



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

SAFETY EVALUATION REPORT BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF FROM REGULATORY REQUIREMENTS

DUKE POWER COMPANY

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

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

INTRODUCTION

The Technical Specifications for the Oconee Nuclear Station, Units 1, 2 and 3, state that inservice examination of 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)(4), to the extent practicable within the limitations of design, geometry and materials of construction of the components, 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)(5), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for his 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 or 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 letters dated May 22, 1989, May 30, 1989, June 22, 1989, July 13, 1989, and July 21, 1989 Duke Power Company (the licensee) requested relief from certain examination requirements for the Second Interval ISI Program of Section XI of the ASME Boiler and Pressure Vessel Code 1980 Edition, Winter 1980 Addenda, for the Oconee Nuclear Station, Units 1, 2, and 3. The relief requests and supporting information were evaluated by the staff in this Safety Evaluation Report.

EVALUATION

RELIEF REQUEST 89-03

Component - Welds for the Installation of Block Valve CCW-293 in the Auxiliary Service Water (ASW) System.

Code Requirement - Subarticle IWA-4400 requires a system hydrostatic test performed in accordance with IWA-5000 after repair by welding.

Relief Requested - Relief is requested from the hydrostatic test requirement. The design pressure and temperature for the ASW line is 1440 psig and 100°F.

Alternative Examination - The welds will be 100 per cent radiographed, and a VT-2 inspection will be performed at operating temperature and pressure.

Basis for Relief - There is no practical way to isolate the affected 3-inch line from the ASW pump. The required hydrostatic test could potentially overpressurize the ASW pump. Alternate methods of isolation were considered but are deemed impractical because they would result in additional work force expenditure and delays in returning the Standby Shutdown Facility (SSF) to service which will be in a seven day administrative Limiting Condition for Operation (LCO). It is possible that the alternate methods of isolation could have been implemented within the LCO time frame. However, based on engineering judgment, it was determined that performance of alternate examinations detailed below offered the most safe and timely option. The alternate methods considered were:

- 1) Modify the ASW pump discharge check valve (CCW-289) so that hydrostatic testing could be performed without damaging the ASW pump. Performance of this modification and the additional post modification testing it would require may require a greater period of time than is available within the LCO.
- 2) Disconnect and blank flange the discharge piping from the ASW pump so that hydrostatic testing could be performed without damaging the ASW pump. Installation of the blank flange and the post modification testing it would require may require a greater period of time than is available within the LCO.
- 3) Use a freeze plug on the line between the ASW pump and the affected portion of piping so that hydrostatic testing could be performed without damaging the ASW pump. Use of a freeze plug may require a greater period of time than is available within the LCO.

Each of these methods would unnecessarily extend the amount of time required to complete the modification, such that it may not be possible to complete both the modification and required post modification testing within the LCO. It is desirable to exit the LCO as soon as practical. Also, because of the additional technical resources required with each of the above methods, the work force expenditure would be significantly increased. Thus, the only way to perform a hydrostatic test on this section of piping is to pressurize a portion of the system which includes the ASW pump. This is impractical because it could result in damage to the ASW pump.

Evaluation - The radiography will be performed when welding is complete. The VT-2 inspection will be performed during the next scheduled test pursuant to Section XI Subsection IWP ASME Code.

The specified method of hydrostatic testing will verify that there are no leaks at 1.25 times the design pressure. The alternative examination of 100 per cent radiography of welds assures that no significant flaws are evident in the welds. Radiography can reveal small weld defects that may never be detected

by a hydrostatic test. The VT-2 inspection indicates that no leaks are detectable when the system is at operating temperature and pressure.

The alternative tests provide an equivalent method to indicate a leak at the higher stress level which is normally verified by the specified method of hydrostatic testing. As such, the proposed alternative examinations provide an acceptable level of quality and safety and will not endanger the health and safety of the public.

Conclusion - We conclude that compliance with the specific requirement of Section XI would result in hardship without a compensating increase in the level of quality and safety. The staff accepts the alternative examination proposed by the licensee to ensure the structural integrity of the repair welds in the Auxiliary Service Water System.

RELIEF REQUEST 89-04

Component - Main Steam Turbine Stop Valve Upper Head Studs.

