FPL

JUL 0 1 2002

L-2002-127
10 CFR 50.55a

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

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Alternative Examination for Reactor Pressure Vessel Nozzle Inner Radius
Response to Request for Additional Information for Relief Request No. 25

Pursuant to 10 CFR 50.55a (a)(3)(i), relief is requested to implement an alternative to the ultrasonic examination requirement of ASME Section XI Table IWB-2500-1, Examination Category B-D, Item B3.100. FPL proposes to perform a visual examination, VT-1 as an alternative method for the inspection of Reactor Pressure Vessel Nozzle Inner Radius.

Florida Power & Light Company (FPL) submitted Relief Request No. 25 previously via letter L-2001-110, dated June 11, 2001. Subsequently, it was revised by letters L-2001-203, dated September 5, 2001, and L-2001-220, dated October 8, 2001. L-2002-085, dated May 6, 2002 superceded all previously submitted letters for Relief Request No. 25. The Staff requested additional information on June 11, 2002. This letter provides both the response to the Staff's questions and the revised Relief Request No. 25 in Attachments 1 and 2, respectively.

FPL requests approval of the attached Relief Request No. 25.

Please contact Walter Parker at (305) 246-6632, if there are any questions about this submittal.

Sincerely,

John P. McElwain
Vice President
Turkey Point Plant

Attachments

NRC Regulatory Issue Summary 2001-05 waived the requirements that multiple copies of documents be submitted to the NRC.

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Response to Request for Additional Information for Relief Request No. 25

The Attached Relief request incorporates the responses to the following questions:

1) **NRC RAI Request**

In Section II, Examination Requirements, provide the specific systems and functions for each of the components listed in the table.

FPL Response

Refer to Section II and Table 1 of the attached Relief Request No. 25 for identification of components for which relief is requested. The Inlet Nozzle (Cold Leg) and the Outlet Nozzle (Hot Leg) are part of the Reactor Coolant System (RCS).

2) **NRC RAI Request**

Describe the system you will use to perform the visual examination, include a description of the magnification and resolution capability of the proposed system and discuss how the examination will be performed (direct, remote, enhanced, etc...). This discussion should include the criteria that will be applied to assure an equivalent to ultrasonic testing.

FPL Response

Refer to Paragraph IV of the attached Relief Request No. 25. FPL proposes to perform the visual examination, VT-1, with resolution demonstration of a 0.001-inch wire in lieu of the code required resolution demonstration (0.044-inch character height). Qualified VT-1 personnel using a remote underwater camera with magnification and lighting sufficient to resolve a 0.001-inch wire will perform the examination of the nozzle inner radius sections. The resolution of the system to be used will be demonstrated prior to performing the visual examinations.

The visual examination will cover the same inspection surface as specified for the UT examination (Reference Figure IWB-2500-7 (a) and (b), surface M-N).

3) **NRC RAI Request**

Provide a comparison of the benefits of your proposed examination method to that of the American Society of Mechanical Engineers Section XI code required examination, including equivalency of inspection surface coverage.

FPL Response

The Ultrasonic examinations of the nozzle inner radius section, required by ASME Section XI, are attempting to detect surface breaking flaws. The visual examination will examine the same (area) surface as specified for the volumetric examinations (surface M-N as shown in Figure IWB-2500-7 (a) and (b).

4) <u>NRC RAI Request</u>

Describe the acceptance criteria that would be used for crack-like surface flaws.

<u>FPL Response</u>

Acceptance Criteria: as stated in Paragraph V of the attached Relief Request No. 25, FPL will utilize the acceptance criteria of Table IWB-3512-1 of the 1989 Edition of Section XI for the examination. When applying Table IWB-3512-1 criteria, the crack depth will be assumed to be equal to one-half the measured crack length.

5) <u>NRC RAI Request</u>

Provide a table describing to what extent these nozzles have been previously examined, including nozzle size, date of prior examination, percent coverage achieved, and type of nondestructive examination conducted. Include a discussion of the results and the percentage coverage achieved.

