum notch depth allowed by Appendix VIII, Supplement 8 is 0.107 inch. Utilizing the maximum notch depth allowed would result in a notch that is 0.143 inches below the non-threaded sections. Therefore, the end surface where a transducer would be placed is of a smaller diameter than that of the threaded sections of the studs where flaws would be located. This configuration makes calibration and flaw detection impractical unless the flaws are significantly deeper than the allowable calibration reflectors.
- b) The center-drilled hole in the studs is 0.25 inches in diameter. The typical search unit module contains at least two (2) transducers mounted in tandem and has an attached "wand" which houses the coaxial cables and internal connections. The wand is used to push and pull the transducer package through the bore hole. The search unit setup consists of two (2) single element 70° shear wave transducers with the beams looking in opposite directions. The 70° nominal angle shear wave transducers are used to scan the outer perimeter examination volume as defined by IWB-2500-12. The transducers required to fit into the bore probe to perform this examination are very fragile due to their size. Additionally, the resulting beam spread of the small transducers limit the detectability of the required calibration reflectors. Therefore, the utilization of a bore probe to perform the examinations of these primary manway studs is impractical.

Other Class 1 studs, such as the reactor vessel closure studs, when removed, require surface and volumetric examinations in the 1989 Edition, No Addenda. However, in the 2000 Addenda and later editions of ASME Section XI (endorsed by reference in 10CFR50.55a), the examination method to be employed was changed to a surface or volumetric. Implementation of a surface examination in lieu of the volumetric examination for the examinations of the St. Lucie Unit 1 primary manway studs will provide an equivalent level of integrity assurance that is required by ASME Section XI for the reactor vessel head closure studs.

Therefore, implementation of the proposed alternative will provide an adequate level of quality and safety for examination of the steam generator primary manway bolting.

**St. Lucie Unit 1  
Third Inservice Inspection Interval  
Relief Request Number 28**

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**6. Duration of Proposed Alternative**

FPL will implement the proposed alternative surface examination of the steam generator primary manway studs during the St. Lucie Unit 1 third inservice inspection interval.

**7. Attachments to Relief Request 28**

Steam Generator Primary Manway Stud Configuration

St. Lucie Unit 1  
Third Inservice Inspection Interval  
Relief Request Number 28

Steam Generator Primary Manway Stud Configuration

