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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

OF THE FIRST 10-YEAR INTERVAL INSERVICE INSPECTION

REQUEST FOR RELIEF 94-02

FOR

DUKE POWER COMPANY, ET AL.

CATAWBA NUCLEAR STATION, UNIT 2

DOCKET NO. 50-414

1.0 INTRODUCTION

The Technical Specifications (TS) for Catawba Nuclear Station (CNS), 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 Code and applicable Addenda as required by Title 10 of the Code of Federal Regulations (10 CFR) Section 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i).

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 Comments," to the extent practical within the limitations of design, geometry and materials of construction of the components. The regulations require that volumetric examination of welds conducted during the second 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) on the date 12 months prior to the start of the 12-month interval, subject to the limitations and modifications listed therein. The applicable edition of Section XI of the inservice inspection (ISI) interval is the 1980 Edition through the Winter 1981 Addenda. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

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 September 14, 1994, Duke Power Company (the licensee), submitted a request for relief No. 94-02 from the examination requirements for certain welds at Catawba Nuclear Station, Unit 2. The licensee determined that these welds could not be examined to the 90 percent minimum coverage requirement of the ASME Code, as clarified by Code Case N-460. On December 5, 1994, the NRC staff held a conference call with the licensee requesting clarification to their submittal. As a result of the conference call, the licensee submitted a supplement, dated August 14, 1995, to clarify the relief request.

2.0 EVALUATION AND CONCLUSIONS

The staff, with technical assistance from its contractor, the Idaho National Engineering Laboratory (INEL), has evaluated the information provided by the licensee in support of its second 10-year interval inservice inspection request for relief No. 94-02 for the Catawba Nuclear Station, Unit 2.

Based on the information submitted, the staff adopts the contractor's conclusions and recommendations contained in the attached Technical Letter Report. The staff has concluded that compliance with the Code requirements would be impractical and a burden on the licensee. Therefore, Request for Relief No. 94-02 is granted as requested pursuant to 10 CFR 50.55a(g)(6)(i). The relief granted is authorized by law, will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden that would result if the requirements were imposed on the facility.

Attachment: Technical Letter Report

Principal Contributor: D. Naujock

Date: January 25, 1996

TECHNICAL LETTER REPORT
ON THE SECOND 10-YEAR INSERVICE INSPECTION INTERVAL
REQUEST FOR RELIEF 94-02
FOR
CATAWBA NUCLEAR STATION, UNIT 2
DUKE POWER COMPANY
DOCKET NUMBER: 50-414

1.0 INTRODUCTION

By letter dated September 14, 1994, Duke Power Company submitted Request for Relief 94-02. Based on the initial review of this submittal, a December 5, 1994, conference call was held between the NRC and the licensee to request clarification of their submittal. As a result of this conference call, the licensee submitted a supplement, dated August 14, 1995, to clarify the relief request. The Idaho National Engineering Laboratory (INEL) staff has evaluated the Request for Relief 94-02 in the following sections.

2.0 EVALUATION

The Code of record for the Catawba Nuclear Station, Unit 2, first 10-year inservice inspection interval, which began August 19, 1986, is the *American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code*, Section XI, 1980 Edition through the Winter 1981 Addenda. The information provided by the licensee in support of the request for relief from impractical requirements has been evaluated and the bases for granting relief from those requirements are documented below.

2.1 Request for Relief 94-02 (Part 1 of 4), Examination Category B-D, Items B3.110 and B3.120, Pressurizer Nozzle-to-Head Welds and Nozzle Inner Radius Sections

Code Requirement: Table IWB-2500-1, Examination Category B-D, Items B3.110 and B3.120 require 100% volumetric examination of all pressurizer nozzle-to-head welds and nozzle inner radius sections as defined by Figure IWB-2500-7.

ATTACHMENT

Licensee's Code Relief Request: The licensee requested relief from the Code-required volumetric coverage for the following pressurizer nozzle-to-head welds and nozzle inner radius sections:

Item Number	Examination Area	Limitation/Coverage
2PZR-W3 B03.110.003 2PZR-W4A B03.110.004 2PZR-W4B B03.110.005	Safety Nozzle-to-Upper Head	Geometric configuration / 67%
2PZR-W3 B03.120.003 2PZR-W4A B03.120.004 2PZR-W4B B03.120.005	Safety Nozzle-to-Upper Head Inside Radius Section	Geometric configuration / 63%

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

"During the ultrasonic examination of the welds shown in Attachment 1[1], two directional coverage as required by ASME Section XI, Appendix III and Section V, Article IV as modified by Code Case N-460, could not be obtained. Causes of these limitations are part geometry, physical barriers, and component/weld material. Where possible a combination of angles and wave modes were used to obtain the maximum coverage. The weld and base metal at the component inside surface was covered from at least one direction with a minimum of one angle. Although the coverage requirements of ASME Section XI, as defined in Section V, Article 4 and Section XI, Appendix III could not be met, the amount of coverage obtained for these examinations provides an acceptable level of quality and integrity. Based on these evaluations, the limited coverage will in no way endanger the health and safety of the general public."

