



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
OF THE
THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN
REQUESTS FOR RELIEF
FOR
VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNIT 2
DOCKET NUMBER: 50-281

1.0 INTRODUCTION

In order to demonstrate the operability of ASME Code Class 1, 2, and 3 components, the Technical Specifications (TS) for Surry Power Station, Unit 2, state that the inservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel (B&PV) Code and applicable addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states 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 preservice 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 applicable edition of Section XI of the ASME Code for the Surry Power Station, Unit 2 second 10-year inservice inspection (ISI) interval is the 1989 Edition.

Enclosure 1

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Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for its facility, information shall be submitted to the Commission in support of that determination and a request made for relief from the ASME Code requirement. After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life, property, or the common defense and security, and are otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed.

In a letter dated January 2, 1997, as supplemented June 2, 1997, Virginia Electric and Power Company, (licensee), submitted requests for relief (SR-018 through SR-024) to ASME Section XI requirements for Surry Power Station, Unit 2. The licensee withdrew Request for Relief No. SR-022 in its letter dated June 2, 1997.

2.0 EVALUATION

The staff, with technical assistance from its contractor, the Idaho National Engineering and Environmental Laboratory (INEEL), has evaluated the information provided by the licensee in support of its third 10-year inservice inspection interval program plan requests for relief for Surry Power Station, Unit 2. Based on the information submitted, the staff adopts the contractor's conclusions and recommendations presented in the Technical Letter Report (TLR) attached.

Request for Relief SR-018: Section XI, Examination Category B-J, Item B9.40, Class 1 Socket Welds requires 100% surface examination of the Class 1 socket welds as defined by Figure IWB-2500-8. Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee proposed to perform the Code-required surface examinations on substitute welds in lieu of the Class 1 socket welds listed below.

Weld No.	Line No.	Drawing No.
1-01	2"-CH-397-1502	11548-WMKS-RC-12Z5
1-01	2"-CH-395-1502	11548-WMKS-RC-11Z3
1-01	2"-CH-393-1502	11548-WMKS-RC-10Z4

The licensee stated:

"It is proposed that the substitution with another weld be counted as meeting the Code requirements. In addition:

1. A visual (VT-2) examination will be performed during the normally scheduled system leakage test each refueling outage.
2. Technical Specifications require that the reactor coolant system leak rate be limited to one gallon per minute unidentified leakage. This value is calculated at least once per 72 hours.
3. The containment atmosphere particulate radioactivity is checked every 12 hours.
4. If a reactor coolant pump main flange is disassembled, thereby making the weld accessible for examination, the welds will be examined consistent with Code requirements.

The proposed alternative examinations stated above will ensure that the overall level of plant quality and safety will not be compromised."

The Code requires 100% surface examination of the subject seal injection pipe welds. However, these welds are inaccessible without disassembly of the reactor coolant pump main flange bolting, which is a major effort that requires many manhours from skilled maintenance personnel. Disassembly of the pump would result in excessive radiation exposure to plant personnel. Therefore, imposition of the Code requirements would cause a burden on the licensee.

The licensee has performed the Code-required surface examination on one of the injection seal pipe welds. In addition, the licensee will select other welds for examination to maintain the 25% examination sample for Examination Category B-J welds. Furthermore, the seal injection pipe welds receive the Code-required VT-2 visual examination for leakage each refueling outage. The combination of these examinations is sufficient for detecting existing patterns of inservice degradation and provides reasonable assurance of the continued structural integrity of the subject welds. Therefore, it is concluded that compliance with the Code requirements would result in hardship without a compensating increase in the level of quality and safety, and the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

Request for Relief SR-019: Examination Category B-J, Item B9.32, Class 1 Branch Connection Weld requires 100% surface examination, as defined by Figure IWB-2500-5, for branch connection pipe welds less than 4-inch nominal pipe size. The licensee, pursuant to 10 CFR 50.55a(g)(5)(iii), has requested relief from performing the Code-required surface examination on branch connection Weld 4-11BC on Line 3"-RC-335-1502.

The licensee proposed as an alternative that a surface examination performed on the fillet weld of the reinforcement pad be substituted for the Code surface examination. In addition:

1. "A visual (VT-2) examination will be performed during the normally scheduled system leakage test each refueling outage."

