

April 4, 2000

Mr. T. F. Plunkett
President - Nuclear Division
Florida Power and Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

SUBJECT: ST. LUCIE PLANT, UNIT 1, INSERVICE INSPECTION PROGRAM - SECOND
10-YEAR INTERVAL - EVALUATION OF REQUESTS FOR RELIEF NOS. 1, 4,
21 AND 22 (TAC NO. MA4884)

Dear Mr. Plunkett:

By letter dated February 11, 1999, the Florida Power and Light Company (FP&L) requested relief from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (the Code), Section XI, examination requirements for the second 10-year interval of the inservice inspection program for St. Lucie Plant, Unit 1.

The U.S. Nuclear Regulatory Commission staff, with technical assistance from its contractor, the Idaho National Engineering and Environmental Laboratory (INEEL), has reviewed the subject relief requests. Based on the information provided by FP&L, the staff concludes that, for all four of the requests, the Code requirements are impractical. The requested reliefs are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest, giving due consideration to the burden on FP&L if the requirements were imposed on the facility. Therefore, reliefs are granted pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50.55a(g)(6)(i). No alternative requirements were determined to be necessary.

The enclosure contains the staff's evaluation. Attachment 1 and 2 to the enclosure are a summary of the relief requests and a copy of the INEEL Technical Letter Report, respectively.

Sincerely,

/RA/

Richard P. Correia, Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-335

Enclosure: As stated

cc: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUESTS FOR RELIEF NOS. 1, 4, 21 AND 22

ST. LUCIE, UNIT 1

FLORIDA POWER AND LIGHT COMPANY

DOCKET NUMBER 50-335

1.0 INTRODUCTION

Inservice inspection (ISI) of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components is performed in accordance with Section XI of the ASME Boiler and Pressure Vessel (B&PV) Code and applicable addenda as required by *Title 10 of the Code of Federal Regulations* (10 CFR), Part 50.55a(g), except where specific written relief has been granted by the U.S. Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i) or alternatives imposed pursuant to 50.55a(a)(3). It is stated in 10 CFR 50.55a(a)(3) that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service 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 limitations and modifications listed therein. The Code of record for the St. Lucie, Unit 1, second 10-year ISI interval is the 1983 Edition through Summer 1983 Addenda of the ASME B&PV.

2.0 EVALUATION

The NRC staff, with technical assistance from Idaho National Engineering and Environmental Laboratory (INEEL), has reviewed the information concerning ISI program Requests for Relief Nos. 1, 4, 21 (Parts A, B, C, D, and E), and 22 (Parts A and B) submitted for the second 10-year interval for St. Lucie, Unit 1, in a Florida Power and Light Company (the licensee) letter dated February 11, 1999. Attachment 1 to this safety evaluation summarizes each relief

request and the status of approval. Attachment 2 gives the evaluations and recommendations for granting relief prepared by INEEL. The NRC staff adopts the evaluation and recommendations of INEEL.

For St. Lucie, Unit 1, relief is granted from the inspection requirements which have been determined to be impractical to perform. The ISI relief requests which are granted are acceptable for implementation. Additionally, the granting of relief is based upon the fulfillment of any commitments made by the licensee in its basis for each relief request. Program changes involving new or revised relief requests must be submitted to NRC for review. Program changes that add or delete components from the ISI program should also be periodically provided to the NRC.

3.0 CONCLUSION

The requests for relief from the Code ISI requirements for the second 10-year interval for St. Lucie, Unit 1, have been reviewed by the staff with the assistance of its contractor, INEEL. The TLR provides INEEL's evaluation of these relief requests. The staff has reviewed the TLR and concurs with the evaluations and recommendations for granting relief.

The staff concludes that the Code requirements as evaluated by this Safety Evaluation are impractical and that the proposed relief requests provides reasonable assurance of component pressure boundary integrity. The staff has determined that 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. In making this determination, the staff has considered the impracticality of performing the required inspections and the burden on the licensee if the requirements were imposed.

Principal Contributor: Thomas K. McLellan, NRR

Attachments: 1. Summary Table
2. INEEL TLR

Date: April 4, 2000

TABLE 1
SUMMARY OF RELIEF REQUESTS

Relief Request Number	INEE L TLR Sec.	System or Component	Exam Category	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Disposition
1	2.1	Reactor Pressure Vessel	B-A	B1.11 B1.12 B1.21 B1.22 B1.30 B1.40	Circumferential Shell Welds Longitudinal Shell Welds Circumferential Head Welds Meridional Head Welds Shell-to-Flange Weld Head-to-Flange Weld	Volumetric Volumetric/Surface	Utilize volumetric coverage obtained	Granted 10 CFR50.55a(g)(6)(i)
4	2.2	Reactor Pressure Vessel	B-D	B3.90	Nozzle-to-Vessel Welds	Volumetric	Utilize volumetric coverage obtained	Granted 10 CFR50.55a(g)(6)(i)
21 Part A	2.3	Class 1 Piping	B-F B-J	B5.130 B9.11	Dissimilar Metal Welds Circumferential Welds	Volumetric/Surface	Utilize volumetric coverage obtained	Granted 10 CFR50.55a(g)(6)(i)
21 Part B	2.4	Shutdown Cooling Ht. Exch.	C-A	C1.10 C1.30	Flange to Body Weld Body to Tube Sheet Weld	Volumetric	Utilize volumetric coverage obtained	Granted 10 CFR50.55a(g)(6)(i)
21 Part C	2.5	Shutdown Cooling Ht. Exch.	C-B	C2.21	Nozzle-to-Shell Welds	Volumetric/Surface	Utilize volumetric coverage obtained	Granted 10 CFR50.55a(g)(6)(i)
21 Part D	2.6	Class 2 Piping	C-C	C3.20	Integral Welded Attachments	Surface	Utilize Surface coverage obtained	Granted 10 CFR50.55a(g)(6)(i)

TABLE 1
SUMMARY OF RELIEF REQUESTS

Relief Request Number	INEE L TLR Sec.	System or Component	Exam Category	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Disposition
21 Part E	2.7	Class 2 Piping	C-F-1 C-F-2	C5.11 C5.21 C5.51	Circumferential Welds in SS Piping Longitudinal Welds in SS Piping Circumferential Welds in CS Piping	Volumetric/Surface	Utilize volumetric coverage obtained	Granted 10 CFR50.55a(g)(6)(i)
22 Part A	2.8	Steam Generator	B-B	B2.31	Head to Stay Cylinder Weld	Volumetric	Utilize volumetric coverage obtained	Granted 10 CFR50.55a(g)(6)(i)
22 Part B	2.9	Steam Generator	B-D	B3.130	Nozzle to Shell Welds	Volumetric	Utilize volumetric coverage obtained	Granted 10 CFR50.55a(g)(6)(i)

TECHNICAL LETTER REPORT
ON THE SECOND 10-YEAR INTERVAL INSERVICE INSPECTION
REQUESTS FOR RELIEF 1, 4, 21, AND 22
FOR
FLORIDA POWER AND LIGHT COMPANY
ST. LUCIE UNIT 1
DOCKET NUMBER: 50-335

1. INTRODUCTION

By letter dated February 11, 1999, the licensee, Florida Power and Light Company, submitted Requests for Relief 1, 4, 21, and 22 seeking relief from the requirements of the ASME Code, Section XI, for the St. Lucie Unit 1, second 10-year inservice inspection (ISI) interval. In response to a request for additional information and issues raised during conference calls on September 8, 1999, and October 21, 1999, the licensee provided additional information in a letter to the NRC dated December 1, 1999. The Idaho National Engineering and Environmental Laboratory (INEEL) staff's evaluation of the subject requests for relief are in the following section.

