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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE INSPECTION REQUEST FOR RELIEF

FOR

DUKE POWER COMPANY

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

DOCKET NOS. 50-269, 50-270, AND 50-287

1.0 INTRODUCTION

The Technical Specifications for Oconee Nuclear Station, Units 1, 2, and 3, state that the inservice inspection and testing 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) 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Section 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 difficulties 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) on the date 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The 1989 Edition of Section XI is the applicable edition of the ASME Code for Oconee, Units 1, 2 and 3, Third 10-year Inservice Inspection (ISI) Interval. 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 requirements. 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.

2.0 EVALUATION

2.1 Licensee's Request

The licensee's submittal, dated June 22, 1994, is requesting approval pursuant to 10 CFR 50.55a(a)(3) for use of Code Case N-522, "Pressure Testing of Component Penetration Piping." Request 94-GO-002 is for relief from performing certain hydrostatic tests at the Oconee Nuclear Station during the second 10-year ISI Interval. In place of the hydrostatic tests required by the ASME Boiler and Pressure Vessel Code, the licensee proposed the alternative to use Code Case N-522. Code Case N-522 has not been endorsed in Regulatory Guide 1.147.

2.1.1 Licensee's Component Identification

All of the remaining Interval hydrostatic testing for piping that penetrates a containment vessel, when the piping and isolation valves that are part of the containment system are Class 2 but the balance of the piping system is outside the scope of Section XI. This request is for system hydrostatic tests to be performed prior to the end of the third 10-year inspection interval.

2.1.2 ASME Code, Section XI, Requirements

In accordance with IWC-5222; Category C-H; Items C7.40 and C7.80, of the 1989 Edition, periodic system pressure testing is required to be performed on Class 2 piping.

2.1.3 Licensee's Proposed Alternative Testing

As an alternative to Code requirements, the licensee proposed using 10 CFR Part 50, Appendix J, tests to satisfy the periodic pressure test requirements for those Class 2 segments of piping systems that penetrate containment where the balance of the adjoining system is classified as non-Code class, as described in Code Case N-522.

2.1.4 Licensee's Basis for Relief

The licensee stated the following basis for relief:

> Consistent with the philosophy of ASME Code Case N-522, this request is based on performing a 10 CFR 50, Appendix J test in lieu of the Interval hydrostatic pressure test, when the piping and isolation valves that are part of the containment system are Class 2 but the balance of the piping system is outside the scope of ASME Boiler & Pressure Vessel Code, Section XI. The only reason that the penetration piping is classified as Class 2 is because of its function as part of the containment pressure boundary. The remaining portion of the system is non nuclear related and the integrity of the system in relation to its primary function is not within the scope of Section XI. Since containment integrity is the only safety related function performed, it is logical to test the penetration portion of the system to the Appendix J criteria.
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> The Final Safety Analysis Report (FSAR) requires 10 CFR 50, Appendix J testing for containment penetrations. By performing a hydrostatic test on these same components imposes a burden of duplicate testing. Duplicate testing results in a significant increase in the total amount of work force and radiological exposure without a compensating increase in the level of quality or safety.
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> ASME Code Case N-522 has been approved by the ASME Boiler & Pressure Vessel Code Committee and the Board on Nuclear Codes and Standards as an acceptable alternative to the rules of the ASME Boiler & Pressure Vessel Code, Section XI. ASME Code Case N-522 has also been published in ASME Code Cases: Nuclear Components, 1992 Edition, Supplement No. 7.

2.1.5 Evaluation

The hydrostatic pressure test required in Table IWC-2500-1, Category C-H provides periodic verification of the leak-tight integrity of Class 2 piping systems or segments at least once during every 10-year ISI interval. The Appendix J pressure testing provides periodic verification of the leak-tight integrity of the primary reactor containment, and systems and components that penetrate containment. The Appendix J test frequency provides assurances that the containment pressure boundary is being maintained at an acceptable level while monitoring for deterioration of seals, valves, and piping. Appendix J requires that three Type A tests be performed at approximately equal intervals during the 10-year ISI interval, with the third test done while shutdown for the 10-year plant ISI. Appendix J also requires Type B and Type C tests be performed during each refueling outage, but in no case at intervals greater than 2 years.

The Class 2 containment isolation valves (CIVs) and connecting pipe segments must withstand the peak calculated containment internal pressure related to the maximum design containment pressure. The licensee indicates (1) that the containment penetration piping is classified as Class 2 because of its function as part of the containment pressure boundary, and (2) that because

containment integrity is the only safety-related function performed by this penetration piping, it is logical to test the penetration piping portion of the associated system to the Appendix J criteria. The staff finds that the pressure retaining integrity of the CIVs and connecting pipings and their associated safety functions may be verified with an Appendix J, Type C test if conducted at the peak calculated containment pressure. The seal between the connecting pipe segment and containment may be verified using an Appendix J, Type B test. Therefore, when the connecting pipe segment is subjected to either a Type B or C test, its safety function is verified and Code Case N-522 may be used. For Class 2 pipe segments between the CIVs that are not subjected to either a Type B or C test, the safety function is not verified and Code Case N-522 may not be used.

Section XI, IWC-5210(b) requires that where air is used as a testing medium, the test procedure shall permit the detection and location of through-wall leakages in components of the system tested. Because an Appendix J, Type C test most likely uses air as a testing medium, the licensee's test procedure should meet the above requirement for the CIVs and pipe segments between the CIVs.

Based on the above analysis and informaton submitted, the staff concludes that compliance with Appendix J would provide an acceptable level of quality and safety in lieu of the Code-required hydrostatic test of Class 2 piping that penetrates containment, where the balance of the piping system is non-Code class. Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's proposal, Relief Request 94-GO-002, for the use of Code Case N-522 is authorized with the restriction that the test procedure permits the detection and location of through-wall leakages in CIVs and pipe segments between the CIVs and that the testing is done under the peak calculated containment pressure.

3.0 CONCLUSIONS

The staff has evaluated the information provided by DPC in support of its request for relief. Based on the information submitted, the alternative for hydrostatic testing contained in the licensee's proposal is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the duration of the currently approved ISI program, provided that the test procedure permits the detection and location of through-wall leakage in CIVs and pipe segments between the CIVs and that the testing is done under the peak calculated containment pressure.

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