2. "Technical Specifications require that the reactor coolant system leak rate be limited to one gallon per minute unidentified leakage. This value is calculated at least once per 72 hours."
3. "The containment atmosphere particulate radioactivity is checked every 12 hours."

"The proposed alternative examinations stated above will ensure that the overall level of plant quality and safety will not be compromised."

The Code requires a 100% surface examination of the subject branch connection weld. However, access to this weld is completely restricted by a reinforcing saddle plate which is fillet welded over the pressure-retaining branch connection weld. Therefore, the design with the reinforcing saddle plate makes the Code requirement impractical for this branch connection weld. To gain access for examination, the saddle plate would have to be removed and the branch connection redesigned and modified. Imposition of this requirement would cause a burden on the licensee.

In lieu of the Code-required surface examination, the licensee will perform a surface examination of the fillet weld used to attach the saddle plate to the main pipe and branch pipe. Examination of these welds will detect any gross structural deformation and confirm the overall integrity of the branch connection. In addition, the licensee will perform VT-2 visual examinations of these areas in conjunction with the Class 2 pressure tests. The staff concludes that the alternative surface examination, along with the Code-required pressure tests, will detect any significant patterns of degradation occurring at the branch connection and will ensure the structural integrity of the subject branch connection. Therefore, Request for Relief No. SR-019 is granted pursuant to 10 CFR 50.55a(g)(6)(i).

Request for Relief SR-020: Section XI, Examination Category B-F, Item B5.70, Steam Generator Nozzle-to-Safe End Welds requires 100% volumetric and surface examinations, as defined by Figure IWB-2500-8, for steam generator nozzle-to-safe end welds 4-inch nominal pipe size or larger. Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the volumetric coverage requirements of the Code for the steam generator nozzle-to-safe end welds listed in the table below.

Weld No. /Line No.	% Coverage					Limitation
	2	5	7	8	Surf.	
1-05DM /29"-RC-301- 2501R	0	28	55	55	100	Nozzle geometry and surface condition. Machined surface on pipe-side. As-cast surface on nozzle side.
1-06DN /31"-RC-308- 2501R	28	0	55	55	100	Nozzle geometry and surface condition. Machined surface on pipe-side. As-cast surface on nozzle side.
2-axial scan, 180° from isometric flow direction 5-axial scan, same direction as isometric flow 7-circumferential scan, clockwise 8-circumferential scan, counter-clockwise						

The licensee proposed as an alternative that the examination already completed at the reduced coverage be counted as meeting the Code requirements. In addition:

1. "A visual (VT-2) examination will be performed during the normally scheduled system leakage test each refueling outage."
2. "Technical Specifications require that the reactor coolant system leak rate be limited to one gallon per minute unidentified leakage. This value is calculated at least once per 72 hours."
3. "The containment atmosphere particulate radioactivity is checked every 12 hours."

"The proposed alternative examinations stated above will ensure that the overall level of plant quality and safety will not be compromised."

The Code requires 100% volumetric and surface examination of the subject steam generator nozzle-to-safe end welds. However, nozzle geometry and surface conditions make complete volumetric examination impractical for these welds. To meet the Code coverage requirements, the nozzle safe ends and associated piping would require design modifications to allow access for examination. Imposition of this requirement would create a burden on the licensee.

Approximately 35% (cumulative) of the Code-required volumetric examination and 100% of the Code-required surface examination was obtained for the two steam generator safe end welds. In addition, there are other safe-end welds in the reactor coolant system that are receiving complete volumetric examination. The combination of the complete surface examination, partial volumetric examination, and the complete examination of other similar welds assures

that existing patterns of degradation will be detected. As a result, reasonable assurance of the structural integrity of the dissimilar metal safe end welds has been provided. Therefore, Request for Relief No. SR-020 is granted pursuant to 10 CFR 50.55a(g)(6)(i).

Request for Relief SR-021: Section XI, Examination Category B-J, Item B9.11, Class 1 Circumferential Weld 2-30 requires 100% volumetric and surface examination, as defined by Figure IWB-2500-5, for Class 1 circumferential welds 4-inch nominal pipe size and larger. The licensee pursuant to 10 CFR 50.55a(g)(5)(iii), requested relief from performing the surface examination, to the extent required by the Code, for Weld 2-30 on line 4"-RC-315-1502. Details are listed in Table SR-021-1 below.

