



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

July 29, 2011

Mr. Edward D. Halpin
President and Chief Executive Officer/
Chief Nuclear Officer
STP Nuclear Operating Company
South Texas Project
P. O. Box 289
Wadsworth, TX 77483

SUBJECT: SOUTH TEXAS PROJECT, UNITS 1 AND 2 - REQUEST FOR RELIEF
RR-ENG-2-55 FROM ASME CODE, SECTION XI REQUIREMENTS FOR WELD
EXAMINATIONS (TAC NOS. ME4514 AND ME4515)

Dear Mr. Halpin:

By letter dated July 29, 2010, as supplemented by letters dated September 29, 2010, and April 21 and June 20, 2011, STP Nuclear Operating Company (the licensee) submitted a request for relief (RR-ENG-2-55) from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI requirements for weld examinations pursuant to paragraph 50.55(g)(5)(iii) of Title 10 of the *Code of Federal Regulations* (10 CFR) for South Texas Project (STP), Units 1 and 2.

ASME Code, Section XI, Tables IWB-2500-1 and IWC-2500-1 require inservice inspection (ISI) of Class 1 and Class 2 component welds by nondestructive examination. The licensee stated that 100 percent examination coverage of these welds during the second 10-year inspection interval was impractical because of component configuration and geometry, and because of the limitations of the examination equipment and techniques used to perform these examinations. The request is for the third 10-year ISI interval for both units. For STP, Unit 1, the second 10-year ISI interval ended on September 24, 2010, and for STP, Unit 2, the second 10-year ISI interval ended on October 18, 2010.

The U.S. Nuclear Regulatory Commission (NRC) staff has completed the review of the subject relief request. Based on the enclosed safety evaluation, the NRC staff concludes that ASME Code examination coverage requirements are impractical for the subject welds listed in RR-ENG-2-55 Part A and Parts C through J. Furthermore, imposition of these ASME Code requirements would create a burden on the licensee. The NRC staff further determines that based on the volumetric and surface coverage, if applicable, obtained on the subject welds, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. Furthermore, the NRC staff concludes that examinations performed to the extent practical provide reasonable assurance of structural integrity of the subject welds.

Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i), and is in compliance with the requirements of 10 CFR 50.55a with the granting of this relief. Therefore, the NRC staff grants

relief for the subject examinations of the components contained in RR-ENG-2-55 Part A and Parts C through J for the second 10-year ISI interval at STP, Units 1 and 2.

The NRC staff concludes that pursuant to 10 CFR 50.55a(g)(6)(i), granting this relief request is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

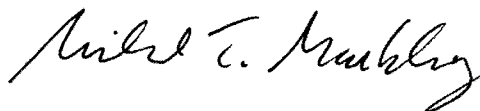
The NRC staff also concludes that the licensee met the ASME Code requirements for RR-ENG-2-55, Part B, and does not require relief from the ASME Code requirements.

RR-ENG-2-55, Part K, was not evaluated for relief since the NRC staff concludes that the licensee met the augmented examination requirements of 10 CFR 50.55a(g)(6)(ii)(E)(2); therefore, the examination for BMI Penetration Weld 41 is acceptable.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

If you have any questions, please contact the project manager, Balwant K. Singal, at 301-415-3016 or via e-mail at Balwant.Singal@nrc.gov.

Sincerely,



Michael T. Markley, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

Enclosure:
As stated

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
REQUEST FOR RELIEF FROM ASME SECTION XI CODE REQUIREMENTS FOR
WELD EXAMINATIONS
SECOND 10-YEAR INSERVICE INSPECTION INTERVAL
SOUTH TEXAS PROJECT, UNITS 1 AND 2
STP NUCLEAR OPERATING COMPANY
DOCKET NOS. 50-498 AND 50-499

1.0 INTRODUCTION

By letter dated July 29, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML102240169), as supplemented by letters dated September 29, 2010, and April 21 and June 20, 2011 (ADAMS Accession Nos. ML102810124, ML11133A186, and ML11178A034, respectively), STP Nuclear Operating Company (STPNOC, the licensee) submitted a request for relief (RR-ENG-2-55), from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI requirements for weld examinations pursuant to paragraph 50.55a(g)(5)(iii) of Title 10 of the *Code of Federal Regulations* (10 CFR), for South Texas Project (STP), Units 1 and 2.

ASME Code, Section XI, Tables IWB-2500-1 and IWC-2500-1 require inservice inspection (ISI) of Class 1 and Class 2 component welds by nondestructive examination. The licensee stated that 100 percent examination coverage of these welds during the second 10-year ISI interval was impractical because of component configuration and geometry, and because of the limitations of the examination equipment and techniques used to perform these examinations. The request is for the second 10-year ISI interval for both units. For STP, Unit 1, the second 10-year ISI interval ended on September 24, 2010, and for STP, Unit 2, the second 10-year ISI interval ended on October 18, 2010.

2.0 REGULATORY EVALUATION

Inservice inspection of the Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code, and applicable addenda, as required by 10 CFR 50.55a(g), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). The regulation at 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the U.S. Nuclear Regulatory Commission (NRC), if the licensee demonstrates that (i) the proposed alternatives would

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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, 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, which was 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 ASME Code of record for the STP, Units 1 and 2, second 10-year interval inservice inspection program, which ended on September 24, 2010, for STP, Unit 1 and October 18, 2010, for STP, Unit 2, is the 1989 Edition with no Addenda. The NRC staff notes that STP, Units 1 and 2 are currently in the third 10-year ISI interval. RR-ENG-2-55 is related to inspection issues that occurred in the second 10-year ISI interval.

3.0 TECHNICAL EVALUATION

The information provided by the licensee in support of the requests for relief from, or alternatives to, ASME Code requirements has been evaluated and the bases for disposition are documented in the following evaluations. For clarity, the NRC staff grouped the relief request for various examination categories by ASME Code Examination Category and evaluated the relief request in several parts, RR-ENG-2-55, Parts A through J (grouped as RR-ENG-2-55-1 through 16 by the licensee). Further, the NRC staff grouped all items associated with risk-informed piping in one category. The correlation between the grouping provided by the licensee in its letter dated April 21, 2011, and the grouping selected by the NRC staff is provided in Table 3.0.1 below. By letter dated April 21, 2011, the licensee withdrew Request for Relief RR-ENG-2-55 (STP, Unit 1) regarding augmented examinations of Main Steam Extrusion-to-Flange Connections (Category Break Exclusion Zone (BEZ) Item CIRC) because they are not part of the ASME Code, Section XI or 10 CFR 50.55a inspection requirements.