2. EVALUATION

The information provided by Florida Power and Light Company in support of the requests for relief from Code requirements has been evaluated and the bases for disposition are documented below. The Code of record for the St. Lucie Unit 1, second 10-year ISI interval, which began February 11, 1988, is the 1983 Edition through Summer 1983 Addenda of Section XI of the ASME Boiler and Pressure Vessel Code.

2.1 Request for Relief No. 1, Examination Category B-A, Items B1.10, B1.20, B1.30, and B1.40 Pressure-Retaining Welds in Reactor Vessel

Code Requirement: Examination Category B-A, Items B1.11 and B1.12 require 100% volumetric examination of RPV circumferential and longitudinal shell welds, as defined by Figures IWB-2500-1 and 2. Items B1.21 and B1.22 require 100% volumetric examination of the accessible portions of all circumferential and meridional head welds, as defined by Figure IWB-2500-3. Item B1.30 requires 100% volumetric examination of the shell-to-flange welds, as defined by Figure IWB-2500-4. Item B1.40 requires 100% volumetric and surface examination of the head-to-flange weld, as defined by Figure IWB-2500-5.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required 100% volumetric examination of the welds listed below.

WELD	ITEM	DESCRIPTION	COVERAG E	LIMITATION
204-03A	B1.22	Bottom head peel segment weld @30°	59%	Limited due to flow skirt-lower head attachment.
204-03B	B1.22	Bottom head peel segment weld @90°	55%	Limited due to flow skirt-lower head attachment and support bracket.
204-03C	B1.22	Bottom head peel segment weld @150°	59%	Limited due to flow skirt-lower head attachment.
204-03D	B1.22	Bottom head peel segment weld @210°	59%	Limited due to flow skirt-lower head attachment.
204-03E	B1.22	Bottom head peel segment weld @270°	59%	Limited due to flow skirt-lower head attachment.
204-03F	B1.22	Bottom head peel segment weld @30°	55%	Limited due to flow skirt-lower head attachment and support bracket.
10-203	B1.21	Bottom head head-to-lower shell weld	80.5%	Limited due to proximity of flow skirt and flow skirt support lug.
9-203	B1.11	Lower shell to intermediate shell circumferential weld	83.5%	Limited along length of weld near vessel material specimen tubes.
1-203B	B1.12	Upper shell longitudinal weld @15°	54%	Limited at intersection with the adjacent outlet nozzle integral extension.
7-203	B1.30	Upper shell-to-flange circumferential weld	72%	Limited due to proximity of the outlet integral extension and the inside surface taper.
209-02	B1.40	Head-to-flange weld	87%	Limited at intersection of flange flex radius, shroud, shroud hold down lugs, and head lifting lugs.

Licensee's Basis for Requesting Relief (as stated):

“FPL performed Inservice Examinations of selected welds in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 1983 Edition with Summer 83 Addenda of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components. When a component has conditions which limit the examination area, Florida Power and Light is required to submit the information to the enforcement and regulatory authorities having jurisdiction at the plant site. This Relief Request has been written to address areas where those types of conditions exist and the required amount of coverage was reduced below the minimum acceptable.

“When examined, the welds listed within this request did not receive the required Code volume coverage due to one or more factors:

- “1) Configuration and permanent attachments prohibit essentially 100% ultrasonic examination coverage of the required examination volume. Additional ultrasonic techniques are employed, where practical, to achieve the Code required volume. See attachment¹ for summary of coverage achieved and limitations.
- “2) Component geometric interference with the scanning equipment and/or geometric shadowing of examination areas.

“Described below, coupled with the Tables and Figures, are details of the examination limitations by weld description. The accompanying Figures graphically depict the extent of the limitations. The Table quantifies the extent of Code required volume which is effectively covered.

“RPV Lower Head Meridional Welds

“Mechanized scanning of the Lower Head Meridional welds 204-03A through F is limited due to interference from the core support lugs and flow skirt. Figure 1 is a roll out inside view showing inside surface scan limitations. Figure 2 provides a side section view of peel segment welds showing limitations caused by core support lugs and flow skirt support. Figure 3 provides a graphic view of a typical meridional weld showing transverse scan limitations in the area behind the flow skirt.

“RPV Circumferential Shell Welds

“The mechanized examination of the Lower Shell-to-Lower Head weld 10-203 is limited due to interference from the flow skirt and flow skirt support lug. Figure 1 is a roll out view showing the inaccessible scan surface from the vessel inside surface and shows the volume of material not examinable from the inside surface where scanning was limited by lug interference.

“Examination of the Middle Shell to Lower Shell weld 9-203 is limited due to interference from the RPV material specimen tubes. Figure 1 is a roll out view of weld 9-203 depicting areas where examination scans can not be performed.

“The Upper Shell to Flange weld 7-203 is examined from the shell side and from the flange seal surface. Beams directed nearly perpendicular to the weld plane from the flange seal surface compensated for the straight beam and angle beam examination limitations on the flange side of the weld. Due to the flange configuration, no transverse examination scans can be

Attachments, figures and tables, furnished with the licensee’s submittal are not included in this report.

performed on the flange side of the weld. Figure 4 shows the limitations to the shell side examination and depicts the coverage obtainable from the seal surface examination. Also shown is the tapered surface where transverse examination is prohibited.

“RPV Longitudinal Shell Welds

“Examination of the Upper Shell Vertical weld 1-203B is limited by interference from the outlet nozzle integral extension and flange taper as shown on Figure 1. However, the examinations are complemented by the Nozzle-to-Shell weld examinations.

“RPV Head to Flange Weld

“Examination of the Head to Flange weld 209-02 is limited due to the configuration and by interference from three lugs as shown on Figure 5.”

Licensee’s Proposed Alternative Examination (as stated):

- “1) Periodic System Pressure tests per Category B-P, Table IWB-2500-1
- “2) Inservice Hydrostatic tests per Table IWB-2500-1 and paragraph 2.2.15 of Section 2.0
- “3) Conduct Mechanized Ultrasonic Examinations to the extent practical.
- “4) 50/70° Bi-modal ultrasonic examination of the inner 25 percent for examinations performed from the ID.”

Evaluation: The Code requires 100% volumetric examination of the subject Reactor Pressure Vessel welds during each inspection interval. Figures supplied by the licensee show that the flow skirt lower head attachment, flow skirt support brackets/lugs, specimen tubes, outlet nozzles, and other appurtenances, restrict access and preclude ultrasonic examination of the full volume of the welds. Therefore, the Code-required 100% volumetric examinations are impractical. To gain access for complete examination, the component would have to be redesigned and modified. This would place a significant burden on the licensee.

The licensee was able to examine a significant portion (54-87%) of the required volume. In addition, other RPV welds received the full (100%) examination required by the Code. Consequently, it is concluded that the examinations performed would have detected any existing patterns of degradation, providing reasonable assurance of the structural integrity of the welds. Therefore, based on the impracticality of the Code examination requirements, and the extent of examinations that were performed, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.2 Request for Relief No. 4, Examination Category B-D, Item B3.90, Full Penetration Welds of Nozzles in Vessels

Code Requirement: Examination Category B-D, Item B3.90 requires 100% volumetric examination of all nozzle-to-vessel welds in the reactor pressure vessel, as defined by Figure IWB-2500-7.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required volumetric examination for the welds listed below.