Code Requirement - Section XI, 1980 Edition, Winter 1980 Addenda, Table IWC-2500-1, Category C-D, Item C4.40, Volumetric Examination (Figure IWC-2500-6).

Relief Requested - Relief is requested from the full volumetric examination of main steam turbine stop valve upper head to valve body studs. The Section XI Code requirement is impractical for the Oconee Nuclear Station, Units 1, 2 and 3.

Alternative Examination - The main steam turbine stop valve upper head studs are constructed with 0.620-inch diameter by 11.13-inch long heater holes in the length of the studs. An in-place ultrasonic examination of the studs will be conducted using an angle beam transducer. The sensitivity of the examination will be established in compliance to the requirement of Section XI ASME Code, 1983 Edition, Winter 1983 Addenda, Paragraph VI-2430.

Basis for Relief - The ASME Code (Figure IWC-2500-6) requires that the full volume of the thread portion of the stud be examined. The request for relief is based on the premise that even though the Code requires a volumetric examination of the entire length of the stud, the actual area of concern would be the thread run-out points, where the threads meet the body of the stud; the first three to four threads that engage the nut.

Article 5 of the ASME Code Section V, Paragraph T-541.5 specifies that the ultrasonic examination be performed from the end of the bolt. Calibration shall be established from a 3/8" diameter, 3" long, flat bottom hole drilled in the end of the calibration standard with dimensions as identified in Table 541.5.2. Configuration of the main steam upper head studs on the turbine stop valve prevents this technique from being properly utilized. The requirement is impractical for Oconee Nuclear Station, Units 1, 2 and 3.

The Design Engineering Department of Duke Power Company performed an evaluation in support of this request. It was concluded from the evaluation that the last 2.9 inches of the stud engaged in the valve body would not have a significant load that might lead to failure. In addition, General Electric, the manufacturer of the studs, reports in their document "Valve Studs-Tightening, Inspection and Replacement Recommendations" (TIL-891) that "the results obtained to date indicate that crack indications will appear at the first or second thread, zero to 0.25 inches below the valve joint surface."

Conclusion - Compliance with the specific requirement of Section XI for the volumetric examination of the main steam turbine stop valve upper head studs is impractical, and would result in a hardship if imposed at the Oconee Nuclear Station, Units 1, 2 and 3. Relief is granted as requested in Relief Request 89-04. The alternative examination procedure is acceptable to the staff and will ensure an adequate level of structural integrity.

RELIEF REQUEST 89-05

Component - Welds for the Installation of Valve in the Auxiliary Steam System.

Code Requirement - Subarticle IWA-4400 requires a system hydrostatic test on the pressure retaining boundary in accordance with Article IWA-5000 after repair by welding.

Relief Requested - Hydrostatic testing of the Auxiliary Steam System is an impractical ASME Code requirement because the header cannot be properly drained after being filled with water.

Alternative Examination - Welds will be 100 per cent radiographed and a VT-2 inspection will be performed at operating temperature and pressure. In addition, the welds will be hydrostatically tested during the second ten-year interval inservice inspection hydro of the main steam lines.

Basis for Relief - Hydrostatic testing would require filling of the Auxiliary Steam System lines with water. Based on past experience the Auxiliary Steam System header cannot be drained properly after being filled with water due to the lack of adequate low point drains in the system. Water left in the auxiliary steam header following the required hydrotest could potentially damage the emergency feedwater pump turbine.

Evaluation - The specified method of hydrostatic testing verifies that there are no leaks at 1.25 times the design pressure. The alternative examination of the 100 per cent radiography of welds assures that no significant flaws are evident in the welds. The VT-2 inspection indicates that no leaks are detectable when the system is at operating temperature and pressure. The alternative tests provide an equivalent method to indicate a leak at the higher stress level which is normally verified by the specified method of hydrostatic testing. As such, the proposed alternative examinations provide an acceptable level of quality and safety.

Conclusion - We conclude that compliance with the specific requirement of Section XI is impractical for the Oconee Nuclear Station, Units 1, 2 and 3, and would result in hardship without a compensating increase in the level of quality and safety. The staff accepts the alternative examination proposed by the licensee to ensure the structural integrity of the repair welds in the Auxiliary Steam System.