ASME Code Examination Category	Item No.	Licensee's Grouping	NRC Staff Grouping
B-A	B1.11	RR-ENG-2-55-1	RR-ENG-2-55, Part A
B-A	B1.21	RR-ENG-2-55-2	RR-ENG-2-55, Part B
B-B	B2.40	RR-ENG-2-55-3	RR-ENG-2-55, Part C
B-D	B3.110	RR-ENG-2-55-4	RR-ENG-2-55, Part D
B-H	B8.20	RR-ENG-2-55-5	RR-ENG-2-55, Part E
C-A	C1.10	RR-ENG-2-55-6	RR-ENG-2-55, Part F
C-B	C2.21	RR-ENG-2-55-7	RR-ENG-2-55, Part G
C-C	C3.30	RR-ENG-2-55-8	RR-ENG-2-55, Part H
C-G	C6.10	RR-ENG-2-55-9	RR-ENG-2-55, Part I
R-A	R1.11, R.15, R2.11.3, R2.11.5, R2.20	RR-ENG-2-55-10 through 16	RR-ENG-2-55, Part J
N-722	B15.80	--	RR-ENG-2-55, Part K

3.1 Request for Relief RR-ENG-2-55, Part A, ASME Code, Section XI, Examination Category B-A, Items B1.11, Pressure Retaining Welds in Reactor Pressure Vessel

ASME Code Requirement

ASME Code, Section XI, Examination Category B-A, Item B1.11 requires essentially 100 percent volumetric examination, as defined by ASME Code, Section XI, Figure IWB-2500-1 of the length of reactor pressure vessel (RPV) circumferential shell welds. "Essentially 100%," as clarified by ASME Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1," is greater than 90 percent coverage of the examination volume, or surface area, as applicable. ASME Code Case N-460 has been approved for use by the NRC in Regulatory Guide (RG) 1.147, Revision 16, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1" (ADAMS Accession No. ML093340041).

Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required 100 percent volumetric examination for the RPV circumferential and longitudinal shell welds shown in Table 3.1.1 below. Table 3.1.1 is reproduced from Tables 1 and 2 included in the licensee's submittal dated April 21, 2011.

ASME Code Item	Weld Identifier	Weld Type	Material	ASME Percent Coverage Obtained
B1.11	RPV1-101-141	RPV Lower Shell-to-Bottom Head Torus (STP, Unit 1)	Carbon Steel (CS)	78
B1.11	RPV2-101-141	RPV Lower Shell-to-Bottom Head Torus (STP, Unit 2)	CS	74

Licensee's Basis for Relief Request (as stated by the licensee)

During ultrasonic [UT] examination of the [RPV welds identified] in [Table 3.1.1 above] of this relief request, 100% coverage of the required examination volume could not be obtained. Examination volume coverage is limited due to six core support lugs. Typical calculations and examples of limited coverage due to lug configuration are attached to the weld examination report.

STPNOC has used the best available techniques to examine the subject weld, and demonstrated an acceptable level of integrity.

Radiography [(RT)] is not practical on this type of weld configuration, which prevents placement of the film and exposure source.

Licensee's Justification (as stated by the licensee)

Examinations used the techniques and examination angles qualified through ASME [Code, Section XI,] Appendix VIII Performance Demonstrative Initiative (PDI) for consideration of [ASME] Code coverage, in accordance with qualified PDI procedures. The examinations performed on the subject items in addition to the examination of other vessel welds contained in the ISI program would detect generic degradation, if it existed, therefore demonstrating an acceptable level of structural integrity.

Licensee's Proposed Alternative Examination

The licensee considered radiography (RT); however, it was not practical. The licensee noted that the examinations were performed to the maximum extent practical.

NRC Staff Evaluation

The ASME Code requires essentially 100 percent volumetric examination of the entire length of RPV circumferential and longitudinal shell welds. However, for the subject welds at STP, Units 1 and 2, complete examinations are restricted by six core support lugs. The RPV would require design modifications to increase the amount of weld volume that can be inspected. Imposing this requirement would place a burden on the licensee.

As shown in technical descriptions and sketches provided by the licensee, the RPV design at STP, Units 1 and 2, includes six core guide lugs that limit the examination of the subject welds. These appurtenances restrict transducer movement during scanning, which limits volumetric coverage for the subject welds. UT examinations were conducted from the interior of the RPV with a remote system using 45-degree shear wave, and 45-degree, refracted longitudinal wave transducers applied on the vessel shell. The licensee obtained 78 and 74 percent coverage, respectively, for STP, Units 1 and 2, of the ASME Code-required inspection volumes for the subject welds. The examinations were conducted with equipment, procedures, and personnel that were qualified to the process outlined in ASME Code, Section XI, Appendix VIII. The licensee did not detect any unacceptable indications for the weld volumes that were examined.

The licensee has shown for RPV Welds RPV1-101-141 and RPV2-101-141 that it is impractical to meet the ASME Code-required volumetric examination coverage for the subject welds due to the design and proximity of RPV internal fixtures. However, based on the examination volumes that were obtained, along with the full examination of other pressure-retaining RPV welds, the NRC staff concludes that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. The NRC staff further concludes that the examinations performed to the extent practical on the subject RPV welds provide reasonable assurance of structural integrity of the subject welds.

3.2 Request for Relief RR-ENG-2-55, Part B, ASME Code, Section XI, Examination Category B-A, Item and B1.21 Pressure Retaining Welds in Reactor Pressure Vessel

ASME Code Requirement

ASME Code, Section XI, Items B1.21 requires essentially 100 percent volumetric examination, as defined by Figure IWB-2500-3, of the "accessible length" of circumferential head weld on the RPV. "Essentially 100%," as clarified by ASME Code Case N-460, is greater than 90 percent coverage of the examination volume, or surface area, as applicable. ASME Code Case N-460 has been approved for use by the NRC in RG 1.147, Revision 16.

Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required 100 percent volumetric examination for the RPV circumferential and longitudinal shell welds shown in Table 3.2.1 below. Table 3.2.1 is reproduced from Tables 1 and 2 included in the licensee's submittal dated April 21, 2011.

ASME Code Item	Weld Identifier	Weld Type	Material	ASME Percent Coverage Obtained
B1.21	RPV1-102-151	RPV Bottom Head Torus-to-Bottom Head Dome (STP, Unit 1)	CS	68
B1.21	RPV2-102-151	RPV Bottom Head Torus-to-Bottom Head Dome (STP, Unit 2)	CS	71

Licensee's Basis for Relief Request (as stated by the licensee)

Due to the geometric configuration and location, certain code examination volumes, as depicted in ASME [Code,] Section XI, cannot be examined to the extent of obtaining full code coverage. Lower Head Dollar Plate weld RPV1-102-151 received a limited examination due to interference from in-core Bottom-Mounted Instrument (BMI) tubes. The BMI tubes caused scanning limitations at numerous locations. This data was obtained robotically and stored electronically. Two typical scanning limitation sketches from BMI tubes are attached to the weld examination report.

STPNOC has used the best available techniques to examine the subject weld, and demonstrated an acceptable level of integrity.

[RT] is not practical on this type of weld configuration because of interference from incore instrumentation tubing and conduit.

Licensee's Justification (as stated by the licensee)

Examinations used the techniques and examination angles qualified through ASME [Code, Section XI,] Appendix VIII [PDI] for consideration of Code coverage, in accordance with qualified PDI procedures. The examinations performed on the subject items in addition to the examination of other vessel welds contained in the ISI program would detect generic degradation, if it existed, therefore demonstrating an acceptable level of structural integrity.

VT-2 examination of the reactor vessel each refueling outage would detect wall defects prior to failure of the vessel.

Licensee's Proposed Alternative Examination

The licensee considered RT; however, it was not practical. The licensee noted that the examinations were performed to the maximum extent practical.

NRC Staff Evaluation

ASME Code, Section XI, Item B1.21 requires that RPV Bottom Head Torus-to-Bottom Head Dome Welds RPV1-102-151 and RPV2-102-151 for STP, Units 1 and 2, respectively, be subject to essentially 100 percent volumetric examination of the "accessible length" of the welds. The ASME Code Committees recognize the limitations of examining these welds and specifically stated in this particular ASME Code requirement to examine the "accessible length" of the welds. The licensee stated in its relief request that it did examine the "accessible length" of the subject welds to the extent practical. Therefore, the NRC staff concludes that the licensee met the ASME Code requirements and does not require relief from the ASME Code requirements.