"No additional examinations are required."

Licensee's Proposed Alternative Examination (as stated):

"We will continue to use the most current ultrasonic techniques available for future examinations of the Item Numbers shown in Attachment 1[1]."

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[1]See table above.

Evaluation: The Code requires that the subject pressurizer nozzle-to-head welds and nozzle inner radius sections receive 100% volumetric examination. Based on a review of the sketches provided by the licensee, it has been determined that the examination area geometry limits the scanning, thus precluding complete volumetric coverage. As a result, examination coverage of the Code-required volume is impractical. To provide complete volumetric coverage, design modifications or component replacement with a design allowing for complete volumetric coverage would be required. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee obtained 67% volumetric coverage of the safety nozzle-to-upper head welds and 63% on the associated nozzle inside radius sections. Based on the percentages of the Code-required volumetric coverage obtained, it is reasonable to conclude that degradation, if present, would have been detected. As a result, reasonable assurance of structural integrity is provided. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), it is recommended that relief be granted.

2.2 Request for Relief 94-02 (Part 2 of 4), Examination Category B-F, Items B5.070 and B5.130, Steam Generator Nozzle-to-Safe End and Pipe Dissimilar Metal Butt Welds

Code Requirement: Table IWB-2500-1, Examination Category B-F, Items B5.070 and B5.130 require 100% volumetric and surface examination of all pressure retaining dissimilar metal welds as defined by Figure IWB-2500-8 each interval.

Licensee's Code Relief Request: The licensee requested relief from the Code-required 100% volumetric coverage of the following dissimilar welds:

Item Number	Examination Area	Limitation/Coverage
2SGC-INLET-SE B05.070.005	SG2C Inlet Nozzle-to-Safe End	Geometric configuration / 75%
2SGC-OUTLET-SE B05.070.006	SG2C Outlet Nozzle-to-Safe End	Geometric configuration / 75%
2NC13-02 B05.130.010	SG2C Inlet Nozzle-to-Safe End to Pipe	Geometric configuration / 75%
2NC13-03 B05.130.011	SG2C Outlet Nozzle-to-Safe End to Pipe	Geometric configuration / 75%

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

"During the ultrasonic examination of the welds shown in Attachment 1[2], two directional coverage as required by ASME Section XI, Appendix III and Section V, Article IV as modified by Code Case N-460, could not be obtained. Causes of these limitations are part geometry, physical barriers, and component/weld material. Where possible a combination of angles and wave modes were used to obtain the maximum coverage. The weld and base metal at the component inside surface was covered from at least one direction with a minimum of one angle. Although the coverage requirements of ASME Section XI, as defined in Section V, Article 4 and Section XI, Appendix III could not be met, the amount of coverage will in no way endanger the health and safety of the general public."

"No additional examinations are required."

Licensee's Proposed Alternative Examination (as stated):

"We will continue to use the most current ultrasonic techniques available for future examinations of the Item Numbers shown in Attachment 1[2]."

Evaluation: The Code requires that the subject dissimilar metal welds receive 100% volumetric and surface examination. Based on a review of the sketches provided, it has been determined that the component geometry limits the scanning area, precluding complete volumetric coverage. As a result, complete volumetric coverage of the Code required volume is impractical. To provide complete volumetric coverage, design

[2]See table above.

modifications or component replacement with a design that provides for complete volumetric coverage would be necessary. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee obtained 75% of the Code-required volumetric coverage of the subject examination areas. Based on the significant percentage of coverage obtained, in combination with the Code-required surface examination, it is reasonable to conclude that degradation, if present, would have been detected. As a result, reasonable assurance of structural integrity is provided. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), it is recommended that relief be granted.

2.3 Request for Relief 94-02 (Part 3 of 4), Examination Category B-J, Item B9.11, Upper Head Injection (UHI) and Vent Pipe Circumferential Welds

Code Requirement: Table IWB-2500-1, Examination Category B-J, Item B9.11 requires 100% surface and volumetric examination of pressure-retaining circumferential butt welds equal to or greater then 4-inch nominal pipe size as defined in Figure IWB-2500-8.

Licensee's Code Relief Request: The licensee requested relief from the Code-required 100% volumetric coverage of the following UHI and vent line circumferential welds:

Item Number	Examination Area	Limitation/Coverage
2NC255-01 B09.011.076	UHI Head Adapter Cap at 270 Degrees	Geometric configuration / 86%
2NC257-01 B09.011.077	NC Vent Line Modification 3X6 Reducer	Geometric configuration / 86%
2NC255-03 B09.011.078	UHI Head Adapter Cap at 90 Degrees	Geometric configuration / 86%
2NC255-04 B09.011.079	UHI Head Adapter Cap at 180 Degrees	Geometric configuration / 86%

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

"During the ultrasonic examination of the welds shown in Attachment 1[3], two directional coverage as required by ASME Section XI, Appendix III and Section V, Article IV as modified by Code Case N-460, could not be obtained. Causes of these limitations are part geometry, physical barriers, and component/weld material. Where possible a combination of angles and wave modes were used to obtain the maximum coverage. The weld and base metal at the component inside surface was covered from at least one direction with a minimum of one angle. Although the coverage requirements of ASME Section XI, as defined in Section V, Article 4 and Section XI, Appendix III could not be met, the amount of coverage will in no way endanger the health and safety of the general public."