Table SR-021-1			
Weld No.	UT Coverage	Surface Coverage	Limitations
2-30	93.3%	81%	Whip restraint on piping extending across the weld at 0°, 90°, 180° and 270°.

The licensee proposed as an alternative that the examination already completed at the reduced coverage be counted as meeting the Code requirements. In addition:

1. "A visual (VT-2) examination will be performed during the normally scheduled system leakage test each refueling outage."
2. "Technical Specifications require that the reactor coolant system leak rate be limited to one gallon per minute unidentified leakage. This value is calculated at least once per 72 hours."
3. "The containment atmosphere particulate radioactivity is checked every 12 hours."

The Code requires 100% surface and volumetric examination of the subject circumferential pipe weld. However, access to the weld is restricted by pipe whip restraints that extend across the weld and prevent completion of the Code-required surface examination. Therefore, the Code coverage requirements are impractical for this weld. To meet the Code requirements, the whip restraint and portions of the piping system would have to be redesigned and modified. Imposition of this requirement would result in a burden on the licensee.

The licensee completed 81% of the Code-required surface examination and essentially 100% of the volumetric examination. In addition, this weld is part of a larger sample of Class 1 circumferential welds that received complete examination. The combination of the volumetric examination, the surface examination to the extent practical, and the examination of other Class 1 piping welds assures that existing patterns of degradation will be detected. As a result, reasonable assurance of the structural integrity of the subject weld has been provided. Therefore, Request for Relief No. SR-021 is granted pursuant to 10 CFR 50.55a(g)(6)(i).

Request for Relief SR-022: Section XI, Examination Category C-G, Item C6.10, Safety Injection Pump Casing Weld. In the licensee's June 2, 1997, response to the NRC's RAI, the licensee withdrew Request for Relief SR-022.

Request for Relief SR-023: Section XI, Examination Category B-D, Item B2.120, Pressurizer Nozzle Inside Radius (IR) Sections requires 100% volumetric examination, as defined by Figure IWB-2500-7, of pressurizer nozzle inside radius sections. Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from examining pressurizer nozzle IR sections 10NIR and 11NIR to the extent required by the Code.

The Code requires 100% volumetric examination of the subject nozzle inside radius (IR) sections. However, the nozzles are integrally cast and the surface conditions preclude complete ultrasonic examination. Reducing the surface irregularities by grinding would reduce the wall thickness, which is not technically prudent. Therefore, the Code-required volumetric examination is impractical for the pressurizer inside radius sections at Surry, Unit 2. To provide a surface suitable for ultrasonic examination, the pressurizer nozzles would require design modification. Imposition of this requirement would result in a considerable burden on the licensee.

In addition to performing the Code-required volumetric examination to the extent practical, the licensee proposed to perform a VT-1 visual examination of the inside surface of the IR sections. This alternative is capable of detecting any significant patterns of degradation and will provide reasonable assurance of the structural integrity of the IR sections provided that remote visual examinations are performed with color video equipment. Therefore, Request for Relief No. SR-023 is granted pursuant to 10 CFR 50.55a(g)(6)(i), provided that remote visual examinations are performed with color video equipment.

Request for Relief SR-024: Examination Category B-J, Item B9.11, Class 1 Circumferential Piping Weld 1-03 requires 100% volumetric and surface examination, as defined by Figure IWB-2500-5, for Class 1 circumferential welds 4-inch nominal pipe size and larger. The licensee requested Code relief pursuant to 10 CFR 50.55a(g)(5)(iii), from performing volumetric examination, to the extent required by the Code, for Weld 1-03 on line 29"-RC-307-2501R. Details are listed in Table SR-024-1 below.

Table SR-024-1						
Weld #	% Coverage					Limitation
	2	5	7	8	Surf	
1-03	0	100	25	25	100	Pipe/valve configuration prevents scanning from side 2. A 60° angle was used to increase coverage (direction 5). Because of use of longitudinal waves, only ½ node examinations were possible.
2-axial scan, 180° from isometric flow direction 5-axial scan, same direction as isometric flow 7-circumferential scan, clockwise 8-circumferential scan, counter-clockwise						

The licensee proposed as an alternative (as stated):

"It is proposed that the examination already completed at the reduced coverage be counted as meeting the Code requirements. In addition:

1. A visual (VT-2) examination will be performed during the normally scheduled system leakage test each refueling outage.
2. Technical Specifications require that the reactor coolant system leak rate be limited to one gallon per minute unidentified leakage. This value is calculated at least once per 72 hours.
3. The containment atmosphere particulate radioactivity is checked every 12 hours.