3.3 Request for Relief RR-ENG-2-55, Part C (STP, Unit 2), ASME Code, Section XI, Examination Category B-B, Item B2.40, Pressure Retaining Welds in Vessels Other Than Reactor Vessels

ASME Code Requirement

ASME Code, Section XI, Examination Category B-B, Item B2.40 requires 100 percent volumetric examination, as defined by ASME Code, Section XI, Figures IWB-2500-6, as applicable, of tubesheet-to-head weld. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 16, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent (i.e., greater than 90 percent examination coverage is obtained).

Licensee's ASME Code Relief Request (as stated by the licensee)

Due to the geometric configuration and location, certain code examination volumes, as depicted in ASME [Code,] Section XI, cannot be examined to the extent of obtaining full code coverage. Pursuant to 10 CFR 50.55a(g)(6)(i), STPNOC requests approval for [UT] examinations performed within the limitations described in [Table 3.3.1 below] of this relief request.

Note: Table 3.3.1 below is reproduced from Table 2 included in the licensee's submittal dated April 21, 2011.

Table 3.3.1 – ASME Code, Section XI, Examination Category B-B				
ASME Code Item	Weld Identifier	Weld Type	Material	ASME Percent Coverage Obtained
B2.40	RSG-2A-TI	Replacement Steam Generator Channel Head to Tube Plate (STP, Unit 2)	CS	88

Licensee's Basis for Relief Request (as stated by the licensee)

During ultrasonic examination of the Steam Generator Pressure Retaining Weld listed in [Table 3.3.1 above] of this relief request, 100% coverage of the required examination volume could not be obtained. Examination volume is limited due to interference from a ring support located below the weld.

STPNOC has used the best available techniques to examine the subject weld, and demonstrated an acceptable level of structural integrity.

[RT] is not practical on this type of weld configuration, which prevents placement of the film and exposure source.

Licensee's Justification (as stated by the licensee)

Examinations used the techniques and examination angles accepted in ASME [Code,] Section V, Article 4. The examinations performed on the subject items in addition to the examination of other vessel welds contained in the ISI program would detect generic degradation, if it existed, therefore demonstrating an acceptable level of structural integrity.

Licensee's Proposed Alternative Examination

The licensee stated it had examined this weld to the extent practical and will continue to perform pressure testing on the subject welds as required by the ASME Code. The licensee considered RT; however, it was not practical.

NRC Staff Evaluation

The ASME Code requires essentially 100 percent volumetric examination of Replacement Steam Generator Head Weld Channel Head-to-Ring Support Weld RSG-2A-TI. However, for the subject weld at STP, Unit 2, complete examinations are restricted by the ring supports. In order to effectively increase the examination coverage, the subject weld would require design modifications or replacement. This would place a burden on the licensee; thus, examining 100 percent of the ASME Code-required volume is considered impractical.

As shown in the sketches and technical descriptions included in the licensee's submittals, examination of the Replacement Steam Generator Head Weld Channel Head-to-Ring Support Weld RSG-2A-TI has been performed to the extent practical, with the licensee obtaining coverage of 88 percent of the ASME Code-required inspection volume. The subject weld was examined with manual UT techniques using 0-degree longitudinal and 45- and 60-degree shear waves in accordance with applicable requirements of the ASME Code, Section V, Article 4. No unacceptable indications were observed in these welds.

The licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage for the subject welds due to the design configuration of the replacement steam generator head weld channel head-to-ring support. Based on the volumetric coverage obtained, along with the examinations completed on other pressure retaining welds in ASME Code, Section XI, Examination Category B-B, the NRC staff concludes that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. The NRC staff further concludes that the examinations performed provide reasonable assurance of structural integrity of the subject components.

3.4 Request for Relief RR-ENG-2-55, Part D (STP, Unit 2), ASME Code, Section XI, Examination Category B-D, Item B3.110, Full Penetration Welded Nozzles in Vessels

ASME Code Requirement

ASME Code, Section XI, Examination Category B-D, Item B3.110 requires 100 percent volumetric examination, as defined by ASME Code, Section XI, Figures IWB-2500-7(a) through (d), as applicable, of RPV nozzle-to-vessel welds. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 16, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent (i.e., greater than 90 percent examination coverage is obtained).

Licensee's ASME Code Relief Request (as stated by the licensee)

Due to the geometric configuration and location, certain code examination volumes, as depicted in ASME [Code,] Section XI, cannot be examined to the extent of obtaining full code coverage. Pursuant to 10 CFR 50.55a(g)(6)(i), STPNOC requests approval for [UT] examinations performed within the limitations described in [Table 3.4.1 below] of this relief request.

Note: Table 3.4.1 below is reproduced from Table 2 included in the licensee's submittal dated April 21, 2011.

ASME Code Item	Weld Identifier	Weld Type	Material	ASME Percent Coverage Obtained
B3.110	PRZ-2-N3	Pressurizer (PRZ) Safety Nozzle-to-Shell Weld	CS	76
B3.110	PRZ-2-N4A	PRZ Relief Nozzle-to-Shell Weld	CS	78
B3.110	PRZ-2-N4B	PRZ Safety Nozzle-to-Shell Weld	CS	64
B3.110	PRZ-2-N4C	PRZ Safety Nozzle-to-Shell Weld	CS	61

Licensee's Basis for Relief Request (as stated by the licensee)

During [UT] examination of the [PRZ] nozzle-to-shell and shell-to-nozzle welds listed in [Table 3.4.1 above] of this relief request, 100% coverage of the required examination volume could not be obtained. The limitation is due to nozzle taper that prevents the ultrasonic beam from impinging on the examination volume.

STPNOC has used the best available techniques to examine the subject weld, and demonstrated an acceptable level of structural integrity.

[RT] is not practical on this type of weld configuration, which prevents placement of the film and exposure source.

Licensee's Justification (as stated by the licensee)

Examinations used the techniques and examination angles accepted in ASME [Code,] Section V, Article 4. The examinations performed on the subject items in addition to the examination of other vessel welds contained in the ISI program would detect generic degradation, if it existed, therefore demonstrating an acceptable level of structural integrity.

Licensee's Proposed Alternative Examination (as stated by the licensee)

STPNOC has examined this weld to the extent practical and will continue to perform pressure testing on the subject welds as required by the [ASME] Code. No alternative testing is proposed at this time.

NRC Staff Evaluation

The ASME Code requires 100 percent volumetric examination of ASME Code, Class 1 nozzle-to-shell welds. However, the design configurations of the subject welds and the proximity of surrounding appurtenances limit access for UT scanning. In order to effectively increase the examination coverage, the nozzle-to-shell welds would require design modifications and

removal of adjacent components. This would place a burden on the licensee; thus, 100 percent ASME Code-required volumetric examinations are considered impractical.

The PRZ nozzle-to-shell welds shown in Table 3.4.1 above are constructed of carbon steel material with stainless steel inside diameter cladding. The welds on the subject nozzles have taper that caused the scanning limitations.