<u>FPL Response</u>

An Ultrasonic examination of the nozzle inner radius sections has been performed during the base line examination, first Inservice inspection interval and second Inservice inspection interval. The results show that there have been no inspection findings and no flaws have been detected at Turkey Point in any of the previous RCS RPV nozzle inner radius sections examinations.

Coverage Achieved: Essentially 100% of the surface has been examined during each of the three inspections. Reactor Pressure Vessel (RPV) internals components (i.e. core barrel) that would limit examination coverage were removed prior to the examinations being performed.

Table 1

Turkey Point Unit 3 RCS RPV Nozzles	Size of Nozzles	Previous Examinations Performed	Examination Previous Performed	Examination Coverage	Limitations Encountered
3-DI-A-IRS -Inlet Nozzle Inner Radius	27.5" Dia.	Interval 1 - 3rd period Interval 2 - 3rd period	UT Jan., 1991	*100%	None
3-DO-A-IRS -Outlet Nozzle Inner Radius	29" Dia.	Interval 1 - 1st & 3rd period Interval 2 - 1st & 3rd period			
3-DI-B-IRS - Inlet Nozzle Inner Radius	27.5" Dia.	Interval 1 - 3rd period Interval 2 - 3rd period			
3-DO-B-IRS - Outlet Nozzle Inner Radius	29" Dia.	Interval 1 - 1st & 3rd period Interval 2 - 1st & 3rd period			
3-DI-C-IRS - Inlet Nozzle Inner Radius	27.5" Dia.	Interval 1 - 3rd period Interval 2 - 3rd period			
3-DO-C-IRS - Outlet Nozzle Inner Radius	29" Dia.	Interval 1 - 1st & 3rd period Interval 2 - 1st & 3rd period			

Table 2

Turkey Point Unit 4 RCS RPV Nozzles	Size of Nozzles	Previous Exam Performed	Examination Previous Performed	Examination Coverage	Limitations Encountered
4-DI-A-IRS -Inlet Nozzle Inner Radius	27.5" Dia.	Interval 1 - 3rd period Interval 2 - 3rd period	UT Dec., 1990	*100%	None
4-DO-A-IRS -Outlet Nozzle Inner Radius	29" Dia.	Interval 1 – 2nd & 3rd period Interval 2 - 1st & 3rd period			
4-DI-B-IRS - Inlet Nozzle Inner Radius	27.5" Dia.	Interval 1 - 3rd period Interval 2 - 3rd period			
4-DO-B-IRS - Outlet Nozzle Inner Radius	29" Dia.	Interval 1 – 2nd & 3rd period Interval 2 - 1st & 3rd period			
4-DI-C-IRS - Inlet Nozzle Inner Radius	27.5" Dia.	Interval 1 - 3rd period Interval 2 - 3rd period			
4-DO-C-IRS - Outlet Nozzle Inner Radius	29" Dia.	Interval 1 – 2nd & 3rd period Interval 2 - 1st & 3rd period			

*One-hundred percent (100%) as defined in 10CFR 50.55a (g)(6)(ii)(A)(2), "*essentially 100% …*" means more than 90 percent of the examination volume of each weld, where the reduction in coverage is due to interference by another component, or part geometry. Review of previous examinations concludes the absence of interfering conditions.

6) **NRC RAI Request**

Provide the specific dates for the current inservice inspection intervals for Turkey Point Units 3 and 4.

FPL Response

Unit 3 – Third Interval – 2/22/1994 through 2/21/2004
Unit 4 – Third Interval – 4/15/1994 through 4/14/2004

7) **NRC RAI Request**

Discuss whether significant thermal cycling during operation has been seen experienced by the subject components at either unit.

FPL Response

Refer to Section IV of the attached Relief Request No. 25. For the Turkey Point Units 3 & 4 nozzles, there is no significant thermal cycling during operation.

8) **NRC RAI Request**

Discuss how you came to the conclusion that 100 percent of the surface area will be examined and provide sketches and/or other documentation that supports your conclusion.

FPL Response

Refer to Section IV of the Relief Request No. 25. In PWR RPV Vessels, once the internal components (i.e. core barrel) and fuel assemblies are removed, there are no limitations for inner radius section examinations. Review of the past examination data supports this conclusion.

