



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE DENIAL OF ASME CODE CASES N-416-1 AND N-498-2

OMAHA PUBLIC POWER DISTRICT

FORT CALHOUN STATION, UNIT NO. 1

DOCKET NO. 50-285

1.0 INTRODUCTION

The Technical Specifications for Fort Calhoun Station 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 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6). 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 that become effective subsequent to editions specified in 10 CFR 50.55a(g)(2) and (g)(3), except the design and access provisions and the pre-service 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 ten-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 twelve 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 Fort Calhoun Station third 10-year inservice inspection (ISI) Interval is the 1989 Edition.

Pursuant to 10 CFR 50.55a(g)(5)(iii), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is impractical for its facility, information should be submitted to the Commission in support of that determination. 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.

By letter dated February 23, 1996, Omaha Public Power District (OPPD) submitted two relief requests for the inservice inspection (ISI) program for Fort Calhoun Station (FCS). OPPD requested approval of using Code Case N-416-1 with a proposed exception, and Code Case N-498-2 as an alternative to the required hydrostatic pressure test. Specifically, relief was requested from hydrostatic test pressure and hold time requirements during system pressure tests. The NRC staff has reviewed OPPD's submittal of February 23, 1996, and finds that the subject relief requests are not acceptable based on the following evaluation.

2.0 EVALUATION

2.1 Code Case N-416-1

In lieu of 1989 edition of the ASME Section XI Code, IWA-4000 and 5000 requirements for hydrostatic pressure testing for welded repairs or installation of replacement items by welding, Code Case N-416-1 requires a visual examination (VT-2) be performed in conjunction with system leakage testing using the 1992 edition of ASME Section XI, in accordance with Paragraph IWA-5000, at nominal operating pressure and temperature. This code case also specifies that non-destructive examination (NDE) of the welds be performed in accordance with the applicable Subsections of the 1992 edition of ASME Section III.

The 1989 edition of ASME Sections III and XI are the latest editions referenced in 10 CFR 50.55a. The staff has compared the system pressure test requirements of the 1992 edition of ASME Section XI to the requirements of IWA-5000 of the 1989 edition of ASME Section XI. In summary, the 1992 edition imposes a more uniform set of system pressure test requirements for Code Class 1, 2, and 3 systems. The terminology associated with the system pressure test requirements for all three code classes has been clarified and streamlined. The test frequency and test pressure conditions associated with these tests have not been changed. The hold time or operation time for system leakage tests has been increased. The NDE requirements for welded repairs of the 1992 edition of ASME Section III remain the same as the requirements of the 1989 edition of ASME Section III. Therefore, the staff finds this aspect of Code Case N-416-1 to be acceptable.

The licensee's alternative includes an exception to Code Case N-416-1. The exception is to use the applicable requirements of the 1989 edition of ASME Section XI instead of the 1992 edition. OPPD's basis for the exception is that the applicable requirements for hydrostatic pressure tests for welded repairs or installation of replacement items by welding Class 1, 2 and 3 components is similar in the 1989 and 1992 editions of ASME Sections III and XI. While OPPD is correct with respect to the traditional hydrostatic test requirements, the use of Code Case N-416-1 in accordance with the 1989 edition in lieu of the 1992 edition would not meet the hold time (or operation time) requirement, i.e., ten-minute for non-insulated components, and four-hour for

insulated components during Code Case N-416-1 system leakage tests. Because sufficient hold time is required for verifying the structural integrity of components under test pressures, the staff finds the proposed alternative that involves an exception to Code Case N-416-1 to be unacceptable in that it will not provide an acceptable level of quality and safety. In addition, the licensee has not shown that compliance with the Code will result in hardship or unusual difficulty without a compensatory increase in the level of quality and safety. Therefore, the proposed alternative is denied.

2.2 Code Case N-498-2

The Code Case N-498-2 was recently approved by ASME, but it has not been reviewed and endorsed by the NRC staff for incorporation into the Regulatory Guide 1.147 "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1." Pursuant to 10 CFR 50.55a(a)(3), alternatives to ASME Code requirements may be found acceptable if (i) the proposed alternatives would provide 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.

In its safety evaluation for approving the use of ASME Code Case N-498-1 "Alternative Rules for 10-year System Hydrostatic Testing for Class 1, 2, and 3 Systems, Section XI, Division 1," the NRC staff has noted that hydrostatic testing is primarily regarded as a means to enhance leakage detection during the examination of components under pressure. Such testing provides good indication of any system leakages, especially those very small leaks that might originate from small through-wall cracks of the pressure boundary. The capability to detect a very small leak is a function of both test pressures and hold times. Code Case N-498-1 was written to lower the test pressure slightly from that required by hydrostatic tests. However, the hold times required by hydrostatic tests are specifically retained in Code Case N-498-1.

The slightly higher pressures imposed on the pressure boundary components during hydrostatic testing produce only a minor enhancement in leak detection capability. This minor enhancement of detecting leakage above that which occurs during a system leakage test at nominal operating pressure results in only a small increase in the ability to determine the pressure boundary integrity. Code Case N-498-1 was approved by the NRC staff on the basis that the compensating increase in the level of quality and safety in the performance of a hydrostatic test does not offset or justify certain hardships created in setting up and performing the hydrostatic test.

The intent of the hydrostatic test is to detect the smallest leak that might originate from a small through-wall flaws of the pressure boundary. After a ten-year period of operation, the Code-required 10-year hydrostatic test can provide a timely discovery and good indication of small leaks which might not be readily detected by any other means such as system walkdowns or installed leak detection systems. The capability of detecting and locating a small leak is directly proportional to the hold times of a pressurized system, especially if it is insulated. Hydrostatic tests or system leakage and pressure tests

specified in Code Case N-498-1 tests, if performed without any hold times, might be insensitive to small leaks because of the long hold times required for them to become visible. As such, the stipulation of no hold times in Code Case N-498-2 does not meet the intent of the hydrostatic test and, therefore, is not acceptable as it would not provide an acceptable level of quality and safety. In addition, the licensee has not shown that compliance with the code would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, the proposed alternative is denied.

OPPD's basis for using Code Case N-498-2 is that the code case was approved by the ASME consensus process, indicating the technical acceptability of the Code Case N-498-2. It should be noted that the ASME's approval of certain code case alone does not constitute an acceptable basis to grant relief to ASME Code requirements. OPPD should resubmit the relief request for staff review with a detailed technical bases and justification, including those from ASME.

Although the staff finds the implementation of Code Case N-498-2 on a plant wide basis to be unacceptable, the staff will review on a system-by system basis proposed alternatives different from Code Case N-498-1 including the use of shorter hold times in accordance with provisions of 10 CFR 50.55a(a)(3). In those cases, the licensee must submit information to demonstrate that the alternative will provide an acceptable level of quality and safety, or that compliance with the hydrostatic test pressure and hold time requirements will result in hardships and unusual difficulties without a compensating increase in the level of quality and safety.

3.0 CONCLUSION

Based on the above evaluation, the staff has concluded that implementation of ASME Code Case N-416-1 with the proposed exception is not acceptable. In addition, the staff finds the plant-wide implementation of Code Case N-498-2 to be unacceptable; however, the staff will review on a system-by system basis alternatives different from Code Case N-498-1 in accordance with the provisions of 10 CFR 50.55a(a)(3). In those cases, the licensee must submit information to demonstrate that the alternative will provide an acceptable level of quality and safety, or that compliance with the hydrostatic test pressure and hold time requirements will result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

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Date: February 13, 1997