The proposed alternative examinations stated above will ensure that the overall level of plant quality and safety will not be compromised."

The Code requires 100% surface and volumetric examination of the subject circumferential pipe weld. However, the weld configuration restricts coverage and precludes 100% volumetric examination. Therefore, the Code coverage requirements are impractical for this weld. To meet the Code requirements, the weld joint would have to be redesigned and modified. Imposition of this requirement would result in a burden on the licensee.

The licensee examined approximately 37% of the Code-required volume and 100% of the surface. In addition, this weld is part of a larger sample of Class 1 circumferential welds that did receive complete examination. The combination of the volumetric examination to the extent practical, the complete surface examination, and the examination of other Class 1 piping welds assures that existing patterns of degradation will be detected. As a result, reasonable assurance of the structural integrity of the subject weld has been provided. Therefore, Request for Relief No. SR-024 is granted pursuant to 10 CFR 50.55a(g)(6)(i).

3. CONCLUSIONS

The staff has reviewed the licensee's submittal and concludes that for Requests for Relief SR-019, 020, 021, and 024, the requirements are impractical at Surry Power Station, Unit 2 and that reasonable assurance of the structural integrity is provided by the examinations performed. Therefore, relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) for these requests. For Request for Relief SR-023, relief is granted pursuant to 10 CFR 50.55a(g)(6)(i), provided the remote visual examinations are performed with color video equipment.

For Request for Relief SR-018, imposition of the Code requirements would cause a burden without a compensating increase in quality and safety. Therefore, the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

Request for Relief SR-022 was withdrawn by the licensee in their June 2, 1997, supplemental submittal.

TECHNICAL LETTER REPORT
THIRD 10-YEAR INTERVAL INSERVICE INSPECTION
REQUESTS FOR RELIEF
VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNIT 2
DOCKET NUMBER 50-281

1.0 INTRODUCTION

By letter dated January 2, 1997, the licensee, Virginia Electric Power Company, submitted seven requests for relief from the requirements of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. In response to a Nuclear Regulatory Commission (NRC) request for additional information (RAI), the licensee provided further information in a letter dated June 2, 1997. The licensee also withdrew Request for Relief SR-022 in that letter. The Idaho National Engineering and Environmental Laboratory (INEEL) staff has evaluated the information provided by the licensee in support of these requests for relief in the following section.

2.0 EVALUATION

The Code of record for the Surry Power Station, Unit 2, third 10-year inservice inspection (ISI) interval, which began May 10, 1994, is the 1989 Edition of ASME Code, Section XI.

A) Request for Relief SR-018, Examination Category B-J, Item B9.40, Class 1 Socket Welds

Code Requirement: Examination Category B-J, Item B9.40 requires 100% surface examination of the Class 1 socket welds as defined by Figure IWB-2500-8.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee proposed to perform the Code-required surface examinations on substitute welds in lieu of the Class 1 socket welds listed below.

Weld I.d.	Line No.	Drawing No.
1-01	2"-CH-397-1502	11548-WMKS-RC-12Z5
1-01	2"-CH-395-1502	11548-WMKS-RC-11Z3
1-01	2"-CH-393-1502	11548-WMKS-RC-10Z4

The licensee stated:

"It is proposed that the substitution with another weld be counted as meeting the Code requirements. In addition:

1. "A visual (VT-2) examination will be performed during the normally scheduled system leakage test each refueling outage.
2. "Technical Specifications require that the reactor coolant system leak rate be limited to one gallon per minute unidentified leakage. This value is calculated at least once per 72 hours.
3. "The containment atmosphere particulate radioactivity is checked every 12 hours.
4. "If a reactor coolant pump main flange is disassembled, thereby making the weld accessible for examination, the welds will be examined consistent with Code requirements.

"The proposed alternative examinations stated above will ensure that the overall level of plant quality and safety will not be compromised."