As shown on the sketches and technical descriptions included in the licensee's submittals, examinations of the subject PRZ nozzle-to-shell welds have been completed to the extent practical with volumetric coverage ranging from approximately 61 percent to 78 percent (see Table 3.4.1 above) of the ASME Code-required volumes. The examination volumes typically included the weld and base materials near the inside surface of the weld joint, which are the highest regions of stress, and where one would expect degradation sources to be manifested should they occur. The PRZ nozzle-to-shell weld examinations were performed with UT techniques in accordance with the applicable requirements of the ASME Code, Section V, Article 4. The PRZ welds were examined using 0-degree longitudinal and 45- and 60-degree shear waves.

Although UT scans were primarily limited to the vessel side, recent studies have found that inspections conducted through carbon steel are equally effective whether the UT waves have only to propagate through the base metal, or have to also propagate through the carbon steel weldment¹. Therefore, it is expected that the UT techniques employed by the licensee would detect structurally significant flaws that might occur on either side of the subject welds due to the fine-grained carbon steel microstructures.

The licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage for the subject nozzle-to-shell welds due to their design and adjacent component obstructions. Based on the volumetric coverage obtained for the subject welds, and considering the licensee's performance of UT techniques employed to maximize this coverage, the NRC staff concludes that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. The NRC staff further concludes that the examinations performed provide reasonable assurance of structural integrity of the subject components.

3.5 Request for Relief RR-ENG-2-55, Part E (STP, Units 1 and 2), ASME Code, Section XI, Examination Category B-H, Item B8.20, Integral Attachment For Vessels

ASME Code Requirement

ASME Code, Section XI, Examination Category B-H, Item B8.20, requires 100 percent volumetric or surface examination as defined by ASME Code, Section XI, Figures IWB-2500-13, -14, and -15, as applicable, of ASME Code Class 1 PRZ integral welded attachments.

¹ Heasler, P. G., and Doctor, S. R., U.S. Nuclear Regulatory Commission, "Piping Inspection Round Robin," NUREG/CR-5068, PNNL-10475, April 1996 (non-publicly available).

Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required 100 percent volumetric examinations of the PRZ integral welded attachments shown in Table 3.5.1 below.

Note: Table 3.5.1 below is reproduced from Tables 1 and 2 included in the licensee's submittal dated April 21, 2011.

ASME Code Item	Identifier	Weld Type	Material	ASME Percent Coverage Obtained Surface
B8.20	PRZ-1-1A, 1B	PRZ Support Bracket (STP, Unit 1)	CS	70
B8.20	PRZ-1-2	PRZ Seismic Lug (STP, Unit 1)	CS	75
B8.20	PRZ-1-3	PRZ Seismic Lug (STP, Unit 1)	CS	75
B8.20	PRZ-1-4	PRZ Seismic Lug (STP, Unit 1)	CS	75
B8.20	PRZ-2-1A, 1B	PRZ Support Bracket (STP, Unit 2)	CS	70
B8.20	PRZ-2-4A, 4B	PRZ Support Bracket (STP, Unit 2)	CS	70 (4B) 63 (4B)
B8.20	PRZ-2-2A, 2B	PRZ Support Bracket (STP, Unit 2)	CS	70 (2A) 63 (2B)
B8.20	PRZ-2-3A, 3B	PRZ Support Bracket (STP, Unit 2)	CS	70

Licensee's Basis for Relief Request (as stated by the licensee)

During [surface] examination of the [PRZ] seismic lug welds (Unit 1) and support bracket welds (Unit 2) added as integrally welded attachments listed in [Table 3.5.1 above] of this relief request, 100% coverage of the required examination surface could not be obtained. [Surface examination] limitation is due to lug configuration and proximity of the support frame to the support brackets.

STPNOC has used the best available techniques to examine the subject weld, and demonstrated an acceptable level of structural integrity.

[RT] is not practical on this type of weld configuration, which prevents placement of the film and exposure source.

Licensee's Justification (as stated by the licensee)

The examinations performed on the subject items in addition to the examination of other vessel welds contained in the ISI program would detect generic degradation, if it existed, therefore demonstrating an acceptable level of structural integrity.

Licensee's Proposed Alternative Examination (as stated by the licensee)

STPNOC has examined this weld to the extent practical and will continue to examine the subject welds as required by the [ASME] Code. No alternative testing is proposed at this time.

NRC Staff Evaluation

The ASME Code requires essentially 100 percent surface examination of ASME Code, Class 1 PRZ integral attachment welds. However, surface examinations are limited due to partial inaccessibility caused by their design and encapsulating restraints. In order for the licensee to obtain 100 percent of the ASME Code-required examination coverage, the integral attachment welds would have to be redesigned and modified. This would place a burden on the licensee; therefore, the ASME Code examination requirements are considered impractical.

As shown on the sketches and technical descriptions included in the licensee's submittals, the liquid penetrant (PT) surface examinations for the eight carbon steel PRZ support bracket lugs listed in Table 3.5.1 above are limited due to access restrictions caused by PRZ support frame. The examinations have been performed to the extent practical, with the licensee obtaining approximately 63 percent to 75 percent of the ASME Code-required surface coverage.

The licensee has shown that it is impractical to meet the ASME Code-required surface examination coverage for the subject ASME Code, Class 1 PRZ integral attachment welds. However, based on the surface coverage obtained, the NRC staff concludes that, if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. The NRC staff further concludes that the examinations performed provide reasonable assurance of structural integrity of the subject components.

3.6 Request for Relief RR-ENG-2-55, Part F (STP, Units 1 and 2), ASME Code, Section XI, Examination Category C-A, Item C1.10, Pressure Retaining Welds in Pressure Vessels

ASME Code Requirement

ASME Code, Section XI, Examination Category C-A, Item C1.10, requires essentially 100 percent volumetric examination, as defined by ASME Code, Section XI, Figure IWC-2500-1, of the length of ASME Code, Class 2 pressure retaining welds in pressure vessel shell circumferential welds. "Essentially 100%," as clarified by ASME Code Case N-460, is greater than 90 percent coverage of the examination volume, or surface area, as applicable. ASME Code Case N-460 has been approved for use by the NRC in RG 1.147, Revision 16.

Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required 100 percent volumetric examination of ASME Code, Class 2 Residual Heat Removal Heat Exchanger Stainless Steel Shell-to-Flange Weld RHAHRS-1A-S2 (STP, Unit 1), and

Residual Heat Removal Heat Exchanger Stainless Steel Shell-to-Flange Weld RHAHRS-2A-S2 (STP, Unit 2).

Licensee's Basis for Relief Request (as stated by the licensee)

During [UT] examination of the Heat Exchanger shell-to-flange circumferential welds listed in Tables 1 and 2 [(not included in this safety evaluation)] of this relief request, 100% coverage of the required examination volume could not be obtained. Due to shell-to-flange (taper) configuration, examination volume was limited. Examination supplemented with high angle 70 degree probes to obtain maximum examination volume coverage.

STPNOC has used the best available techniques to examine the subject weld, and demonstrated an acceptable level of integrity.

[RT] is not practical on this type of weld configuration, which prevents placement of the film and exposure source.

Licensee's Justification (as stated by the licensee)

Examinations used the techniques and examination angles qualified through ASME [Code, Section XI,] Appendix III for consideration of [ASME] Code coverage. The examinations performed on the subject items in addition to the examination of other vessel welds contained in the ISI program would detect generic degradation, if it existed, therefore demonstrating an acceptable level of structural integrity.

Licensee's Proposed Alternative Examination (as stated by the licensee)

STPNOC has examined this weld to the extent practical and will continue to perform pressure testing on the subject welds as required by the [ASME] Code. No alternative testing is proposed at this time.