WELD	ITEM	DESCRIPTION	COVERAG E	LIMITATION
10-205-A	B3.90	Outlet nozzle to shell @0°	60%	Limited along length of weld due to proximity of outlet integral extension.
10-205-B	B3.90	Outlet nozzle to shell @180°	60%	Limited along length of weld due to proximity of outlet integral extension.

Licensee's Basis for Requesting Relief (as stated):

“FPL performed Inservice Examinations of selected welds in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 1983 Edition with Summer 83 Addenda of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components. When a component has conditions which limit the examination area, Florida Power and Light is required to submit the information to the enforcement and regulatory authorities having jurisdiction at the plant site. This Relief Request has been written to address areas where those types of conditions exist and the required amount of coverage was reduced below the minimum acceptable.

“When examined, the welds listed within this request did not receive the required Code volume coverage due to the following:

- “1) Configuration of the nozzle integral extension prohibit essentially 100% ultrasonic examination coverage of the required examination volume. Additional ultrasonic techniques are employed, where practical, to achieve the Code required volume.
- “2) Component geometric interference with the scanning equipment.

“The Ultrasonic Testing (UT) techniques for each weld were reviewed to determine if additional coverage could have been achieved. The coverages obtained were the maximum practical.”

Licensee's Proposed Alternative Examination (as stated):

- “1) Periodic System Pressure tests per Table IWB-2500-1
- “2) Conduct Mechanized Ultrasonic Examinations to the extent practical.
- “3) 50/70° Bi-modal ultrasonic examination of the inner 25 percent for examinations performed from the ID.”

Evaluation: The Code requires 100% volumetric examination of the subject RPV nozzle-to-vessel welds. However, complete examination from the inside surface is restricted by physical obstructions (nozzle internal integral extensions) that make 100% volumetric examination impractical for these areas. To gain access for examination, the RPV nozzles would require design modifications. Imposition of this requirement would create a significant burden on the licensee.

The licensee examined a significant portion of the subject welds (60%). In addition, other Class 1 nozzle-to-vessel welds have been examined as required by the Code. Therefore, any existing patterns of degradation would have been detected by the examinations that were completed and reasonable assurance of continued structural integrity has been provided.

Based on the impracticality of meeting the Code examination requirements for the subject nozzle-to-vessel welds, and the reasonable assurance provided by the examinations that were completed on these and other Class 1 nozzles, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.3 Request for Relief No. 21, Revision 1 (Part A), Examination Category B-F, Item B5.130, Pressure-Retaining Dissimilar Metal Welds, Examination Category B-J, Item No. B9.11, Pressure-Retaining Welds in Piping

Code Requirement: Examination Category B-F, Item B5.130 requires 100% volumetric and surface examination of dissimilar metal butt welds in piping \geq 4-inch nominal pipe size as defined by Figure IWB-2500-8. Examination Category B-J, Item B9.11 requires surface and volumetric examination for circumferential welds in piping NPS 4 or larger as defined by Figure IWC-2500-8 .

Licensee’s Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the full Code-required volumetric examination for the welds listed below.

WELD	CAT. ITEM	DESCRIPTION	COVERAGE	LIMITATION
RC-115-6-503	B-F B5.130	Elbow to safe end	100% from elbow side; 0% from safe end side	Safe end to pump configuration
RC-121-5-503	B-F B5.130	Elbow to safe end	100% from elbow side; 25% from safe end side	Safe end to pump configuration
RC-112-5-503	B-F B5.130	Elbow to safe end	100% from elbow side; 25% from safe end side	Safe end to pump configuration
RC-124-5-503	B-F B5.130	Elbow to safe end	100% from elbow side; 25% from safe end side	Safe end to pump configuration

WELD	CAT. ITEM	DESCRIPTION	COVERAGE	LIMITATION
10-509-A	B-F B5.130	Nozzle to safe end	100% from safe end side; 40% from nozzle side	Nozzle configuration
10-509-B	B-F B5.130	Nozzle to safe end	100% from safe end side; 75% from nozzle side	Nozzle configuration
RC-115-FW-3-500F	B-J B9.11	Safe end to pump	100% from safe end side; 0% from pump side	Pump configuration
RC-115-FW-3-500E	B-J B9.11	Pump to safe end	100% from safe end side; 0% from pump side	Pump configuration
RC-121-FW-3-500B	B-J B9.11	Safe end to pump	20% from safe end side; 0% from pump side	Safe end and pump configuration
RC-121-FW-3-500A	B-J B9.11	Safe end to pump	100% from safe end side; 0% from pump side	Pump configuration
RC-112-FW-3-500G	B-J B9.11	Safe end to pump	100% from safe end side; 0% from pump side	Pump configuration
RC-112-FW-3-500H	B-J B9.11	Pump to safe end	100% from safe end side; 0% from pump side	Pump configuration
RC-124-FW-3-500C	B-J B9.11	Safe end to pump	19% from safe end side; 0% from pump side	Pump configuration
RC-124-FW-3-500D	B-J B9.11	Pump to safe end	100% from safe end side; 0% from pump side	Pump configuration
SI-148-FW-5	B-J B9.11	Elbow to Valve 3227	100% from elbow side; 0% from valve side	Valve body configuration
SI-148-FW-1	B-J B9.11	Valve 3624 to pipe	100% from pipe side; 0% from valve side	Valve body configuration
RC-151-FW-1	B-J B9.11	Valve 3227 to elbow	100% from elbow side; 0% from valve side	Valve body configuration
SI-113-FW-13	B-J B9.11	Pipe to tee	100% from pipe side; 0% from tee side	Tee configuration
SI-149-FW-1	B-J B9.11	Valve V-3614 to pipe	0% from valve side; 100% from pipe side	Valve body configuration
SI-149-2-SW-1	B-J B9.11	Elbow to tee	100% from elbow side; 0% from tee side	Tee configuration