Licensee's Basis for the Proposed Alternative (as stated):

"The components listed above are terminal ends on seal injection piping connected to the reactor coolant pumps. The welds are completely inaccessible due to their closeness to the pump flange (i.e., they are underneath the flange. The attached picture shows the configuration.) However, when the reactor coolant pump main flange is disassembled, the weld is accessible for examination. However, disassembly of the pump would cause a burden without a compensating increase in quality and safety. All terminal end welds are scheduled for examination. Therefore, substitution with another weld is not feasible. However, another weld will be selected for examination in order to ensure that 25% of examination category B-J will be examined."

In the June 2, 1997, letter, the licensee stated:

"During the last refueling outage (March 1997), the "A" reactor coolant pump (RCP) main flange bolting was disassembled for maintenance making the seal injection pipe weld accessible for examination, and the weld was examined. No indications were identified, and the weld was accepted. However, future partial disassembly of reactor coolant pumps for the sole purpose of examining the subject seal injection pipe welds would represent a considerable hardship. Shielding would be required to be installed in the motor room to reduce radiation levels. In addition, it would take two individuals at least twenty-four hours to remove and reinstall enough RCP bolting to make the pipe weld accessible. Three to four bolts would also have to be removed in the location of the piping weld, as well as another three or four bolts 180° across from the bolts in the weld area. Furthermore, loosening the bolting could cause gasket problems which would require removal of the remaining bolts, replacement of the gasket, and retensioning of the bolting. Past RCP maintenance activities at Surry indicate that it can take up to six days to properly retention bolting on the RCPs. Reasonable assurance of system structural integrity is provided by

the addition of another weld to the B-J welds examinations to makeup the 25% sample, the system leakage test performed every refueling outage, primary system leakage monitoring during routine operation, and the containment atmospheric radioactivity monitoring system. These assurances are included in Relief Request, SR-018.

"Consequently, we request relief from performing the weld examination coverage requirements for the subject weld pursuant to 10 CFR 50.55a(a)(3)(ii) for the reasons cited in our January 2, 1997 response as well as the supplemental basis provided above."

Evaluation: The Code requires 100% surface examination of the subject seal injection pipe welds. However, these welds are inaccessible without disassembly of the RCP main flange bolting, which is a major effort that requires many manhours from skilled maintenance personnel. Disassembly of the pump would result in excessive radiation exposure to plant personnel. Therefore, imposition of the Code requirements would cause a burden on the licensee.

The licensee has performed the Code-required surface examination on one of the injection seal pipe welds. In addition, the licensee will select other welds for examination to maintain the 25% examination sample for Examination Category B-J welds. Furthermore, the seal injection pipe welds receive the Code-required VT-2 visual examination for leakage each refueling outage. The combination of these examinations is sufficient for detecting existing patterns of inservice degradation and provides reasonable assurance of the continued structural integrity of the subject welds. Therefore, it is concluded that compliance with the Code requirements would result in hardship without a compensating increase in the level of quality and safety, and it is recommended that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

B) Request for Relief SR-019, Examination Category B-J, Item B9.32, Class 1 Branch Connection Weld

Code Requirement: Examination Category B-J, Item B9.32 requires 100% surface examination, as defined by Figure IWB-2500-5, for branch connection pipe welds less than 4-inch nominal pipe size.

Licensee's Code Relief Request: Pursuant to 10 CFR 50.55a(g)(5)(iii), relief is requested from performing the Code-required surface examination on branch connection Weld 4-11BC on Line 3"-RC-335-1502.

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

"The weld listed above is covered by a reinforcement pad/saddle weld, which totally covers the examination area described in the Code. Therefore, examination coverage cannot be achieved due to the configuration of the piping. This weld is a

branch connection and, as such, all welds of this type are scheduled for examination. Therefore, substitution with another weld is not feasible."

Licensee's Proposed Alternative (as stated):

"It is proposed that a surface examination performed on the fillet weld of the reinforcement pad be substituted for the Code surface examination. In addition:

1. "A visual (VT-2) examination will be performed during the normally scheduled system leakage test each refueling outage.
2. "Technical Specifications require that the reactor coolant system leak rate be limited to one gallon per minute unidentified leakage. This value is calculated at least once per 72 hours.
3. "The containment atmosphere particulate radioactivity is checked every 12 hours.

"The proposed alternative examinations stated above will ensure that the overall level of plant quality and safety will not be compromised."