NRC Staff Evaluation

The ASME Code requires 100 percent volumetric examination of ASME Code, Class 2 vessel circumferential shell welds. However, for RHAHRS Shell-to-Flange Weld RHAHRS-1A-S2 (STP, Unit 1), and RHAHRS Shell-to-Flange Weld RHAHRS-2A-S2 (STP, Unit 2), complete examinations are limited by the taper configuration of the flange and in order to achieve greater volumetric coverage, the residual heat removal (RHR) heat exchangers would have to be redesigned and modified. This would place a burden on the licensee, therefore the ASME Code examinations are considered impractical.

As shown on the sketches and technical descriptions included in the licensee's submittal, examinations of subject welds were performed to the extent practical, with the licensee obtaining approximately 85 percent on RHAHRS-1A-S2 and 88 percent on RHAHRS-2A-S2 of the ASME-Code required volumetric coverage. The base, weld, and flange material is stainless

steel. The licensee used nondestructive examination (NDE) techniques and procedures in accordance with the ASME Code, Section XI Code, Appendix VIII to perform volumetric examinations. No recordable flaw indications were observed during these examinations.

The licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage for the subject shell-to-flange welds on the RHR heat exchangers for STP, Units 1 and 2, due to the design of this weld. Based on the volumetric coverage obtained, the NRC staff concludes that, if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. The NRC staff further concludes that the examinations performed provide reasonable assurance of structural integrity of the subject welds.

3.7 Request for Relief RR-ENG-2-55, Part G (STP, Units 1 and 2), ASME Code, Section XI, Examination Category C-B, Item C2.21, Pressure Retaining Nozzle Welds in Vessels

ASME Code Requirement

ASME Code, Section XI, Examination Category C-B, Item C2.21 requires 100 percent volumetric and surface examinations, as defined by ASME Code, Figure IWC-2500-4(a) or (b), as applicable, of nozzle-to-shell (or head) welds in ASME Code, Class 2 vessels. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 16, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent (i.e., greater than 90 percent examination coverage is obtained).

Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examination of Nozzle-to-Shell Weld RHAHRS-1A-NA on the RHR Heat exchanger (STP, Unit 1) and Nozzle-to-Shell Welds RHAHRS-2A-NA and RHAHRS-2A-NB on the RHR heat exchanger (STP, Unit 2)

Licensee's Basis for Relief Request (as stated by the licensee)

During ultrasonic examination of the [RHR] Heat Exchanger nozzle-to-shell welds listed in Tables 1 and 2 [(Tables 1 and 2 not included in this SE)] of this relief request, 100 percent coverage of the required examination volume could not be obtained. Due to complex shell-to-nozzle configuration and an internal reinforcing pad weld preventing beam reflection at shell inside diameter [(ID)], examination volume was limited. Examination supplemented nozzle side with high angle 70 degree probes to obtain maximum examination volume coverage.

STPNOC has used the best available techniques to examine the subject weld, and demonstrated an acceptable level of integrity

[RT] is not practical on this type of weld configuration, which prevents placement of the film and exposure source.

Licensee's Justification (as stated by the licensee)

Examinations used the techniques and examination angles qualified through ASME [Code, Section XI,] Appendix III for consideration of [ASME] Code coverage. The examinations performed on the subject items in addition to the examination of other vessel welds contained in the ISI program would detect generic degradation, if it existed, therefore demonstrating an acceptable level of structural integrity

Licensee's Proposed Alternative Examination (as stated by the licensee)

STPNOC has examined this weld to the extent practical and will continue to perform pressure testing on the subject welds as required by the [ASME] Code. No alternative testing is proposed at this time.

NRC Staff Evaluation

The ASME Code requires 100 percent volumetric and surface examination of Class 2 nozzle to shell welds. However, Nozzle-to-Shell Weld RHAHRS-1A-NA on the RHR heat exchanger (STP, Unit 1) and Nozzle-to-Shell Welds RHAHRS-2A-NA and RHAHRS-2A-NB on the RHR heat exchanger (STP, Unit 2), complete examination is limited due to the nozzle configuration and an internal reinforcing pad weld. In order to achieve greater volumetric coverage, the nozzle and vessel would have to be redesigned and modified. This would place a burden on the licensee; therefore, the ASME Code volumetric examination is considered impractical.

As shown on the sketches and technical descriptions included in the licensee's submittal, examination of the subject welds was performed to the extent practical, with the licensee obtaining approximately 64 percent for the Stainless Steel Nozzle-to-Shell Weld RHAHRS-1A-NA, RHAHRS-2A-NA, and RHAHRS-2A-NB of the required examination volume, including 45- and 70-degree shear wave scans from the shell side of the weld. The subject RHR heat exchangers are fabricated of stainless steel material. The licensee used NDE techniques and procedures qualified in accordance with the ASME Code, Section XI, Appendix VIII to perform volumetric examinations. The ASME Code-required surface examination was completed with no limitations. No unacceptable indications were noted during the volumetric or surface examinations.

The licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage for the subject nozzle-to-shell weld due to the nozzle design configuration. However, based on the volumetric and surface coverage obtained, the NRC staff concludes that, if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations performed. The NRC staff further concludes that the examinations performed provide reasonable assurance of structural integrity of the subject welds.

3.8 Request for Relief RR-ENG-2-55, Part H, ASME Code, Section XI, Examination Category C-C, Item C3.30, Integral Attachments for Class 2 Pumps

ASME Code Requirement

ASME Code, Section XI, Examination Category C-C, Item C3.30, requires essentially 100 percent surface examination, as defined by ASME Code, Figure IWC-2500-5, of integrally welded attachments to Class 2 pumps.

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examinations of the piping welds shown in Table 3.8.1 below. Table 3.8.1 is reproduced from both Tables 1 and 2 included in the licensee's submittal dated April 21, 2011.

Table 3.8.1 ASME Code, Section XI, Examination Category C-C for STP, Units 1 and 2					
ASME Code Item	Component	Weld Identifier	Weld Configuration	Material	ASME Percent Surface Coverage Obtained
C3.30	RHARHS Pump 1A	RHARHS-1A-IWA1	Integrally Welded Attachment Pump 1A (STP, Unit 1)	Stainless Steel (SS)	75
C3.30	RHARHS Pump 1A	RHARHS-1A-IWA2	Integrally Welded Attachment Pump 1A (STP, Unit 1)	SS	75
C3.30	RHARHS Pump 1A	RHARHS-1A-IWA3	Integrally Welded Attachment Pump 1A (STP, Unit 1)	SS	72
C3.30	RHARHS Pump 2A	RHARHS-2A-IWA2	Integrally Welded Attachment Pump 2A (STP, Unit 2)	SS	90

Licensee's ASME Code Relief Request (as stated by the licensee)

Due to the geometric configuration and location, certain [ASME] Code examination surfaces, as depicted in ASME [Code,] Section XI, cannot be examined to the extent of obtaining full code coverage. Pursuant to 10 CFR 50.55a(g)(6)(i), STPNOC requests approval for visual examination performed within the limitations described in [Table 3.8.1 above] of this relief request.

Licensee's Basis for Relief Request (as stated by the licensee)

During visual examination of the piping lug welds listed in [Table 3.8.1 above] off this relief request, 100% coverage of the required examination surface could not be obtained. Due to obstructions such as pump support stanchions, welded attachment, and pump support legs, examination surface is limited.