WELD	CAT. ITEM	DESCRIPTION	COVERAGE	LIMITATION
SI-149-2-SW-2	B-J B9.11	Tee to pipe	0% from tee side; 100% from pipe side	Tee configuration
SI-149-FW-4	B-J B9.11	Valve V-3217 to pipe	100% from pipe side; 0% from valve side	Valve body configuration
RC-154-FW-1	B-J B9.11	Elbow to valve V-3217	0% from valve side; 100% from elbow side	Valve body configuration
SI-150-FW-1	B-J B9.11	Valve V-3634 to elbow	100% from elbow side; 60% from valve side	Valve body configuration
RC-152-FW-1	B-J B9.11	Valve V-3237 to elbow	100% from pipe side; 16% from valve side	Valve body configuration
SI-151-1-SW-9	B-J B9.11	Pipe to reducer	100% from pipe side; 0% from reducer side	Reducer configuration
SI-151-FW-1	B-J B9.11	Valve V-3644 to pipe	55% from valve side; 100% from pipe side	Valve body configuration
SI-151-1-SW-4	B-J B9.11	Pipe to tee	100% from pipe side; 55% from tee side	Tee configuration
SI-151-1-SW-2	B-J B9.11	Tee to pipe	0% from tee side; 100% from pipe side	Tee configuration
SI-130-FW-1	B-J B9.11	Pipe to valve MV-3652	100% from pipe side; 0% from valve side	Valve body configuration
SI-130-FW-2	B-J B9.11	Valve MV-3652 to elbow	100% from elbow side; 0% from valve side	Valve body configuration
SI-130-FW-3	B-J B9.11	Pipe to valve MV-3651	100% from pipe side; 0% from valve side	Valve body configuration
SI-127-FW-600	B-J B9.11	Pipe to valve-3480	100% from pipe side; 35% from valve side	Valve body configuration
SI-127-FW-601	B-J B9.11	Valve-3480 to elbow	100% from elbow side; 10% from valve side	Valve body configuration
SI-127-FW-3	B-J B9.11	Elbow to Valve 3481	100% from elbow side; 0% from valve side	Valve body configuration
SI-113-1-SW-6	B-J B9.11	Reducer to tee	70% from reducer side; 0% from tee side	Reducer configuration and tee configuration
SI-113-1-SW-5	B-J B9.11	Tee to pipe	100% from pipe side; 23% from tee side	Tee configuration
SI-113-FW-6	B-J B9.11	Pipe to Penetration #36	100% from pipe side; 0% from Pen. side	Penetration configuration
SI-111-1-SW-3	B-J B9.11	Reducer to tee	70% from reducer side; 0% from tee side	Reducer configuration and tee configuration

WELD	CAT. ITEM	DESCRIPTION	COVERAGE	LIMITATION
SI-111-1-SW-2	B-J B9.11	Tee to pipe	0% from tee side; 100% from pipe side	Tee configuration
SI-111-FW-8	B-J B9.11	Pipe to penetration	100% from pipe side; 57% from Pen. side	Penetration configuration

Licensee's Basis for Requesting Relief (as stated):

"FPL performed Inservice Examinations of selected welds in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 1983 Edition with Summer 1983 Addenda of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components. When a component has conditions which limit the examination area, Florida Power and Light is required to submit the information to the enforcement and regulatory authorities having jurisdiction at the plant site. This relief request has been written to address areas within the plant where those types of conditions exist and the required amount of coverage was reduced below the minimum acceptable.

"The attached table (Attachment 1) summarizes the percent of coverage achieved and references specific figures (Attachment 2) that show the extent of the coverage.

"Volumetric Examination Limitations (Examination Categories B-F, B-J..)

"When examined, the welds listed within this request did not receive the required Code volume coverage due to one or more factors:

- "1. Portions of the required volumetric area are inaccessible due to permanent physical obstructions
- "2. Some welds, such as branch connections, shell to flange welds, pipe/elbow to valve, can be examined and receive coverage from only one side due to their configuration.
- "3. High attenuation of the ultrasonic sound- When examining some welds, such as the Reactor Coolant pump to safe end, which are a cast stainless steel material and have highly attenuative acoustic properties, bouncing off the inside surface back up into the base metal and weld is not possible with current technology.

"The Ultrasonic Testing (UT) techniques for each weld were reviewed to determine if additional coverage could have been achieved. FPL's

procedures require the examiner to consider whether additional coverage is necessary and practical. Those alternate techniques were investigated at the time of discovery. The alternate techniques considered were extending the calibration distance and/or using additional beam angles or modes. This has often provided the additional coverage needed to avoid relief. Using additional UT techniques on the weld examination areas in this relief request would have provided little or no additional coverage. The coverages obtained were the maximum practical.

“If practical, physical obstructions were removed. In most cases, it was not possible to remove the obstruction without significant work, radiation exposure, and/or damage to the plant. Additional weld preparation by welding or metal removal is a modification of the examination area requiring significant engineering and construction personnel support. High radiation exposure and costs would be incurred in order to perform these types of modifications. Radiography is impractical due to the amount of work being performed in the area on a 24 hour basis. This would result in numerous work related stoppages and increased exposure due to the shutdown and startup of other work in the area. The water must be drained from systems where radiography is performed. Removal of water from the associated piping is not always possible, and when performed, increases the radiation dose rates over a much broader area than the weld being examined. It would be a significant hardship to perform weld or area modifications or radiography in order to increase examination coverage.

“FPL performed the examinations to the extent possible. Operations personnel and system engineers perform walkdowns of every system on a periodic basis looking for leakage or other abnormal conditions. Surface and volumetric examinations performed, along with the required system pressure test, provide reasonable assurance of an acceptable level of quality and safety.

“Justification For The Granting of Relief:

“FPL has made reasonable efforts to meet Code requirements.

“For volumetric examination limitations, coverage attained was derived by graphically plotting the angles on a cross sectional view of the as welded surfaces (when possible) and looking at actual and theoretical coverage that could be obtained with additional UT angles. In each case, the coverage obtained was considered the maximum practical. Additional angles and/or techniques would not have enhanced the coverage, nor added to the quality of the examination or safety of the system.

“Denial of this relief would result in FPL being required to perform significant rework of many of the areas or welds... Radiation exposure would be very high. Reengineering and rework of the areas would not add to the safety of

the system, but could be replacing welds that have performed satisfactorily for many years with new, untested welds. Baseline examinations are required on new welds and supports.”

Licensee’s Proposed Alternative Examination (as stated):

- “1. Volumetric examinations are performed to the extent possible. Where practical, alternative ultrasonic examination techniques were performed.
- “2. Surface examinations are completed in accordance with Code requirements.
- “3. System pressure tests, as required by the St. Lucie Inservice Pressure Test Program, were performed.
- “4. Regular walkdowns by operations personnel and system engineers are performed on Class 2 systems to check for leakage, piping configuration, and/or damage. During outages, system engineers walkdown Class 1 and Class 2 systems inside containment. This walkdown is performed to look for system anomalies which could affect plant performance.

“The examination volume achieved by ultrasonic and surface examinations, combined with the system pressure tests and system walkdowns, provide an acceptable level of quality and safety. If permanent obstructions are removed, FPL will examine those areas to the extent practical.”

Evaluation: The Code requires 100% volumetric and surface examination of the subject welds. Review of the contour sketches provided by the licensee revealed that complete volumetric examination is impractical due to component configurations including valve bodies, tee radii, nozzle geometries, elbow geometries, penetrations, and pump geometries. To meet the Code requirements for volumetric examination, the subject welds and/or adjoining components would require significant engineering re-design and modifications. Therefore, the Code’s volumetric examination requirement is impractical for the subject welds. Imposition of this requirement would create a considerable burden on the licensee.

The licensee has examined approximately 35-87.5% of the Code-required volume of the subject welds. All of the Code-required surface examinations have been completed. Additionally, these welds are part of a larger sample (177 welds) that have received the required Code examinations. Based upon the volumes of the subject welds that were examined, and the Code-required surface examinations completed, it is reasonable to conclude that patterns of degradation, if present, would have been detected. Therefore, reasonable assurance of the continued structural integrity of the subject welds has been provided, and it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.4 Request for Relief No. 21 Revision 1 (Part B), Examination Category C-A, Pressure-Retaining Welds in Class 2 Pressure Vessels

Code Requirement: Examination Category C-A, Items C1.10 and C1.30 require 100% volumetric examination of pressure vessel shell circumferential and tubesheet-to-shell welds as defined by Figures IWC-2500-1 and 2. In the case of multiple vessels of similar design, size, and service, the required examinations may be limited to one vessel or distributed among the vessels.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required volumetric examination of the following welds.