Relief Request No. 25
Alternative Examination for Reactor Pressure Vessel Nozzle Inner Radius

I. COMPONENT IDENTIFICATION:

ASME Code Class: Class 1
System: Reactor Coolant System (RCS)
Components: Reactor Pressure Vessel (RPV) 3 Inlet (Cold Leg) and 3 Outlet (Hot Leg) Nozzles

II. ASME SECTION XI EXAMINATION REQUIREMENTS

Rules for Inservice Inspection of Nuclear Power Plant Components, ASME Section XI, 1989 Edition, Table IWB-2500-1, Examination Category B-D, Full Penetration Welds of Nozzles in Vessels – Inspection Program B, Code Item B3.100, Reactor Vessel Nozzle Inner Radius Sections, Figure IWB-2500-7(a) and (b), surfaces M-N requires an Ultrasonic (UT) examination.

Table 1 and Table 2 identify respectively the Turkey Point Unit 3 and 4 nozzles, which require examination. The tables summarize the size of each nozzle, intervals and periods of the previous examination performed, the date of the last exam performed, the type of exam performed, the examination coverage and the limitations encountered in previous exams.

III. RELIEF REQUESTED

Pursuant to 10 CFR 50.55a (a)(3)(i), relief is requested from the Ultrasonic (UT) examination requirement of ASME Section XI Table IWB-2500-1, Examination Category B-D, Item B3.100 to implement an alternative examination method. FPL proposes to perform a remote Visual examination, VT-1, as an alternative method for the inspection of inlet and outlet RCS RPV nozzle inner radius sections identified in Tables 1 and 2 of this relief request.

IV. BASIS FOR RELIEF:

At Turkey Point Units 3 and 4, all nozzle forgings were nondestructively examined during fabrication and have been examined twice during service using ultrasonic techniques specific to the nozzle configuration. There have been no inspection findings and no flaws have been detected at Turkey Point in any of the previous RCS RPV nozzle inner radius sections examinations. Additionally, there have been no service related cracking discovered in any of the PWR fleet plant nozzles inner radius sections (Reference 3).

For FPL's Turkey Point Units 3 and 4, there is no significant thermal cycling during operation. As identified in Reference 3, the only mechanism of damage that can be envisioned for the nozzle inner radius is fatigue. Fracture toughness tests performed

at Oak Ridge National Laboratories indicate there is a large flaw tolerance for nozzle inner radius regions. Even if flaw propagation was assumed, test results indicated a leak before break scenario would occur, which would not result in a significant increase in core damage frequency. Additionally, pressure testing continues to be performed and, during plant operation, the containment is monitored for changes in unidentified leakage. From a risk perspective, the failure probability is extremely low under the plant operating conditions and replacement of the ultrasonic examination for the RPV nozzle inner radius with at VT-1 examination is not expected to result in a significant increase in risk. Therefore, there is no need to perform volumetric examination of any nozzles. Reference 3 was submitted to the NRC Staff by the ASME, Boiler & Pressure Vessel Code, Subcommittee Inservice Inspection, - Section XI. The Staff indicated that Reference 3 supports the conclusion that the UT examination could be replaced by Visual examination, VT-1, for the proposed RPV nozzle inspections on the basis that surveillance is maintained and a Visual examination, VT-1, is performed.

Florida Power & Light believes the application of a visual examination alternative for the listed nozzle inner radius sections ensures an acceptable level of quality and safety. FPL proposes to perform the VT-1 with the resolution demonstration of a 0.001 inch wire in lieu of the code required resolution demonstration (1/32 inch line). Qualified VT-1 personnel using a remote underwater camera with magnification and lighting sufficient to resolve a 0.001 inch wire will perform the examination of the nozzle inner radius sections. The resolution of the system will be demonstrated prior to performing the examinations.