Evaluation: The Code requires a 100% surface examination of the subject branch connection weld. However, access to this weld is completely restricted by a reinforcing saddle plate which is fillet welded over the pressure-retaining branch connection weld. Therefore, the design with the reinforcing saddle plate makes the Code requirement impractical for this branch connection weld. To gain access for examination, the saddle plate would have to be removed and the branch connection redesigned and modified. Imposition of this requirement would cause a burden on the licensee.

In lieu of the Code-required surface examination, the licensee will perform a surface examination of the fillet weld used to attach the saddle plate to the main pipe and branch pipe. Examination of these welds will detect any gross structural deformation and confirm the overall integrity of the branch connection. In addition, the licensee will perform VT-2 visual examinations of these areas in conjunction with the Class 2 pressure tests. The INEEL staff concludes that the alternative surface examination, along with the Code-required pressure tests, will detect any significant patterns of degradation occurring at the branch connection and will ensure the structural integrity of the subject branch connection. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

C) Request for Relief SR-020, Examination Category B-F, Item B5.70, Steam Generator Nozzle-to-Safe End Welds

Code Requirement: Examination Category B-F, Item B5.70 requires 100% volumetric and surface examinations, as defined by Figure IWB-2500-8, for steam generator nozzle-to-safe end welds 4-inch nominal pipe size or larger.

Licensee's Code Relief Request: Pursuant to 10 CFR 50.55a(g)(5)(iii), relief is requested from the volumetric coverage requirements of the Code for the steam generator nozzle-to-safe end welds listed in the table below.

Weld No. /Line No.	Coverage					Limitation
	2	5	7	8	Surf.	
1-05DM /29"-RC-301-2501R	0	28	55	55	100	Nozzle geometry and surface condition. Machined surface on pipe-side. As-cast surface on nozzle side.
1-06DN /31"-RC-308-2501R	28	0	55	55	100	Nozzle geometry and surface condition. Machined surface on pipe-side. As-cast surface on nozzle side.
2-axial scan, 180° from isometric flow direction 5-axial scan, same direction as isometric flow 7-circumferential scan, clockwise 8-circumferential scan, counter-clockwise						

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

"The components listed above have been examined to the extent practical as required by the Code. However, full volumetric coverage could not be achieved due to joint configuration and material characteristics. Coverage of the volumetric and surface examinations is detailed in Tables SR-020-1 and SR-020-2 [paraphrased above]. Figure SR-020-1* is provided as graphic detail of the limitations experienced. Substitution with another weld is not feasible because all welds in the Category and Item must be examined.

Licensee's Proposed Alternative (as stated):

"It is proposed that the examination already completed at the reduced coverage be counted as meeting the Code requirements. In addition:

*Contained in licensee's submittal but not this report.

1. "A visual (VT-2) examination will be performed during the normally scheduled system leakage test each refueling outage.
2. "Technical Specifications require that the reactor coolant system leak rate be limited to one gallon per minute unidentified leakage. This value is calculated at least once per 72 hours.
3. "The containment atmosphere particulate radioactivity is checked every 12 hours.

"The proposed alternative examinations stated above will ensure that the overall level of plant quality and safety will not be compromised."

Evaluation: The Code requires 100% volumetric and surface examination of the subject steam generator nozzle-to-safe end welds. However, nozzle geometry and surface conditions make complete volumetric examination impractical for these welds. To meet the Code coverage requirements, the nozzle safe ends and associated piping would require design modifications to allow access for examination. Imposition of this requirement would create a burden on the licensee.

Approximately 35% (cumulative) of the Code-required volumetric examination and 100% of the Code-required surface examination was obtained for the two steam generator safe end welds. In addition, there are other safe-end welds in the reactor coolant system that are receiving complete volumetric examination. The combination of the complete surface examination, partial volumetric examination, and the complete examination of other similar welds assures that existing patterns of degradation will be detected. As a result, reasonable assurance of the structural integrity of the dissimilar metal safe end welds has been provided. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

D) Request for Relief SR-021, Examination Category B-J, Item B9.11, Class 1 Circumferential Weld 2-30

Code Requirement: Examination Category B-J, Item B9.11 requires 100% volumetric and surface examination, as defined by Figure IWB-2500-5, for Class 1 circumferential welds 4-inch nominal pipe size and larger.

Licensee's Code Relief Request: Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from performing the surface examination, to the extent required by the Code, for Weld 2-30 on line 4"-RC-315-1502. Details are listed in Table SR-021-1 below.