WELD	CAT. ITEM	DESCRIPTION	COVERAGE	LIMITATION
2-2701	C-A C1.10	Flange to body weld-shutdown cooling heat exchanger	85% from body side; 10% from flange side	Flange configuration
2-2702	C-A C1.30	Body to tube sheet weld- Shutdown cooling heat exchanger	100% from body side; 10% from tubesheet side	Tubesheet configuration

Licensee's Basis for Requesting Relief (as stated):

"FPL performed Inservice Examinations of selected welds in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 1983 Edition with Summer 1983 Addenda of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components. When a component has conditions which limit the examination area, Florida Power and Light is required to submit the information to the enforcement and regulatory authorities having jurisdiction at the plant site. This relief request has been written to address areas within the plant where those types of conditions exist and the required amount of coverage was reduced below the minimum acceptable.

"The attached table (Attachment 1) summarizes the percent of coverage achieved and references specific figures (Attachment 2) that show the extent of the coverage.

"Volumetric Examination Limitations (Examination Categories ..C-A..)

"When examined, the welds listed within this request did not receive the required Code volume coverage due to one or more factors:

- "1. Portions of the required volumetric area are inaccessible due to permanent physical obstructions.

- “2. Some welds, such as branch connections, shell to flange welds, pipe/elbow to valve, can be examined and receive coverage from only one side due to their configuration.
- “3. High attenuation of the ultrasonic sound- When examining some welds, such as the Reactor Coolant pump to safe end, which are a cast stainless steel material and have highly attenuative acoustic properties, bouncing off the inside surface back up into the base metal and weld is not possible with current technology.

“The Ultrasonic Testing (UT) techniques for each weld were reviewed to determine if additional coverage could have been achieved. FPL’s procedures require the examiner to consider whether additional coverage is necessary and practical. Those alternate techniques were investigated at the time of discovery. The alternate techniques considered were extending the calibration distance and/or using additional beam angles or modes. This has often provided the additional coverage needed to avoid relief. Using additional UT techniques on the weld examination areas in this relief request would have provided little or no additional coverage. The coverages obtained were the maximum practical.

“If practical, physical obstructions were removed. In most cases, it was not possible to remove the obstruction without significant work, radiation exposure, and/or damage to the plant. Additional weld preparation by welding or metal removal is a modification of the examination area requiring significant engineering and construction personnel support. High radiation exposure and costs would be incurred in order to perform these types of modifications. Radiography is impractical due to the amount of work being performed in the area on a 24 hour basis. This would result in numerous work related stoppages and increased exposure due to the shutdown and startup of other work in the area. The water must be drained from systems where radiography is performed. Removal of water from the associated piping is not always possible, and when performed, increases the radiation dose rates over a much broader area than the weld being examined. It would be a significant hardship to perform weld or area modifications or radiography in order to increase examination coverage.

“FPL performed the examinations to the extent possible. Operations personnel and system engineers perform walkdowns of every system on a periodic basis looking for leakage or other abnormal conditions. Surface and volumetric examinations performed, along with the required system pressure test, provide reasonable assurance of an acceptable level of quality and safety.

“Justification For The Granting of Relief:

“FPL has made reasonable efforts to meet Code requirements.

“For volumetric examination limitations, coverage attained was derived by graphically plotting the angles on a cross sectional view of the as welded surfaces (when possible) and looking at actual and theoretical coverage that could be obtained with additional UT angles. In each case, the coverage obtained was considered the maximum practical. Additional angles and/or techniques would not have enhanced the coverage, nor added to the quality of the examination or safety of the system.

“Denial of this relief would result in FPL being required to perform significant rework of many of the areas or welds. The cost of reworking each area is significant. Radiation exposure would be very high. Reengineering and rework of the areas would not add to the safety of the system, but could be replacing welds that have performed satisfactorily for many years with new, untested welds. Baseline examinations are required on new welds and supports.”

Licensee’s Proposed Alternative Examination (as stated):

- “1. Volumetric examinations are performed to the extent possible. Where practical, alternative ultrasonic examination techniques were performed.
- “2. Surface examinations are completed in accordance with Code requirements.
- “3. System pressure tests, as required by the St. Lucie Inservice Pressure Test Program, were performed.
- “4. Regular walkdowns by operations personnel and system engineers are performed on Class 2 systems to check for leakage, piping configuration, and/or damage. During outages, system engineers walkdown Class 1 and Class 2 systems inside containment. This walkdown is performed to look for system anomalies which could affect plant performance.

“The examination volume achieved by ultrasonic and surface examinations, combined with the system pressure tests and system walkdowns, provide an acceptable level of quality and safety. If permanent obstructions are removed, FPL will examine those areas to the extent practical.”

Evaluation: The Code requires 100% volumetric examination for the subject circumferential shell and tubesheet-to-shell welds. Review of drawings submitted by the licensee show that complete examination was not possible because the flange and tubesheet geometries restricted access. Therefore, the Code examination requirements are impractical for these welds. To meet the Code requirements, engineering redesign and modification of the subject components would be required to allow additional access to the weld. Imposition of the Code requirements would result in a considerable burden on the licensee.

The licensee examined the subject welds to the extent practical, examining 47-55% of the cumulative Code-required volume for the subject welds. Additionally, these welds are part of a larger population of welds that were examined during the interval. Therefore, any significant patterns of degradation would have been detected by the examinations that were completed and reasonable assurance of the structural integrity of the pressure-retaining circumferential shell and tubesheet-to-shell welds has been provided. Based on the impracticality of meeting the Code requirements for the subject welds, and the reasonable assurance provided by the examinations that were completed, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.5 Request for Relief No. 21 Revision 1 (Part C), Examination Category C-B, Item C2.21, Pressure-Retaining Nozzle Welds in Vessels

Code Requirement: Examination Category C-B, Item C2.21 requires 100% surface and volumetric examination of nozzle-to-shell (or head) welds in Class 2 vessels as defined by Figure IWC-2500-4(a) or (b). In the case of multiple vessels of similar design, size, and service, the required examinations may be limited to one vessel or distributed among the vessels.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required volumetric examination of the following welds.

WELD	CAT. ITEM	DESCRIPTION	COVERAGE	LIMITATION
2-2742-1	C-B C2.21	Nozzle to Shell Weld- Shutdown Cooling Ht. Exch.	100% from shell side 0% from nozzle side	Nozzle Configuration
2-2741-1	C-B C2.21	Nozzle to Shell Weld- Shutdown Cooling Ht. Exch.	100% from shell side 0% from nozzle side	Nozzle Configuration

Licensee's Basis for Requesting Relief (as stated):

"FPL performed Inservice Examinations of selected welds in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 1983 Edition with Summer 1983 Addenda of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components. When a component has conditions which limit the examination area, Florida Power and Light is required to submit the information to the enforcement and regulatory authorities having jurisdiction at the plant site. This relief request has been written to address areas within the plant where those types of conditions exist and the required amount of coverage was reduced below the minimum acceptable.

“The attached table (Attachment 1) summarizes the percent of coverage achieved and references specific figures (Attachment 2) that show the extent of the coverage.

“Volumetric Examination Limitations (Examination Categories ..C-B.)