RELIEF REQUEST 89-06

Component - Welds in Main Steam System for the Installation of Valve 2MS-76 (Unit 2).

Code Requirement - Subarticle IWA-4400 requires a system hydrostatic test performed in accordance with Article IWA-5000 after repair by welding.

Relief Requested - Relief is requested from the hydrostatic test requirement.

Alternative Examination - The welds will be 100 percent radiographed, and a VT-2 inspection for leakage will be performed at operating temperature and pressure. In addition, the welds will be hydrostatically tested during the second ten-year interval inservice inspection of the Main Steam System.

Basis for Relief - Hydrostatic testing would require filling the main steam line, the steam generator, and part of the feedwater system with water. Hydrostatic testing would unnecessarily require an additional cycle burden on the steam generator and is an impractical ASME Code requirement for Oconee Nuclear Station, Unit 2.

Evaluation - The radiography will be performed when welding is complete. The VT-2 inspection will be performed during startup from the Unit 2 End of Cycle 10 refueling outage. Hydrostatic testing will be performed during the second ten-year interval inservice inspection hydro of the main steam lines.

The specified method of hydrostatic testing verifies that there are no leaks at 1.25 times the design pressure. The alternative examination of the 100 percent radiography of welds assures that no significant flaws are evident in the welds. The VT-2 inspection indicates that no leaks are detectable when the system is at operating temperature and pressure. The alternative tests provide an equivalent method to indicate a leak at the higher stress level which is normally verified by the specified method of hydrostatic testing. As such, the proposed alternative examinations provide an acceptable level of quality and safety.

Conclusion - We conclude that compliance with the specific requirement of Section XI would result in hardship without a compensating increase in the level of quality and safety. The staff accepts the alternative examination proposed by the licensee to ensure the structural integrity of the repair welds in the Main Steam System of Oconee Nuclear Station, Unit 2. Relief from the Section XI requirement is granted as requested in Relief Request 89-06.

RELIEF REQUEST 89-07

Component - Repair welds in the Emergency Feedwater System (Unit 1).

Code Requirement - Subarticle IWA-4400 requires a system hydrostatic test performed in accordance with Article IWA-5000 after repairs by welding.

Relief Requested - Relief is requested from the hydrostatic test requirement.

Alternative Examination - Welds will be 100 per cent radiographed, and a VT-2 inspection will be performed at operating temperature and pressure.

Basis for Relief - It is not possible to hydrostatically test against the emergency feedwater pump turbine. Valve 1MS-97 has a seat leak, thus hydrostatic testing against 1MS-97 is impractical because the system is open to the condenser. Hydrostatic testing would require significant system design modification in order to protect the emergency feedwater pump turbine.

Evaluation - The specified method of hydrostatic testing verifies that there are no leaks at 1.25 times the design pressure. The alternative examination of 100 per cent radiography of welds assures that no significant flaws are present. The VT-2 inspection shows that no leaks are detectable when the system is at operating temperature and pressure. The alternative tests provide an equivalent method to indicate a leak at the higher stress level which is normally verified by the specified method of hydrostatic testing. As such, the proposed alternative examinations provide an acceptable level of quality and safety and will not endanger the health and safety of the public.

Conclusion - We conclude that compliance with the specific requirement of Section XI to hydrostatically test the repair welds in the Emergency Feedwater System is impractical to perform at the Oconee Nuclear Station, Unit 1. The staff accepts the alternative examination proposed by the licensee to ensure the structural integrity of the repair welds. Relief from the Section XI requirement is granted as requested in Relief Request 89-07.

CONCLUSION

We conclude from our evaluation of the determinations made by the Duke Power Company that certain Section XI ASME Code, 1980 Edition, Winter 1980 Addenda, examination requirements were impractical to perform at the Oconee Nuclear Station, Units 1, 2 and 3. The licensee requested relief from performing the impractical Section XI ASME Code examination requirements. Pursuant to 10 CFR 50.55a(g)(6)(i), relief is granted as requested for Relief Request Nos. 89-03, 89-04, 89-05, 89-06 and 89-07. This relief is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. The alternative examination procedures as discussed in the body of this report are imposed in lieu of the Code requirement to ensure the structural integrity of the subject components.

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