STPNOC has used the best available techniques to examine the subject weld, and demonstrated an acceptable level of structural integrity.

[RT] is not practical on this type of weld configuration, which prevents placement of the film and exposure source.

Licensee's Basis for Relief Request (as stated by the licensee)

The examinations performed on the subject items in addition to the examination of other vessel welds contained in the ISI program would detect generic degradation, if it existed, therefore demonstrating an acceptable level of structural integrity.

Licensee's Proposed Alternative Examination (as stated by the licensee)

STPNOC has examined this weld to the extent practical and will continue to examine the subject welds as required by the [ASME] Code. No alternative testing is proposed at this time.

NRC Staff Evaluation

The ASME Code requires essentially 100 percent surface examination of the subject ASME Code, Class 2 integral pump attachment welds. However, surface examinations are limited due to inaccessibility and interferences caused by welded attachment configurations, and interference of pump stanchions. In order for the licensee to obtain 100 percent of the ASME Code-required examination coverage, the integral attachment weld would have to be redesigned and modified. This would place a burden on the licensee; therefore, the ASME Code examination requirements are considered impractical.

As shown on the sketches and technical descriptions included in the licensee's submittals, PT examination of subject welds has been performed to the extent practical, with the licensee obtaining surface examination coverage from 72 to 75 percent for STP, Unit 1, and 90 percent for STP, Unit 2, of the ASME Code-requirement. No reportable indications were detected during these surface examinations.

The licensee has shown that it is impractical to meet the ASME Code-required surface examination coverage for the subject ASME Code, Class 2 integral attachment pump weld. However, based on the surface coverage obtained, and coverage on other similar components the NRC staff concludes that, if significant service-induced degradation had occurred, evidence of it would have been detected by the examination that was performed. The NRC staff further concludes that the examinations performed to the extent practical on the subject weld provide reasonable assurance of structural integrity of the subject welds.

3.9 Request for Relief RR-ENG-2-55, Part I (STP, Units 1 and 2), ASME Code, Section XI, Examination Category C-G, Item C6.10, Pressure Retaining Welds in Pumps and Valves

ASME Code Requirement

ASME Code, Section XI, Examination Category C-G, Item C6.10 requires 100 percent surface examination, as defined by ASME Code, Section XI, Figure IWC-2500-8, of selected circumferential ASME Code, Class 2 pump and valve component welds.

Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examinations of the carbon steel piping welds shown in Table 3.9.1 below. Table 3.9.1 below is reproduced from Table 1 included in the licensee's submittal dated April 21, 2011.

Table 3.9.1 ASME Code, Section XI, Examination Category C-G STP, Unit 1				
ASME Code Item	Weld Identifier	Weld Configuration	Material	ASME Code Percent Coverage Obtained
C6.10	Safety Injection (SI) SIAPLH-1A-PCW1	SI Pump 1A Flange-to Upper Case Weld (STP, Unit 1)	SS	56
C6.10	Containment Spray (CS) CIAPCS-2APCW1	CS Pump 2A - Flange-to-Upper Case (STP, Unit 2)	SS	74
C6.10	Safety Injection (SI) SIAPLH-2A-PCW1	SI Pump 1A Flange-to Upper Case Weld (STP, Unit 2)	SS	74

Licensee's Basis for Relief Request (as stated by the licensee)

During [surface] examination of the pump flange to upper case welds listed in [Table 3.9.1 above] of this relief request, 100% coverage of the required examination surface could not be obtained. Due to floor obstructions, examination surface is limited.

STPNOC has used the best available techniques to examine the subject weld, and demonstrated an acceptable level of structural integrity.

[RT] is not practical on this type of weld configuration, which prevents placement of the film and exposure source.

Licensee's Justification (as stated by the licensee)

The examinations performed on the subject items in addition to the examination of other vessel welds contained in the ISI program would detect generic

degradation, if it existed, therefore demonstrating an acceptable level of structural integrity.

Licensee's Proposed Alternative Examination (as stated by the licensee)

STPNOC has examined this weld to the extent practical and will continue to examine the subject welds as required by the [ASME] Code. No alternative testing is proposed at this time.

NRC Staff Evaluation

The ASME Code requires 100 percent surface examination of selected ASME Code, Class 2 pump casing welds. However, examination of the subject pump casing is limited by floor obstructions (e.g., floor grading and concrete in the area of required surface examination). In order for the licensee to obtain 100 percent of the ASME Code-required examination coverage for the subject weld, the pump and area near the pump would have to be redesigned and modified, or the pump would require disassembly to access the weld from the inside diameter surface. These alternatives would place a burden on the licensee; therefore, the ASME Code examination requirements are impractical.

As shown on the sketches, photographs, and technical descriptions included in the licensee's submittal, examination of the subject weld could not be performed due to the pump's design, which places most of the casing weld within vertical concrete walls, making it nearly inaccessible from the outside surface. For STP, Units 1 and 2, 56 and 74 percent, respectively, of the required surface examination coverage was achieved using a PT method. No recordable indications were observed in the examined region of this weld.

The licensee has shown that it is impractical to meet the ASME Code-required surface examination coverage for the subject pump casing weld. However, based on the limited examination performed, and the VT-2 visual examinations that are conducted after each refueling outage, the NRC staff concludes that, if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. The NRC staff further concludes that the VT-2 visual examinations provide reasonable assurance of leak tightness of the subject pumps.

3.10 Request for Relief RR-ENG-2-55, Part J (STP, Units 1 and 2), ASME Code, Section XI, Examination Category R-A, Items R1.11, R1.15, R2.11.3, R2.11.5, and R2.20, Risk Informed Piping Examinations ASME Code Requirement

The STP risk-informed inservice inspection (RI-ISI) program was developed in accordance with Electric Power Research Institute (EPRI) TR-112657, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," Rev. B-A, which was approved by the NRC by safety evaluation dated October 28, 1999 (ADAMS Accession No. ML993190474), and Code Case N-578², "Risk-Informed Requirements for Class 1, 2 or 3 Piping, Method B, Section XI, Division 1." Risk classifications were previously applied to Class 1 and Class 2 welds addressed in STP, Units 1 and 2, relief requests RR-ENG-2-16 (see the licensee's letters dated December 30, 1999, and April 17, 2000, at ADAMS Accession Nos. ML003676903 and ML003706801, respectively), and RR-ENG-2-23 (see the licensee's letters dated February 27, 2001, and January 10, 2002, at ADAMS Accession Nos. ML010650285 and ML020440417, respectively). The NRC approved the RI-ISI program for STP, Units 1 and 2, on September 11, 2000, and March 5, 2002 (ADAMS Accession Nos. ML003749167 and ML020390041, respectively).

The examination requirements for the subject piping welds at STP, Units 1 and 2, are in Table 3.3.1 (Table 3.3.1 is reproduced below as Table 3.10.1) from the licensee's Second 10-Year ISI Program Plan dated November 17, 2010, and provided in the licensee's letter dated June 20, 2011 (ADAMS Accession No. ML11178A034), and ASME Code Case N-578, which the licensee assigns Examination Category R-A, Items R1.11.1, R1.11.2, R1.11.3, and etc. to piping inspection elements subject to thermal fatigue, intergranular stress corrosion cracking (IGSCC), and elements not subject to a known damage mechanism, respectively. The licensee's RI-ISI program requires 100 percent of the examination location volume, as described in Figures IWB-2500-8(c), 9, 10, or 11, as described in the ASME Code, Section XI, as applicable, including an additional ½-inch of base metal adjacent to the ASME Code volume, be completed for selected ASME Code, Class 1 piping welds. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 16, states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent (i.e., greater than 90 percent examination coverage is obtained). ASME Section XI, Code Case N-578, Examination Category R-A, Risk-Informed Piping Examinations, applies the volumetric examination requirements shown in Figure IWB-2500-8(c) to these welds for parts subject to thermal fatigue.