“When examined, the welds listed within this request did not receive the required Code volume coverage due to one or more factors:

- “1. Portions of the required volumetric area are inaccessible due to permanent physical obstructions
- “2. Some welds, such as branch connections, shell to flange welds, pipe/elbow to valve, can be examined and receive coverage from only one side due to their configuration.
- “3. High attenuation of the ultrasonic sound- When examining some welds, such as the Reactor Coolant pump to safe end, which are a cast stainless steel material and have highly attenuative acoustic properties, bouncing off the inside surface back up into the base metal and weld is not possible with current technology.

“The Ultrasonic Testing (UT) techniques for each weld were reviewed to determine if additional coverage could have been achieved. FPL’s procedures require the examiner to consider whether additional coverage is necessary and practical. Those alternate techniques were investigated at the time of discovery. The alternate techniques considered were extending the calibration distance and/or using additional beam angles or modes. This has often provided the additional coverage needed to avoid relief. Using additional UT techniques on the weld examination areas in this relief request would have provided little or no additional coverage. The coverages obtained were the maximum practical.

“If practical, physical obstructions were removed. In most cases, it was not possible to remove the obstruction without significant work, radiation exposure, and/or damage to the plant. Additional weld preparation by welding or metal removal is a modification of the examination area requiring significant engineering and construction personnel support. High radiation exposure and costs would be incurred in order to perform these types of modifications. Radiography is impractical due to the amount of work being performed in the area on a 24 hour basis. This would result in numerous work related stoppages and increased exposure due to the shutdown and startup of other work in the area. The water must be drained from systems where radiography is performed. Removal of water from the associated piping is not always possible, and when performed, increases the radiation dose rates over a much broader area than the weld being examined. It would be a significant hardship to perform weld or area modifications or radiography in order to increase examination coverage.

“FPL performed the examinations to the extent possible. Operations personnel and system engineers perform walkdowns of every system on a periodic basis looking for leakage or other abnormal conditions. Surface and volumetric examinations performed, along with the required system pressure test, provide reasonable assurance of an acceptable level of quality and safety.

“Justification For The Granting of Relief:

“FPL has made reasonable efforts to meet Code requirements.

“For volumetric examination limitations, coverage attained was derived by graphically plotting the angles on a cross sectional view of the as welded surfaces (when possible) and looking at actual and theoretical coverage that could be obtained with additional UT angles. In each case, the coverage obtained was considered the maximum practical. Additional angles and/or techniques would not have enhanced the coverage, nor added to the quality of the examination or safety of the system.

“Denial of this relief would result in FPL being required to perform significant rework of many of the areas or welds... Radiation exposure would be very high. Reengineering and rework of the areas would not add to the safety of the system, but could be replacing welds that have performed satisfactorily for many years with new, untested welds. Baseline examinations are required on new welds and supports.”

Licensee’s Proposed Alternative Examination (as stated):

- “1. Volumetric examinations are performed to the extent possible. Where practical, alternative ultrasonic examination techniques were performed.
- “2. Surface examinations are completed in accordance with Code requirements.
- “3. System pressure tests, as required by the St. Lucie Inservice Pressure Test Program, were performed.
- “4. Regular walkdowns by operations personnel and system engineers are performed on Class 2 systems to check for leakage, piping configuration, and/or damage. During outages, system engineers walkdown Class 1 and Class 2 systems inside containment. This walkdown is performed to look for system anomalies which could affect plant performance.

“The examination volume achieved by ultrasonic and surface examinations, combined with the system pressure tests and system walkdowns, provide an acceptable level of quality and safety. If permanent obstruction are removed, FPL will examine those areas to the extent practical.”

Evaluation: The Code requires 100% surface and volumetric examination of Class 2 pressure vessel nozzle-to-shell welds. However, sketches provided by the licensee show that complete volumetric examination of Welds 2-2742-1 and 2-2741-1 is limited due to the nozzle design configuration. Therefore, the Code examination requirements are impractical for these welds. To meet the Code requirements, the subject components would require engineering redesign and modification to allow access to the subject welds. Imposition of the Code requirements would result in a considerable burden on the licensee.

The licensee examined the subject welds to the extent practical, examining 100% of the volume from the shell side and 0% from the nozzle side. This equates to a cumulative total of 50% of the volume having been examined for the subject welds. Additionally, the Code-required 100% surface examination was performed on each nozzle weld. Therefore, based on the volume examined and the Code-required surface examinations performed, it is concluded that any significant patterns of degradation, if present, would have been detected and reasonable assurance of the structural integrity of the pressure-retaining nozzle welds has been provided.

Based on the impracticality of meeting the Code examination requirements for the subject welds, and the reasonable assurance provided by the examinations that were completed, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.6 Request for Relief No. 21 Revision 1 (Part D), Examination Category C-C, Item C3.20, Integral Attachments for Piping

Code Requirement: Examination Category C-C, Item C3.20 requires 100% surface examination of integrally welded attachments on piping as defined by Figure IWC-2500-5. Examinations are limited to attachment welds of components examined under Examination Categories C-F and C-G.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required surface examinations of the following welds/integral attachments.

WELD	CAT. ITEM	DESCRIPTION	COVERAGE	LIMITATION
BFH-6IA	C-CC3.20	Welded lugs	44%	Permanent physical obstructions

Licensee's Basis for Requesting Relief (as stated):

“FPL performed Inservice Examinations of selected welds in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 1983 Edition with Summer 1983 Addenda of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components. When a component has conditions which limit the examination area, Florida Power and Light is required to submit the information to the enforcement and

regulatory authorities having jurisdiction at the plant site. This relief request has been written to address areas within the plant where those types of conditions exist and the required amount of coverage was reduced below the minimum acceptable.

“The attached table (Attachment 1) summarizes the percent of coverage achieved and references specific figures (Attachment 2) that show the extent of the coverage.

“Surface Examination Limitation (Examination Category C-C)

“When examined, the welded attachments listed within this request did not receive the required Code required surface coverage due to portions of the required examination area being inaccessible because of permanent physical obstructions. If practical, the physical obstruction would be removed. In this case, it is not possible to remove the obstruction without significant work and/or damage to the plant. Radiography is impractical due to the configuration of the support. It would be a significant hardship to perform support modifications for radiography in order to increase examination coverage.

“FPL performed the examinations to the extent possible. Operations personnel and system engineers perform walkdowns of every system on a periodic basis looking for leakage or other abnormal conditions. The extent of the surface examinations performed, along with the required system pressure tests, provide reasonable assurance of an acceptable level of quality and safety.”

Licensee’s Proposed Alternative Examination (as stated):

- “1. Surface examinations are performed to the extent possible.
- “2. System pressure tests, as required by the St. Lucie in-service pressure test program, were performed.
- “3. Regular walkdowns by operations personnel and system engineers are performed on Class 2 systems to check for leakage, piping configuration, and/or damage. This walkdown is performed to look for system anomalies that could affect plant performance.

“The examination volume achieved by the surface examinations combined with the system pressure tests and system walkdowns, provide an acceptable level of quality and safety. If permanent obstructions are removed, FPL will examine those areas to the extent practical.”

Evaluation: The Code requires 100% surface examination of the subject integrally welded attachments. Review of the sketches submitted by the licensee revealed that complete examination was impractical because a box type pipe support and the design configuration of the attachments restrict access. To meet the Code requirements, the integral attachments and/or interfering structure would require design modification and/or

removal to allow access to the subject welds. Imposition of this requirement would create a considerable burden on the licensee . Therefore, surface examination of the subject integral attachment welds, to the extent required by the Code, is impractical.

