



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ON THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL

REQUEST FOR RELIEF NO. 32

ROCHESTER GAS AND ELECTRIC CORPORATION

R. E. GINNA NUCLEAR POWER PLANT

DOCKET NO. 50-244

1.0 INTRODUCTION

The Technical Specifications for the R. E. Ginna Nuclear Power Plant state that the inservice inspection and testing of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME 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)(i). 10 CFR 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 difficulty 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 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 Ginna plant, for the current inservice inspection (ISI) interval, is the 1986 Edition. 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.

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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.

By letters dated March 10, 1997 and June 19, 1997, Rochester Gas and Electric (RG&E) Corporation (licensee) requested relief from performing inner radius examinations on the regenerative heat exchanger (RHE) due to the size and configuration of the nozzles which rendered the Code examination to be impractical.

The staff has reviewed and evaluated the licensee's request and supporting information on the technical limitations of inner radius examination, pursuant to the provisions of 10 CFR 50.55a(g)(6)(i).

2.0 DISCUSSION

Licensee's Request for Code Relief

The licensee requests relief from the requirement of the ASME Code, Section XI, 1986 Edition, to volumetrically examine inner radius of the 2-inch nozzles on the RHE.

Code Requirement

The ASME Code, Section XI, 1986 Edition, Table IWB-2500-1, Examination Category B-D, Item Number B3.160, requires volumetric examination of the nozzle inside the radius section of the heat exchanger primary side.

Licensee's Basis for Relief Request (As stated in part)

"The Regenerative Heat Exchanger inner radius examinations were to be performed on small heavy wall nozzles that are connected to 2 inch piping."

"To assist in the evaluation of performing an acceptable Code ultrasonic inner radius examination, Computer modeling and mock-ups of the nozzle to vessel configuration were initiated. Computer modeling was performed by SouthWest Research Institute, AEA Technology and EPRI."

"Computer modeling performed by the various organizations compared favorably. The computer modeling initiatives indicated that several different transducers would be required to be used and that the inner radius examination results would be questionable at best due to the size and configuration of the nozzles. The modeling also indicated that beam spread and mode conversion at

the notches and neighboring surfaces would seriously reduce the signal to noise ratios, causing confusing spurious signals."

"Based upon the computer modeling results, EPRI NDE Center personnel were utilized to perform actual "hands-on" inner radius examination evaluations on the mock-ups. An area was selected on both mock-ups of the nozzle and suitable transducers and wedges were selected to perform the examination. The inspection was performed from the boss region of the nozzle because inspection from the shell surface proved to be greatly affected by attenuation and scattering from the nozzle-to-shell weld material. A variety of inspection frequencies were attempted of which none provided what was considered successful for the detection of the notches on these nozzles. It should be noted that the transducer position for detecting the selected notch was nearly optimum. Since the attempts made were unsuccessful, it was decided to increase the depth of the notch from 10% to 30%. The increase of the notch is greater than code allowable. Attempts were made on the greater notch depth but detection was not achievable."

Licensee' Proposed Alternate Examination or Testing

The licensee proposes to use the VT-2 visual examination which is performed as part of the system leakage test after each refueling outage, to verify leak-tight integrity of the nozzles.

3.0 EVALUATION

The ASME Code, Section XI, 1986 Edition requires 100% volumetric examination of the inside radius of the RHE nozzles. The staff has evaluated the limitations of ultrasonic examination of the inner radius of the 2-inch nozzle on the RHE. The test conducted on the mock-up at the EPRI NDE Center demonstrates that even a calibration notch greater than that required by Code, located in the most favorable location of the mock-up, could not be differentiated from noise and geometric reflectors without physically damping by finger from inside the surface of the mock-up. Hence, an acceptable Code examination is impracticable to perform due to size and configuration of the nozzles. There is no other volumetric examination method which can be used successfully, as an alternative to ultrasonic examination, to examine the inner radius of the nozzle. If the Code requirements were imposed, the components would have to be redesigned and would have to be replaced which places unnecessary burden on the licensee. The staff reviewed industry data on the reliability of the component and found no evidence of failure of the heat exchanger attributed to cracking of the subject nozzle attachment. The staff further believes that the licensee's VT-2 visual examination that will be performed as part of the system leakage test after each refueling outage, would confirm leak-tight integrity of the nozzle inner radius and hence, would provide reasonable assurance of operational readiness of the components.

4.0 CONCLUSION

The staff concludes on the licensee's Request for Relief No. 32 for R. E. Ginna that an acceptable Code volumetric examination of inner radius of 2-inch nozzle on the RHE is impractical to perform due to size and configuration of the nozzle. If the Code requirements are imposed, the components must be redesigned and replaced which imposes an unnecessary burden on the licensee. The VT-2 visual examination of the subject heat exchanger that will be performed during the system leakage test following an outage, would confirm a leak-tight integrity of the nozzle attachment to the heat exchanger and hence, would provide reasonable assurance of operational readiness. Therefore, a relief from the Code requirement is granted and the alternative imposed for the third 10-year inspection interval, pursuant to 10 CFR 50.55a(g)(6)(i). This relief has been granted giving due consideration to the burden upon the licensee that could result if the requirements were imposed.

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Date: August 12, 1997

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