² ASME Code Case N-578 has not been approved for use in RG 1.147, Revision 16. Licensees base their RI-ISI inspection sample size and examination methodology on Table 1 of ASME Code Case N-578.

Table 3.10.1 Risk Informed Category/Item Number Designations					
Risk Informed Categories					
	R-A-1	Class 1 Risk Informed Piping			
	R-A-2	Class 2 Risk Informed Piping			
Risk Informed Item Numbers					
#	R	#.	m.	#	
1					Class 1
2					Class 2
	R				Risk-Informed
		1.			High Risk
		2.			Medium Risk
		3.			Low Risk
			11.		Thermal Fatigue
			11.	1	Thermal Stratification Cycling and Striping (TASCS)
			11.	2	Thermal Transient (TT)
			11.	3	TASCS-TT
			11.	4	TASCS-TT-PWSCC
			11.	5	TT-IGSCC
			11.	6	TT-PWSCC
			11.	7	TASCS-PWSCC
			12.		High Cycle Mechanical Fatigue
			13.		Erosion-Cavitation
			14.		Crevice Corrosion Cracking
			15.		Primary Water Stress Corrosion Cracking (PWSCC)
			16.		IGSCC/TGSCC (Intergranular/Transgranular SCC)
			17.		Microbiologically Influenced Corrosion (MIC) or Pitting
			18.		Flow Accelerated Corrosion (FAC)
			19.		External Chloride (ECSCC)
			20.		No Degradation Mechanism

Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examinations of the cast, carbon and stainless steel piping welds shown in Tables 3.10.2 and 3.10.3 below are reproduced from Tables 1 and 2 included in the licensee's submittal dated April 21, 2011.

Table 3.10.2 – ASME Code, Section XI, Examination Category R-A (STP, Unit 1)				
ASME Code Item	Weld ID/ Component	Weld Type (Exam Method)	Material	Coverage Obtained Percent
R1.11.1	1/Reactor Coolant System (RCS)	Valve-to-Pipe (ASME Code, Section XI Appendix VIII)	SS	50
R1.11.2	11/RCS	Pipe-to-Flange (ASME Code, Section XI Appendix VIII)	SS	86
R1.11.3	1/RCS	Valve-to-Pipe (ASME Code, Section XI Appendix VIII)	SS	50
R1.15	RSG1A-IN-SE/RCS	Safe End-to-replacement Steam Generator (SG) Inlet Nozzle Loop 1 (ASME Code, Section XI Appendix VIII)	SS-to-Carbon Steel (CS)	75
R1.15	RSG1D-IN-SE/RCS	Safe End-to-Steam Generator (SG) Inlet Nozzle Loop 4 (ASME Code, Section XI Appendix VIII)	SS-to-CS	75
R2.11.3	2/RCS	Valve-to-Pipe (ASME Code, Section XI Appendix VIII)	SS	50
R2.11.5	10/RCS	Pipe-to-Valve (ASME Code, Section XI Appendix VIII)	SS	50
R2.20	9/RCS	Elbow-to-Reactor Coolant Pump 1A/ Loop 1 (ASME Code, Section V, Article 4)	Cast SS	53
R2.20	9/RCS	Elbow-to-Reactor Coolant Pump 1B/ Loop 2 (ASME Code, Section V, Article 4)	Cast SS	52
R2.20	9/RCS	Elbow-to-Reactor Coolant Pump 1C/ Loop 3 (ASME Code, Section V, Article 4)	Cast SS	82

Table 3.10.3 – ASME Code, Section XI, Examination Category R-A (STP, Unit 2)				
ASME Code Item	Weld ID/ Component	Weld Type (Exam Method)	Material	Coverage Obtained Percent
R1.112	11/RCS	Elbow-to-Flange (ASME Code, Section XI Appendix VIII)	SS	75
R1.15	RSG-2A-IN-SE/RCS	Safe End-to-Replacement Steam Generator (SG) Inlet Nozzle Loop 1 (ASME Code, Section XI Appendix VIII)	SS-to-CS	75
R1.15	RSG-2D-IN-SE/RCS	Safe End-to-Replacement Steam Generator (SG) Inlet Nozzle Loop 4 (ASME Code, Section XI Appendix VIII)	SS-to-CS	75
R2.11.5	9/RCS	Pipe-to-Valve (ASME Code, Section XI Appendix VIII)	SS	50
R.2.20	9/RCS	Elbow-to-Reactor Coolant Pump Loop 1 (ASME Code, Section XI Appendix VIII)	Cast SS	42
R.2.20	9/RCS	Elbow-to-Reactor Coolant Pump Loop 2 (ASME Code, Section XI Appendix VIII)	Cast SS	45
R.2.20	9/RCS	Elbow-to-Reactor Coolant Pump Loop 3 (ASME Code, Section XI Appendix VIII)	Cast SS	50

Licensee's Basis for Relief

Due to the piping configuration, only limited scanning could be performed from one side. Performance Demonstrative Initiative (PDI) procedure is not qualified for detection and length sizing when only single-sided access is available. 60 to 70 degree longitudinal technique supplemented for maximum examination volume coverage. For Item Number R1.15, the nozzle taper prevented the ultrasonic beam from impinging in the examination volume on the circumferential scans taper side. For Item Number R2.20, examination coverage was limited due to weld profile configuration (mismatch) for an elbow to pump configuration. This is a cast stainless steel weld component that requires special dual probe configurations to impinge sound to inside diameter surface.

By letter dated April 21, 2011, the licensee stated, in part, that

STPNOC has used the best available techniques to examine the subject weld, and demonstrated an acceptable level of integrity.

RT is not practical on this type of weld configuration, which prevents placement of the film and exposure source.

Licensee's Justification (as stated by the licensee)

Examinations used the techniques and examination angles qualified through ASME Code, Section XI, Appendix VIII, for consideration of Code coverage, in

accordance with qualified PDI procedures. The examinations performed on the subject items in addition to the examination of other vessel welds contained in the ISI program would detect generic degradation, if it existed, therefore demonstrating an acceptable level of structural integrity.

Licensee's Proposed Alternative Examination (as stated by the licensee)

STPNOC has examined this weld to the extent practical and will continue to perform pressure testing on the subject welds as required by the [ASME] Code. No alternative testing is proposed at this time.

NRC Staff Evaluation

The examination requirements for the subject piping welds at STP, Units 1 and 2, are governed by an RI-ISI program that was approved by the NRC in safety evaluations dated September 11, 2000, and March 5, 2002, respectively. This program assigns ASME Code, Examination Category R-A, Item R1.11 to piping elements not subject to a known damage mechanism, and requires inspection of 100 percent of the examination location volume for ASME Code, Class 1 circumferential piping welds. However, for the elbow-to-valve, elbow-to-pump, elbow-to-flange, safe end-to-replacement SG, pipe-to-flange, and pipe-to-valve, the configuration of these components limits volumetric examination. In order to meet the RI-ISI program volumetric coverage requirements, the subject component welds would have to be re-designed and modified.