The visual examination will cover the same inspection surface as specified for the UT examination (Reference Figure IWB-2500-7(a) and (b), surface M-N). The Inservice examinations of the RCS RPV nozzle inner radius sections are performed subsequent to the removal of internals components, thereby removing all limiting conditions that would preclude complete examination coverage of the examination area. Therefore 100% coverage is expected to be achieved.

The implementation of this relief request will provide FPL the additional benefits of reducing personnel radiation exposure and reducing on-vessel examination time by as much as 6 hours. During the previous ultrasonic examinations, scanning heads were required to be removed from the RPV during an equipment change by personnel standing on the refueling bridge and replaced; this is obviated by the remote VT-1 examination.

The remote Visual examination of the nozzle inner radius sections will be performed in conjunction with the code required 10-year Inservice Inspection of the RPV, thereby eliminating the need for personnel to perform equipment changes during the performance of the nozzle inner radius examinations. The performance of this visual examination uses the reactor water as a shield and the camera is not removed until all 10-year ISI visual examinations are complete. This is consistent with FPL's ALARA program.

V. ALTERNATIVE EXAMINATIONS:

1. In lieu of the UT examination requirements of ASME Section XI, Table IWB-2500-1, Examination Category B-D, Item B3.100, a remote visual examination, VT-1, shall be performed on surface M-N as shown in Figure IWB-2500-7(a) and (b). The resolution capability of a 0.001 inch wire will be substituted in lieu of the Code required resolution for the examinations. The examination results will be evaluated in accordance with ASME Section XI Code section IWB-3140. FPL will utilize the acceptance criteria of Table IWB-3512-1 of the 1989 Edition of Section XI for the examination. When applying Table IWB-3512-1 criteria, the crack depth will be assumed to be equal to one-half the measured crack length.

2. Periodic System Pressure Tests per Category B-P, Table IWB-2500-1.

VI. IMPLEMENTATION SCHEDULE:

Third Inservice Inspection Interval for Turkey Point Unit 3 (February 22, 1994 – February 21, 2004) and Unit 4 (April 15, 1994 – April 14, 2004).

VII. REFERENCES:

1. Nuclear Regulatory Commission Federal Register Part II, Vol. 64, No. 183, Wednesday September 22, 1999, 10 CFR Part 50 Industry Codes and Standards; Amended Requirements; Final Rule.