"No additional examinations are required."

Licensee's Proposed Alternative Examination (as stated):

"We will continue to use the most current ultrasonic techniques available for future examinations of the Item Numbers shown in Attachment 1[3]."

Evaluation: The Code requires that the subject UHI and vent line circumferential welds receive 100% volumetric and surface examinations. Based on a review of the sketches provided, it has been determined that the component geometry limits the scanning area, precluding complete Code-required volumetric coverage. As a result, the Code-required coverage of the subject areas is impractical. To perform the complete Code-required examination, design modifications or component replacement with ones of a design that provides for complete volumetric coverage would be required. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee obtained 86% of the Code-required volumetric coverage of the subject welds. For each of the subject welds, the licensee supplemented the shear wave examination with a 60-degree longitudinal ultrasonic wave technique, ensuring a minimum of one-directional interrogation of the inside surface. Based on the significant percentage of coverage obtained, in combination with the supplemental 60-degree longitudinal

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[3]See table above.

ultrasonic wave technique and the Code-required surface examination, it is reasonable to conclude that degradation, if present, would have been detected. As a result, reasonable assurance of structural integrity is provided. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), it is recommended that relief be granted.

2.4 Request for Relief 94-02 (Part 4 of 4), Examination Categories C-A and C-B, Items C1.10 and C2.22, Class 2 Pressure Vessel Shell Welds and Nozzle Inner Radius Section

Code Requirement: Table IWC-2500-1, Examination Category C-A, Item C1.10, requires 100% volumetric examination of Class 2 steam generator circumferential shell welds at gross structural discontinuities as defined by Figure IWC-2500-1. Examination Category C-B, Item C2.22 requires 100% volumetric examination of nozzle inner radius sections of nozzles without reinforcing plates in vessels >1/2 inch nominal thickness as defined by Figure IWC-2500-4(a) or (b).

Licensee's Code Relief Request: The licensee requested relief from the Code-required 100% volumetric coverage of the following welds:

Item Number	Examination Area	Limitation/Coverage
C01.010.002	steam generator lower shell-to-transition cone	Geometric configuration / 68%
C02.022.004	steam generator feedwater nozzle-to-stub barrel inside radius section	Geometric configuration / 84%

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

"During the ultrasonic examination of the welds shown in Attachment 1[4], two directional coverage as required by ASME Section XI, Appendix III and Section V, Article IV as modified by Code Case N-460, could not be obtained. Causes of these limitations are part geometry, physical barriers, and component/weld material. Where possible a combination of angles and wave modes were used to obtain the maximum coverage. The weld and base metal at the component inside surface was covered from at least one direction with a minimum of one angle. Although the coverage requirements of ASME Section XI, as defined in Section V, Article 4 and Section XI, Appendix III could not be met, the amount of coverage will in no way endanger the health and safety of the general public."

"No additional examinations are required."

Licensee's Proposed Alternative Examination (as stated):

"We will continue to use the most current ultrasonic techniques available for future examinations of the Item Numbers shown in Attachment 1[4]."

Evaluation: The Code requires that the subject steam generator lower shell-to-transition cone weld and the steam generator feedwater nozzle-to-stub barrel inside radius section receive 100% volumetric examination. Based on a review of the sketches provided, it has been determined that in the case of the steam generator lower shell-to-transition cone circumferential shell weld, a permanent restraint ring limits scanning. In the case of the nozzle inner radius section, the nozzle configuration limits the scanning area, precluding complete volumetric coverage. As a result, complete, Code-required, volumetric examination coverage is impractical. To provide complete volumetric coverage, design modifications or component replacement with ones of a design that provides for complete coverage would be required. Imposition of this requirement would cause a considerable burden on the licensee.

The licensee obtained 68% of the Code-required volumetric coverage of the steam generator lower shell-to-transition cone circumferential shell weld and 84% coverage of the steam generator feedwater nozzle-to-stub barrel

[4]See table above.

inside radius section. Based on the percentages of coverage obtained, it is reasonable to conclude that degradation, if present, would have been detected. As a result, reasonable assurance of structural integrity is provided. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), it is recommended that relief be granted.

3.0 CONCLUSION

The INEL staff has reviewed Request for Relief 94-02 and concludes that, pursuant to 10 CFR 50.55a(g)(6)(i), the specific requirements of the Code are impractical for the subject components at Catawba Nuclear Station, Unit 2. Therefore, it is recommended that relief be granted as requested.