The licensee has completed 44% of the Code-required surface examinations for the each of the subject welded attachments. Based upon the surface coverage obtained for each component, it is reasonable to conclude that existing patterns of degradation, if present, would have been detected, thus providing reasonable assurance of the structural integrity of the subject nozzle-to-vessel welds. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.7 Request for Relief No. 21 (Part E), Examination Category C-F-1, Items C5.11 and C5.21, Pressure-Retaining Welds in Austenitic Stainless Steel or High Alloy Piping; Examination Category C-F-2, Items C5.51, Pressure-Retaining Welds in Carbon or Low Alloy Steel Piping

Note: Code Case N-408 was used by the licensee during the second ten year interval.
Code Requirement: Code Case N-408, Examination Category C-F-1, Items C5.11 and C5.21 require 100% surface and volumetric examination of circumferential welds in piping $\geq 3/8$ in. nominal wall thickness for piping $>NPS$ 4, and circumferential welds in piping $\geq 1/5$ in. nominal wall thickness for piping $\geq NPS$ 2 and $\leq NPS$ 4 as defined by Figure IWC-2500-7. Examination Category C-F-2, Item C5.51 requires 100% surface and volumetric examination of circumferential welds in piping $\geq 3/8$ in. nominal wall thickness for piping $>NPS$ 4 as defined by Figure IWC-2500-7.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required volumetric examinations of the following welds:

WELD	CAT. ITEM	DESCRIPTION	COVERAGE	LIMITATION
SI-146-FW-1	C-F-1 C5.11	Valve HCV-3645 to pipe	100% from pipe side; 13% from valve side	Valve body configuration
SI-110-FW-9	C-F-1 C5.11	Pipe to Valve V-3144	100% from pipe side; 13% from valve side	Valve body configuration
SI-113-FW-9	C-F-1 C5.11	Pipe to Valve V-3114	100% from pipe side; 32% from valve side	Valve body configuration
SI-142-FW-1	C-F-1 C5.11	Valve HCV-3625 to pipe	13% from valve side; 100% from pipe side	Valve body configuration
SI-112-FW-9A	C-F-1 C5.11	Pipe to Valve 3124	100% from pipe side; 13% from valve side	Valve body configuration
SI-208-1-SW-1	C-F-1 C5.11	Flange to tee	81% from flange side; 66% for tee side	Flange and tee configuration
SI-212-FW-1A	C-F-1 C5.11	Tee to pipe	0% from tee side; 100 % from pipe side	Tee configuration

WELD	CAT. ITEM	DESCRIPTION	COVERAGE	LIMITATION
SI-212-FW-1	C-F-1 C5.11	Pipe to Valve V-3656	100% from pipe side; 0% from valve side	Valve body configuration
SI-105-FW-1	C-F-1 C5.11	Valve V-3656 to pipe	0% from valve side; 100% from pipe side	Valve body configuration
SI-209-FW-2	C-F-1 C5.11	Valve V-3405 to pipe	80% from valve side; 70% from pipe side	Valve body configuration
SI-213-FW-2	C-F-1 C5.11	Valve 3654 to pipe	0% from valve side; 100% from pipe side	Valve body configuration
BF-14-FW-6	C-F-2 C5.51	Reducer to Valve V-09-252	50% from reducer side; 55% from valve side	Valve body and reducer configuration
BF-55-FW-1	C-F-2 C5.51	Valve V-09-248 to pipe	81% from valve side 68% from pipe side	Valve body and pipe configuration
BF-56-FW-1	C-F-2 C5.51	Valve V-09-280 to pipe	81% from valve side 68% from pipe side	Valve body and pipe configuration

Licensee's Basis for Requesting Relief (as stated):

"FPL performed Inservice Examinations of selected welds in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 1983 Edition with Summer 1983 Addenda of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components. When a component has conditions which limit the examination area, Florida Power and Light is required to submit the information to the enforcement and regulatory authorities having jurisdiction at the plant site. This relief request has been written to address areas within the plant where those types of conditions exist and the required amount of coverage was reduced below the minimum acceptable.

"The attached table (Attachment 1) summarizes the percent of coverage achieved and references specific figures (Attachment 2) that show the extent of the coverage.

"Volumetric Examination Limitations (Examination Categories ..C-B.)

"When examined, the welds listed within this request did not receive the required Code volume coverage due to one or more factors:

- "1. Portions of the required volumetric area are inaccessible due to permanent physical obstructions

- “2. Some welds, such as branch connections, shell to flange welds, pipe/elbow to valve, can be examined and receive coverage from only one side due to their configuration.
- “3. High attenuation of the ultrasonic sound- When examining some welds, such as the Reactor Coolant pump to safe end, which are a cast stainless steel material and have highly attenuative acoustic properties, bouncing off the inside surface back up into the base metal and weld is not possible with current technology.

“The Ultrasonic Testing (UT) techniques for each weld were reviewed to determine if additional coverage could have been achieved. FPL’s procedures require the examiner to consider whether additional coverage is necessary and practical. Those alternate techniques were investigated at the time of discovery. The alternate techniques considered were extending the calibration distance and/or using additional beam angles or modes. This has often provided the additional coverage needed to avoid relief. Using additional UT techniques on the weld examination areas in this relief request would have provided little or no additional coverage. The coverages obtained were the maximum practical.

“If practical, physical obstructions were removed. In most cases, it was not possible to remove the obstruction without significant work, radiation exposure, and/or damage to the plant. Additional weld preparation by welding or metal removal is a modification of the examination area requiring significant engineering and construction personnel support. High radiation exposure and costs would be incurred in order to perform these types of modifications. Radiography is impractical due to the amount of work being performed in the area on a 24 hour basis. This would result in numerous work related stoppages and increased exposure due to the shutdown and startup of other work in the area. The water must be drained from systems where radiography is performed. Removal of water from the associated piping is not always possible, and when performed, increases the radiation dose rates over a much broader area than the weld being examined. It would be a significant hardship to perform weld or area modifications or radiography in order to increase examination coverage.

“FPL performed the examinations to the extent possible. Operations personnel and system engineers perform walkdowns of every system on a periodic basis looking for leakage or other abnormal conditions. Surface and volumetric examinations performed, along with the required system pressure test, provide reasonable assurance of an acceptable level of quality and safety.

“Justification For The Granting of Relief:

“FPL has made reasonable efforts to meet Code requirements.

“For volumetric examination limitations, coverage attained was derived by graphically plotting the angles on a cross sectional view of the as welded surfaces (when possible) and looking at actual and theoretical coverage that could be obtained with additional UT angles. In each case, the coverage obtained was considered the maximum practical. Additional angles and/or techniques would not have enhanced the coverage, nor added to the quality of the examination or safety of the system.

“Denial of this relief would result in FPL being required to perform significant rework of many of the areas or welds... Radiation exposure would be very high. Reengineering and rework of the areas would not add to the safety of the system, but could be replacing welds that have performed satisfactorily for many years with new, untested welds. Baseline examinations are required on new welds and supports.”