2. ASME Section XI, 1989 Edition, No Addenda, "Rules For Inservice Inspections of Nuclear Power Plant Components."

3. White Paper – ISI-99-26 "Technical Basis for Elimination of Reactor Vessel Nozzle Inner Radius Inspections."

VIII. ATTACHMENT

1. Table 1 and 2.

2. ASME Section XI, 1989 Edition, Figure IWB-2500-7(a) and (b).

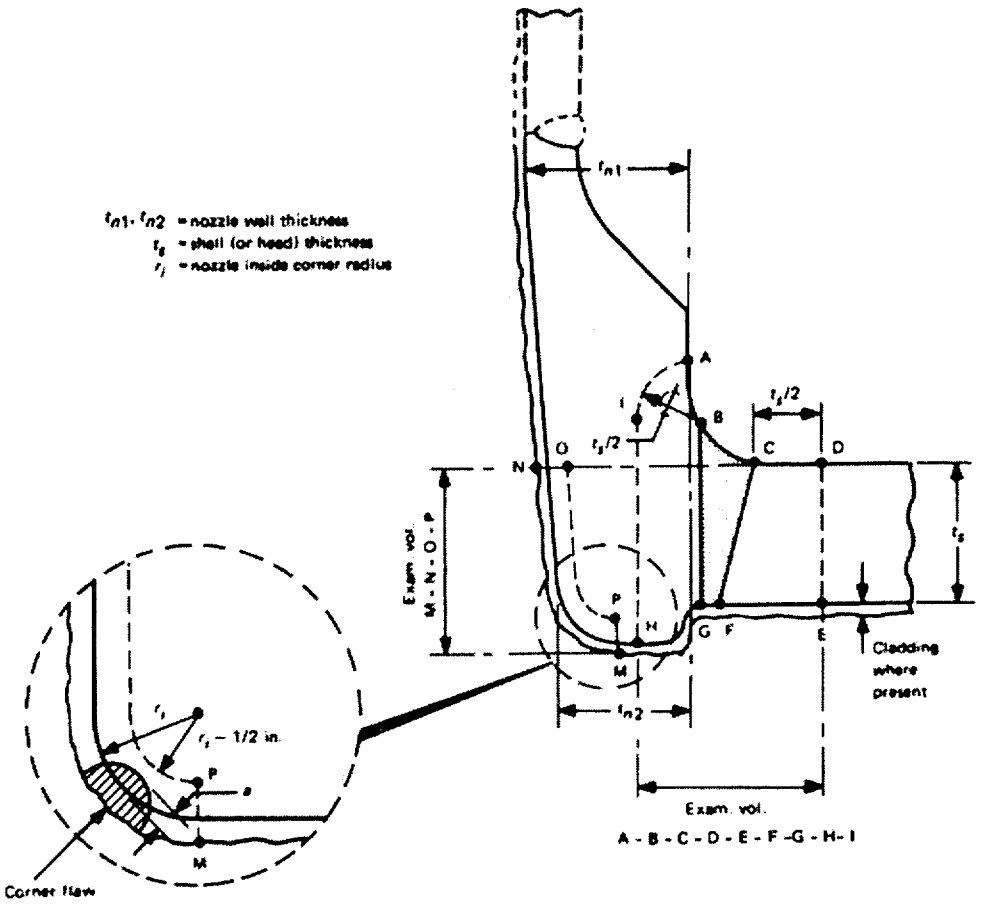
Table 1

Turkey Point Unit 3 RCS RPV Nozzles	Size of Nozzles	Previous Examinations Performed	Examination Previous Performed	Examination Coverage	Limitations Encountered
3-DI-A-IRS -Inlet Nozzle Inner Radius	27.5" Dia.	Interval 1 - 3rd period Interval 2 - 3rd period	UT Jan., 1991	*100%	None
3-DO-A-IRS -Outlet Nozzle Inner Radius	29" Dia.	Interval 1 - 1st & 3rd period Interval 2 - 1st & 3rd period			
3-DI-B-IRS - Inlet Nozzle Inner Radius	27.5" Dia.	Interval 1 - 3rd period Interval 2 - 3rd period			
3-DO-B-IRS - Outlet Nozzle Inner Radius	29" Dia.	Interval 1 - 1st & 3rd period Interval 2 - 1st & 3rd period			
3-DI-C-IRS - Inlet Nozzle Inner Radius	27.5" Dia.	Interval 1 - 3rd period Interval 2 - 3rd period			
3-DO-C-IRS - Outlet Nozzle Inner Radius	29" Dia.	Interval 1 - 1st & 3rd period Interval 2 - 1st & 3rd period			

Table 2

Turkey Point Unit 4 RCS RPV Nozzles	Size of Nozzles	Previous Exam Performed	Examination Previous Performed	Examination Coverage	Limitations Encountered
4-DI-A-IRS -Inlet Nozzle Inner Radius	27.5" Dia.	Interval 1 - 3rd period Interval 2 - 3rd period	UT Dec., 1990	*100%	None
4-DO-A-IRS -Outlet Nozzle Inner Radius	29" Dia.	Interval 1 – 2nd & 3rd period Interval 2 - 1st & 3rd period			
4-DI-B-IRS - Inlet Nozzle Inner Radius	27.5" Dia.	Interval 1 - 3rd period Interval 2 - 3rd period			
4-DO-B-IRS - Outlet Nozzle Inner Radius	29" Dia.	Interval 1 – 2nd & 3rd period Interval 2 - 1st & 3rd period			
4-DI-C-IRS - Inlet Nozzle Inner Radius	27.5" Dia.	Interval 1 - 3rd period Interval 2 - 3rd period			
4-DO-C-IRS - Outlet Nozzle Inner Radius	29" Dia.	Interval 1 – 2nd & 3rd period Interval 2 - 1st & 3rd period			

*One-hundred percent (100%) as defined in 10CFR 50.55a (g)(6)(ii)(A)(2), "*essentially 100%…*" means more than 90 percent of the examination volume of each weld, where the reduction in coverage is due to interference by another component, or part geometry. Review of previous examinations concludes the absence of interfering conditions.