Table SR-021-1			
Weld No.	UT Coverage	Surface Coverage	Limitations
2-30	93.3%	81%	Whip restraint on piping extending across the weld at 0°, 90°, 180° and 270°.

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

"The component listed above has been examined to the extent practical as required by the Code. However, full surface coverage could not be achieved due to interferences from an adjacent pipe support. The required volumetric examination had limitations, but they were less than 10%. Coverage of the volumetric and surface examinations is detailed in Table SR-021-1. Picture SR-021-1* is provided as graphic detail of the limitations experienced. Substitution with another weld of the same size would not necessarily improve the examination coverage since this weld is representative of plant design and similar geometric conditions are expected.

Licensee's Proposed Alternative (as stated):

"It is proposed that the examination already completed at the reduced coverage be counted as meeting the Code requirements. In addition:

1. "A visual (VT-2) examination will be performed during the normally scheduled system leakage test each refueling outage.
2. "Technical Specifications require that the reactor coolant system leak rate be limited to one gallon per minute unidentified leakage. This value is calculated at least once per 72 hours.
3. "The containment atmosphere particulate radioactivity is checked every 12 hours."

Evaluation: The Code requires 100% surface and volumetric examination of the subject circumferential pipe weld. However, access to the weld is restricted by pipe whip restraints that extend across the weld and prevent completion of the Code-required surface examination. Therefore, the Code coverage requirements are impractical for this weld. To meet the Code requirements, the whip restraint and portions of the piping system would have to be redesigned and modified. Imposition of this requirement would result in a burden on the licensee.

The licensee completed 81% of the Code-required surface examination and essentially 100% of the volumetric examination. In addition, this weld is part of a

*Contained in licensee's submittal but not this report.

larger sample of Class 1 circumferential welds that received complete examination. The combination of the volumetric examination, the surface examination to the extent practical, and the examination of other Class 1 piping welds assures that existing patterns of degradation will be detected. As a result, reasonable assurance of the structural integrity of the subject weld has been provided. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

E. Request for Relief SR-022. Examination Category C-G. Item C6.10. Safety Injection Pump Casing Weld

Note: In the June 2, 1997, response to the NRC's RA1, the licensee withdrew Request for Relief SR-022.

F. Request for Relief SR-023. Examination Category B-D. Item B2.120. Pressurizer Nozzle Inside Radius (IR) Sections

Code Requirement: Examination Category B-D, Item B2.120 requires 100% volumetric examination, as defined by Figure IWB-2500-7, of pressurizer nozzle inside radius sections.

Licensee's Code Relief Request: Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from examining pressurizer nozzle IR sections 10NIR and 11NIR to the extent required by the Code.

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

"The components listed above have been examined to the extent practical as required by the Code. However, full volumetric coverage could not be achieved due to inherent interferences from a rough and bumpy surface, which causes the ultrasonic search unit to lose contact and change angles. The use of alternate angles would not have improved volumetric coverage. The nozzles are integrally cast to the pressurizer, therefore weld contour preparation (grinding or weld buildup and grinding) prior to examination will result in vessel wall reduction and is not recommended. Picture SR-023-2 (NIR-11)* is provided as graphic detail of the pressurizer nozzles, and is representative of existing conditions. Substitution with another nozzle inside radius section is not feasible because all of the pressurizer nozzle inside radius sections must be examined."

In the June 2, 1997, response to the NRC's request for additional information, the licensee stated:

"It is estimated that only five percent of the required volume could be examined for the reason stated in the relief request. The visual examination described in paragraph V of the relief request will be a VT-1 examination. The use of remote

*Contained in licensee's submittal but not this report.

visual aids as allowed by IWA-2211(c) of ASME Section XI-1989 Edition may be required."

Licensee's Proposed Alternative (as stated):

"It is proposed that the examination already completed at the reduced coverage be counted as meeting the Code requirements. In addition,

1. "The nozzle inside radius sections will be visually examined from the inside using direct or remote techniques prior to the end of the inspection interval.
2. "A visual (VT-2) examination will be performed during the normally scheduled system leakage test each refueling outage.
3. "Technical Specifications require that the reactor coolant system leak rate be limited to one gallon per minute unidentified leakage. This value is calculated at least once per 72 hours.
4. "The containment atmosphere particulate radioactivity is checked every 12 hours.

"The proposed alternative examinations stated above will ensure that the overall level of plant quality and safety will not be compromised."