As shown on the sketches and technical descriptions included in the licensee's submittal, examination of the subject component welds have been completed to the extent practical with aggregate volumetric coverage range of approximately 42 percent to 86 percent of the ASME Code-required volume. UT personnel, procedures, and equipment qualified through the industry's PDI were employed, including 45-degree and 60-degree shear wave scans from the accessible sides of the stainless steel weld. Volumetric examinations from the valve side of the weld could not be performed due to the cast material and sloping surface of the valve. In addition, the pipe elbow intrados limited scanning in the circumferential direction. Volumetric examinations were conducted with equipment, procedures, and personnel that were qualified to the process outlined in ASME Code, Section XI, Appendix VIII. No recordable flaw indications were observed during the examinations of the subject component welds.

The licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage for the subject piping weld due to UT access restrictions caused by the subject components design. However, based on the coverage obtained, and considering full volumetric coverage on other R-A Category welds, the NRC staff concludes that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. The NRC staff further concludes that the examinations performed provide reasonable assurance of structural integrity of the subject welds in the above tables.

3.11 Request for Relief RR-ENG-2-55, Part K (STP, Unit 1), Examination Category ASME Code Case N-722, Item B15.80 "Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components Fabricated With Alloy 600/82/182 Materials Section XI, Division 1"

Component for Relief Request

Bottom Mounted Instrumentation (BMI) Penetration Weld 41.

Examination Requirements

The NRC staff will not evaluate this relief under 10 CFR 50.55a(a)(3)(i), 10 CFR 50.55a(a)(3)(ii), or 10 CFR 50.55a(g)(5)(iii) because these examinations are augmented examinations not required by the ASME Code, Section XI; however, the staff will make a determination if the examinations are acceptable or unacceptable based on if the licensee met the intent of the augmented examinations under ASME Code Case N-722, "Additional Examinations for PWR Pressure Retaining Welds in Class 1 Components fabricated With Alloy 600/82/182 Materials, Section XI, Division 1," and 10 CFR 50.55a(g)(6)(ii)(E).

The regulations in 10 CFR 50.55a(g)(6)(ii)(E), "Reactor coolant pressure boundary visual inspections," states that

- (E) Reactor coolant pressure boundary visual inspections³
 - (1) All licensees of pressurized water reactors shall augment their inservice inspection program by implementing ASME Code Case N-722 subject to the conditions specified in paragraphs (g)(6)(ii)(E)(2) through (4) of this section. The inspection requirements of ASME Code Case N-722 do not apply to components with pressure retaining welds fabricated with Alloy 600/82/182 materials that have been mitigated by weld overlay or stress improvement.
 - (2) If a visual examination determines that leakage is occurring from a specific item listed in Table 1 of ASME Code Case N-722 that is not exempted by the ASME Code, Section XI, IWB-1220(b)(i), additional actions must be performed to characterize the location, orientation, and length of crack(s) in Alloy 600 nozzle wrought material and location, orientation, and length of crack(s) in Alloy 82/182 butt welds. Alternatively, licensees may replace the Alloy 600/82/182 materials in all the components under the item number of the leaking component.

³ For inspections to be conducted every refueling outage and inspections conducted every other refueling outage, the initial inspection shall be performed at the next refueling outage after January 1, 2009. For inspections to be conducted once per interval, the inspections shall begin in the interval in effect on January 1, 2009, and shall be prorated over the remaining periods and refueling outages in this interval.

- (3) If the actions in paragraph (g)(6)(ii)(E)(2) of this section determine that a flaw is circumferentially oriented and potentially a result of primary water stress corrosion cracking, licensees shall perform non-visual NDE inspections of components that fall under that ASME Code Case N-722 item number. The number of components inspected must equal or exceed the number of components found to be leaking under that item number. If circumferential cracking is identified in the sample, non-visual NDE must be performed in the remaining components under that item number.
- (4) If ultrasonic examinations of butt welds are used to meet the NDE requirements in paragraphs (g)(6)(ii)(E)(2) or (g)(6)(ii)(E)(3) of this section, they must be performed using the appropriate supplement of Section XI, Appendix VIII of the ASME Boiler and Pressure Vessel Code.

NRC Staff Evaluation

As noted above, the NRC staff did not evaluate this relief under 10 CFR 50.55a(a)(3)(i), 10 CFR 50.55a(a)(3)(ii), or 10 CFR 50.55a(g)(5)(iii) since these examinations are augmented examinations not required by the ASME Code, Section XI. The NRC staff reviewed this pursuant to 10 CFR 50.55a(g)(6)(ii)(E) which incorporates by reference ASME Code Case N-722.

The licensee had the option per ASME Code Case N-722 of performing visual examinations or volumetric examinations of the BMI penetrations. The licensee opted for volumetric examinations and obtained 48 percent coverage for BMI Penetration Weld 41 and during the volumetric examinations the licensee found no flaw indications. Therefore, the NRC staff determines that the licensee followed and performed volumetric examinations on the subject welds in accordance with ASME Code Case N-722, as conditioned in 10 CFR 50.55a(g)(6)(ii)(E)(2) and (g)(6)(ii)(E)(3) and has met the intent of the augmented examinations as required in 10 CFR 50.55a(g)(6)(ii)(E).

4.0 CONCLUSION

The NRC staff has reviewed the licensee's submittal and concludes that ASME Code examination coverage requirements are impractical for the subject welds listed in RR-ENG-2-55 Part A and Parts C through J. Furthermore, imposition of these ASME Code requirements would create a burden on the licensee. The NRC staff further determines that based on the volumetric and surface coverage, if applicable, obtained on the subject welds, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. Furthermore, the NRC staff concludes that examinations performed to the extent practical provide reasonable assurance of structural integrity of the subject welds.

Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i), and is in compliance with the requirements of 10 CFR 50.55a with the granting of this relief. Therefore, the NRC staff grants relief for the subject examinations of the components contained in RR-ENG-2-55 Part A and Parts C through J for the second 10-year ISI interval at STP, Units 1 and 2.

The NRC staff concludes that pursuant to 10 CFR 50.55a(g)(6)(i) granting this relief request is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

The NRC staff also concludes that the licensee met the ASME Code requirements for RR-ENG-2-55, Part B, and does not require relief from the ASME Code requirements.

RR-ENG-2-55, Part K, was not evaluated for relief since the NRC staff concludes that the licensee met the augmented examination requirements of 10 CFR 50.55a(g)(6)(ii)(E)(2); therefore, the examination for BMI Penetration Weld 41 is acceptable.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

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Date: July 29, 2011

relief for the subject examinations of the components contained in RR-ENG-2-55 Part A and Parts C through J for the second 10-year ISI interval at STP, Units 1 and 2.

The NRC staff concludes that pursuant to 10 CFR 50.55a(g)(6)(i), granting this relief request is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

The NRC staff also concludes that the licensee met the ASME Code requirements for RR-ENG-2-55, Part B, and does not require relief from the ASME Code requirements.

RR-ENG-2-55, Part K, was not evaluated for relief since the NRC staff concludes that the licensee met the augmented examination requirements of 10 CFR 50.55a(g)(6)(ii)(E)(2); therefore, the examination for BMI Penetration Weld 41 is acceptable.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

If you have any questions, please contact the project manager, Balwant K. Singal, at 301-415-3016 or via e-mail at Balwant.Singal@nrc.gov.

Sincerely,

/RA/

Michael T. Markley, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

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