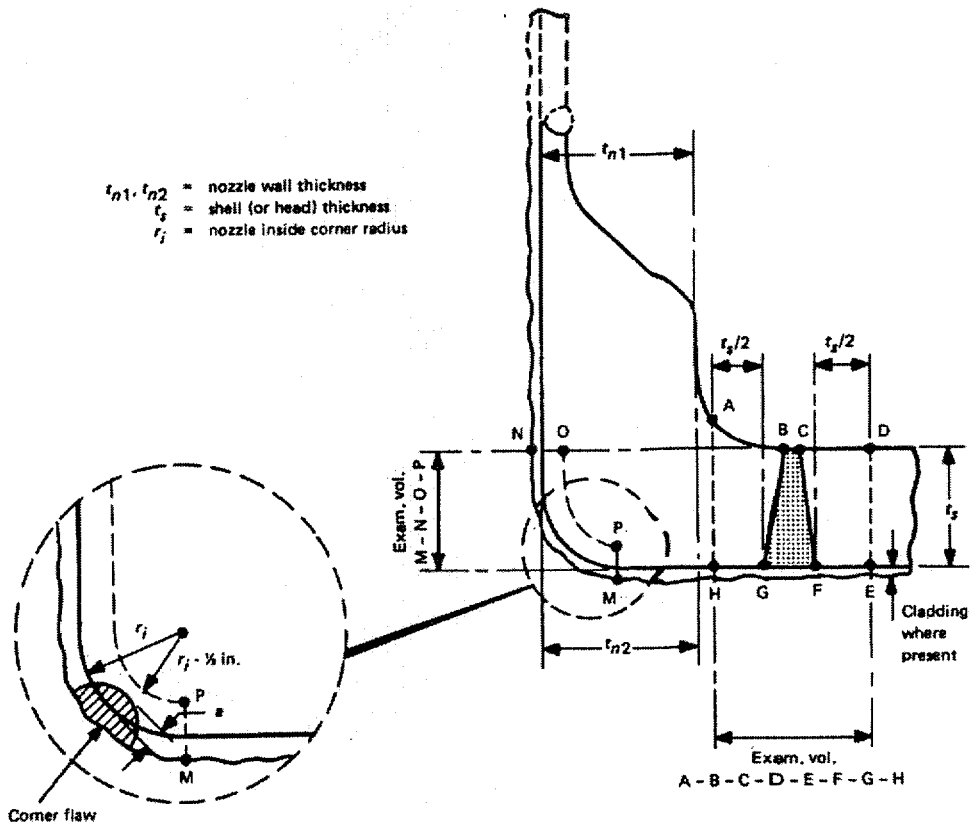


EXAMINATION REGION (Note (1))
Shell (or head) adjoining region
Attachment weld region
Nozzle cylinder region
Nozzle inside corner region

EXAMINATION VOLUME (Note (2))
C-D-E-F
B-C-F-G
A-B-G-H-I
M-N-O-P

NOTES:
(1) Examination regions are identified for the purpose of differentiating the acceptance standards in IWB-3512.
(2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. IWB-2500-7(a) NOZZLE IN SHELL OR HEAD
(Examination Zones in Barrel Type Nozzles Joined by Full Penetration Corner Welds)



EXAMINATION REGION [Note (1)]	EXAMINATION VOLUME [Note (2)]
Shell (or head) adjoining region	C-D-E-F
Attachment weld region	B-C-F-G
Nozzle cylinder region	A-B-G-H
Nozzle inside corner region	M-N-O-P

NOTES:
(1) Examination regions are identified for the purpose of differentiating the acceptance standards in IWB-3512.
(2) Examination volumes may be determined either by direct measurements on the component or by measurements based on design drawings.

FIG. IWB-2500-7(b) NOZZLE IN SHELL OR HEAD
(Examination Zones in Flange Type Nozzles Joined by Full Penetration Butt Welds)