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

CATAWBA NUCLEAR STATION, UNITS 1 AND 2

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

OCONEE NUCLEAR STATION, UNITS 1 AND 2

DOCKET NOS. 50-413, 50-414, 50-369, 50-370, 50-269, AND 50-270

1.0 INTRODUCTION

The Technical Specifications for Catawba Nuclear Station, Units 1 and 2, McGuire Nuclear Station, Units 1 and 2, and 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 1986 Edition and the 1989 Edition of Section XI are the applicable editions of the ASME Code for McGuire, Units 1 and 2, respectively, Second 10-year Inservice Inspection (ISI) Intervals. The applicable edition for Catawba, Unit 1 Second 10-year ISI interval is the 1989 Edition, and for Catawba, Unit 2, First 10-year ISI interval is the 1980

Edition through Winter 1981 Addenda. The 1989 Edition, with no Addenda, of Section XI is the applicable edition of the ASME Code for the Oconee Units 1, 2, and 3 Third 10-year 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.

In a letter dated August 4, 1995, the licensee, Duke Power Company (DPC), proposed an alternative examination qualification to the requirements of the 1989 Edition of the ASME Boiler and Pressure Code, Section XI. Duke Power Company requested approval for the implementation of the alternative examination qualification techniques of the 1992 Edition with the 1993 Addenda of ASME Section XI, Appendix VIII, Supplements 2 and 3, pursuant to 10 CFR 50.55a(a)(3)(i).

2.0 EVALUATION

2.1 Licensee's Request

This submittal is requesting approval pursuant to 10 CFR 50.55a(a)(3)(i) for use of the ultrasonic examination qualification techniques of the 1992 Edition with the 1993 Addenda of the ASME Section XI, Appendix VIII, for procedures, equipment, and personnel.

2.1.1 Licensee's Component Identification

All Examination Category B-J, C-F-1, and C-F-2 similar metal piping welds that require volumetric examination.

2.1.2 ASME Code, Section XI, Requirements

ASME Section XI, 1989 Edition, Appendix III, Supplement 4 - "Austenitic and Dissimilar Metal Welds," does not specify the method or acceptance criteria to be used for a procedure qualification. Paragraphs (a) and (c) specify the applicable type welds and qualification requirements.

Paragraph (a). The following welds and cast materials, because of their inherent coarse grained structure, may be subject to marked variations in attenuation, velocity, reflection and refraction at grain boundaries.

(1) high alloy steels;
(2) high nickel alloys
(3) cast pipe and fittings;
(4) dissimilar metal welds between combinations of (1), (2), and (3) above and wrought carbon or low alloy steels.

Paragraph (c). Qualification - In recognition of the difficulty in ultrasonic examination of the welds and materials in (a) above, it is recommended that examiners and procedures be qualified using welded samples, and simulated or actual flaws, or both, located in positions where geometry may make them more difficult to detect (e.g., the break in counterbore or adjacent to the weld root). The purpose of the examination procedure qualification is to determine that the proposed examination technique is capable of detecting the specified flaws of interest and that its capabilities and limitations will be identified.

2.1.3 Licensee's Proposed Alternative Testing

The licensee has proposed to use the method and acceptance criteria in the ASME Section XI, Appendix VIII, 1992 Edition with the 1993 Addenda for the qualification of procedures, equipment, and personnel used for the ultrasonic examination of the specified welds.

2.1.4 Licensee's Basis for Relief

The licensee stated the following basis for relief:

> ASME Section XI, 1989 Edition, Appendix III, Supplement 4 does not specify the method or acceptance criteria to be used for a procedure qualification. ASME Section XI, 1992 Edition with 1993 Addenda, Appendix VIII, does specify the method and acceptance criteria to qualify an ultrasonic procedure. Use of Appendix VIII fulfills the recommendation of Appendix III, Supplement 4 (c) in that it requires welded samples, and actual flaws located in positions where geometry may make them more difficult to detect (e.g., the break in counterbore or adjacent to the weld root).
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> The Appendix VIII qualification, as administered by the Electric Power Research Institute NDE Center (EPRI) in cooperation with the Performance Demonstration Initiative (PDI), satisfies the purpose of the examination procedure qualification.
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> Duke Power Company Procedure NDE-600, Revision 4, "Ultrasonic Examination of Similar Metal Welds in Wrought Ferritic and Austenitic Piping" was qualified by performance demonstration at the EPRI NDE Center. Test specimens used in the qualification were ferritic and austenitic pipe welds fabricated in accordance with ASME Section XI, 1992 Edition with 1993 Addenda, Appendix

VIII, Supplements 2 and 3. Duke Power Company requests relief in order to use ASME Section XI, 1992 Edition with 1993 Addenda, Appendix VIII, as a basis for procedure and personnel qualification when performing ultrasonic examination of Examination Categories B-J, C-F-1 and C-F-2.

2.1.5 Evaluation

ASME Section XI, of the 1980, 1986 and 1989 Editions, Appendix III, Supplement 4, recommend that examiners and procedures used in ultrasonic examination of (1) high alloy steels, (2) high nickel alloys, (3) cast pipe and fittings, and (4) dissimilar metal welds between combinations of (1), (2), or (3) and wrought carbon or low alloy steels, be qualified using welded samples, and simulated or actual flaws. However, these editions of ASME do not specify the method or acceptance criteria to be used for qualification. The licensee has proposed to use the method and acceptance criteria in ASME Section XI, Appendix VIII, 1992 Edition with the 1993 Addenda for these qualifications. This method meets the 1980, 1986, and 1989 Edition recommendations in that it utilizes welded samples and actual flaws in locations that would make them difficult to detect.

The 1992 Edition of the ASME Code is currently under review by the NRC. Although not yet endorsed by the NRC, the qualification method and acceptance criteria for ultrasonic examinations contained in the 1992 Edition is generally recognized as being better than any other method currently available in the industry. Therefore, the use of ASME Section XI, Appendix VIII, 1992 Edition with the 1993 Addenda as a basis for procedure, equipment, and personnel qualification when performing ultrasonic examinations of Examination Categories B-J, C-F-1 and C-F-2 is acceptable as it provides a sufficient assurance of weld integrity and the capability to detect flaws.

3.0 CONCLUSION

The staff evaluated the information provided by DPC in support of its request for relief. Based on the information submitted, the alternative for ultrasonic examination qualification for procedures, equipment, and personnel contained in the licensee's proposal is authorized pursuant to 10 CFR 50.55a(a)(3)(i) as it provides an acceptable level of quality and safety. Upon endorsement of Appendix VIII by the NRC, the licensee is to follow all provisions, with limitations, issued in the regulations, if any.

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