Licensee’s Proposed Alternative Examination (as stated):

- “1. Volumetric examinations are performed to the extent possible. Where practical, alternative ultrasonic examination techniques were performed.
- “2. Surface examinations are completed in accordance with Code requirements.
- “3. System pressure tests, as required by the St. Lucie Inservice Pressure Test Program, were performed.
- “4. Regular walkdowns by operations personnel and system engineers are performed on Class 2 systems to check for leakage, piping configuration, and/or damage. During outages, system engineers walkdown Class 1 and Class 2 systems inside containment. This walkdown is performed to look for system anomalies which could affect plant performance.

“The examination volume achieved by ultrasonic and surface examinations, combined with the system pressure tests and system walkdowns, provide an acceptable level of quality and safety. If permanent obstruction are removed, FPL will examine those areas to the extent practical.

Evaluation: The Code requires 100% volumetric and surface examination of the subject Class 2 circumferential piping welds. Review of the contour sketches provided by the licensee revealed that complete volumetric examination is impractical due to component configurations including valve bodies, piping, and tee-radii geometries. To meet the Code requirements for volumetric examination, the subject welds and/or adjoining components would require significant engineering re-design and modifications. Therefore, the Code volumetric examination requirement for the subject welds is impractical. Imposition of this requirement would create a considerable burden on the licensee.

The licensee has completed approximately 50-75% of the Code-required volumetric examinations, and 100% of the Code-required surface examinations. Additionally, these welds are part of a larger population of welds that were examined during the interval. It is concluded that any significant patterns of degradation would have been detected by the examinations that were completed and reasonable assurance of the structural integrity of the subject welds has been provided. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.8 Request for Relief No. 22 (Part A), Examination Category B-B, Item B2.31, Class 1 Steam Generator Circumferential Head Welds

Code Requirement: Examination Category B-B, Item B2.31 requires 100% volumetric examination of circumferential head welds on vessels other than reactor vessels, as defined in Figure IWB-2500-3.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required 100% volumetric examinations of steam generator head to stay cylinder weld #4.

WELD	CAT. ITEM	DESCRIPTION	COVERAG E	LIMITATION
Weld #4	B-B B2.31	Head to Stay Cylinder Weld	58%	One-sided configuration, primary outlet nozzles, primary inlet nozzles and manway

Licensee's Basis for Requesting Relief (as stated):

"FPL performed Preservice Examinations² of selected welds in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 1986 Edition of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components. When a component has conditions which limit the examination area, Florida Power and Light is required to submit the information to the enforcement and regulatory authorities having jurisdiction at the plant site. This Relief Request has been written to address areas where those types of conditions exist and the required amount of coverage was reduced below minimum acceptable.

"When examined, two welds did not receive the required Code volume coverage due to one or more factors:

- "1. Portions of the required volumetric area are inaccessible due to permanent physical obstructions.

Preservice examination performed on replacement Steam Generators during second ten-year interval

“2. These welds could be examined from only one side due to the configuration of the component.

“The Ultrasonic Testing (UT) techniques for each weld were reviewed to determine if additional coverage could have been achieved. The coverages obtained were the maximum practical.

“The following table³ summarizes the percent of coverage achieved and references specific figures that show the extent of the coverage.”

Licensee’s Proposed Alternative Examination (as stated):

“1. Volumetric examinations are performed to the extent possible. Where practical, alternative ultrasonic examination techniques were performed.

“2. System pressure tests were performed.

“The examination volume achieved by ultrasonic examination provides an acceptable level of quality and safety.”

Evaluation: Examination Category B-B, Item B2.31 requires 100% volumetric examination of the circumferential head welds on vessels other than reactor vessels. As stated by the licensee and shown by sketches provided, complete examination coverage is limited by physical interferences from the steam generator pedestal support, and the configuration of the shell, stay cylinder, and the pedestal support. These conditions make 100% volumetric examination impractical for this weld. To gain access for examination, the steam generator would require design modifications. Imposition of this requirement would impose a significant burden on the licensee.

The licensee has examined a significant portion of the weld (58%). Based on the volumetric coverage obtained, it is concluded that any existing patterns of degradation would have been detected by the examination that was completed and reasonable assurance of structural integrity has been provided.

Due to the impracticality of meeting the Code examination requirements for the subject weld, and the reasonable assurance provided by the examination that was completed, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

2.9 Request for Relief No. 22 (Part B), Examination Category B-D, Item B3.130, Class 1 Steam Generator Nozzle-To-Shell Welds

Code Requirement: Examination Category B-D, Item B3.130, requires 100% volumetric examination of nozzle-to-shell welds, as defined in Figure IWB-2500-7.

Attachments, figures and tables, furnished with the licensee’s submittal are not included in this report.

Licensee's Code Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code-required 100% volumetric examinations of steam generator nozzle-to-vessel Weld #5.

Licensee's Basis for Requesting Relief (as stated):

"FPL performed Preservice Examinations⁴ of selected welds in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 1986 Edition of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components. When a component has conditions which limit the examination area, Florida Power and Light is required to submit the information to the enforcement and regulatory authorities having jurisdiction at the plant site. This Relief Request has been written to address areas where those types of conditions exist and the required amount of coverage was reduced below minimum acceptable.

"When examined, two welds did not receive the required Code volume coverage due to one or more factors:

- "1. Portions of the required volumetric area are inaccessible due to permanent physical obstructions.
- "2. These welds could be examined from only one side due to the configuration of the component.

"The Ultrasonic Testing (UT) techniques for each weld were reviewed to determine if additional coverage could have been achieved. The coverages obtained were the maximum practical.

"The following table⁵ summarizes the percent of coverage achieved and references specific figures that show the extent of the coverage."

Licensee's Proposed Alternative Examination (as stated):

- "1. Volumetric examinations are performed to the extent possible. Where practical, alternative ultrasonic examination techniques were performed.
- "2. System pressure tests were performed.

"The examination volume achieved by ultrasonic examination provides an acceptable level of quality and safety."

Evaluation: Examination Category B-D, Item B3.130 requires 100% volumetric examination of steam generator nozzle-to-vessel welds. As stated by the licensee and

Preservice examination performed on replacement Steam Generators during second ten-year interval

Attachments, figures and tables, furnished with the licensee's submittal are not included in this report.

shown by sketches provided, complete examination coverage is limited by the shell and nozzle configuration. The component configuration results in an extreme radius on the shell side of the subject weld, allowing only one-sided examination in the radius region. These conditions make 100% volumetric examination impractical for this weld. To gain access for examination, the steam generator and/or nozzle would require design modifications. Imposition of this requirement would impose a significant burden on the licensee.

The licensee has examined a significant portion of the weld (85%). Considering the volume examined, it is concluded that any existing patterns of degradation would have been detected by the examination that was completed and reasonable assurance of structural integrity has been provided.

Based on the impracticality of meeting the Code examination requirements for the subject weld, and the reasonable assurance provided by the examination that was completed, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

3. CONCLUSION

The INEEL staff has evaluated the licensee's submittal and concludes that certain inservice examinations cannot be performed to the extent required by the Code at the St. Lucie Unit 1. For Requests for Relief 1, 4, 21 (Revision 1, Parts A, B, C, D, and E), and 22 (Parts A, and B,) it is concluded that the Code requirements are impractical for the subject welds. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

Mr. T. F. Plunket
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. J. A. Stall
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

Mr. Rajiv S. Kundalkar
Vice President
St. Lucie Nuclear Plant
6351 South Ocean Drive
Jensen Beach, Florida 34957