Evaluation: The Code requires 100% volumetric examination of the subject nozzle inside radius (IR) sections. However, the nozzles are integrally cast and the surface conditions preclude complete ultrasonic examination. Reducing the surface irregularities by grinding would reduce the wall thickness, which is not technically prudent. Therefore, the Code-required volumetric examination is impractical for the pressurizer inside radius sections at Surry, Unit 2. To provide a surface suitable for ultrasonic examination, the pressurizer nozzles would require design modification. Imposition of this requirement would result in a considerable burden on the licensee.

In addition to performing the Code-required volumetric examination to the extent practical, the licensee proposed to perform a VT-1 visual examination of the inside surface of the IR sections. This alternative is capable of detecting any significant patterns of degradation and will provide reasonable assurance of the structural integrity of the IR sections provided that remote visual examinations are performed with color video equipment. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i) provided that remote visual examinations are performed with color video equipment.

G. Request for Relief SR-024, Examination Category B-J, Item B9.11, Class 1 Circumferential Piping Weld 1-03

Code Requirement: Examination Category B-J, Item B9.11 requires 100% volumetric and surface examination, as defined by Figure IWB-2500-5, for Class 1 circumferential welds 4-inch nominal pipe size and larger.

Licensee's Code Relief Request: Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from performing the volumetric examination, to the extent required by the Code, for Weld 1-03 on line 29"-RC-307-2501R. Details are listed in Table SR-024-1 below.

Table SR-024-1						
Weld #	% Coverage					Limitation
	2	5	7	8	Surf	
1-03	0	100	25	25	100	Pipe/valve configuration prevents scanning from side 2. A 60° angle was used to increase coverage (direction 5). Because of use of longitudinal waves, only ½ node examinations were possible.
2-axial scan, 180° from isometric flow direction 5-axial scan, same direction as isometric flow 7-circumferential scan, clockwise 8-circumferential scan, counter-clockwise						

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

"The component listed above has been examined to the extent practical as required by the Code. However, full volumetric coverage could not be achieved due to joint configuration. Coverage of the volumetric and surface examinations is detailed in Table SR-024-1 [paraphrased above]. Figure SR-024-1* is provided as graphic detail of the limitations experienced. Substitution with another weld of the same size would not necessarily improve the examination coverage since this weld is representative of plant design and similar geometric conditions are expected."

Licensee's Proposed Alternative (as stated):

*Contained in licensee's submittal but not this report.

"It is proposed that the examination already completed at the reduced coverage be counted as meeting the Code requirements. In addition:

1. "A visual (VT-2) examination will be performed during the normally scheduled system leakage test each refueling outage.
2. "Technical Specifications require that the reactor coolant system leak rate be limited to one gallon per minute unidentified leakage. This value is calculated at least once per 72 hours.
3. "The containment atmosphere particulate radioactivity is checked every 12 hours.

"The proposed alternative examinations stated above will ensure that the overall level of plant quality and safety will not be compromised."

Evaluation: The Code requires 100% surface and volumetric examination of the subject circumferential pipe weld. However, the weld configuration restricts coverage and precludes 100% volumetric examination. Therefore, the Code coverage requirements are impractical for this weld. To meet the Code requirements, the weld joint would have to be redesigned and modified. Imposition of this requirement would result in a burden on the licensee.

The licensee examined approximately 37% of the Code-required volume and 100% of the surface. In addition, this weld is part of a larger sample of Class 1 circumferential welds that did receive complete examination. The combination of the volumetric examination to the extent practical, the complete surface examination, and the examination of other Class 1 piping welds assures that existing patterns of degradation will be detected. As a result, reasonable assurance of the structural integrity of the subject weld has been provided. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

3.0 CONCLUSION

The INEEL staff has reviewed the licensee's submittal and concludes that for Requests for Relief SR-019, 020, 021, and 024, the requirements are impractical at Surry Power Station, Unit 2 and that reasonable assurance of the structural integrity is provided by the examinations performed. Therefore, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i) for these requests. For Request for Relief SR-023, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i) provided remote visual examinations are performed with color video equipment.

For Request for Relief SR-018, imposition of the Code requirements would cause a burden without a compensating increase in quality and safety. Therefore, it is recommended that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

Request for Relief SR-022 was withdrawn by the licensee in their June 2, 1997, response to the NRC RAI.