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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE INSPECTION REQUESTS FOR RELIEF

FOR

ROCHESTER GAS AND ELECTRIC CORPORATION

R. E. GINNA NUCLEAR POWER PLANT

DOCKET NUMBER 50-244

1.0 INTRODUCTION

The Technical Specifications for R. E. Ginna 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 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 1983 Edition, Summer 1983 Addenda, of Section XI is the applicable edition of the ASME Code for the Ginna Second and First 10-year inservice inspection (ISI) interval. The components (including supports) may meet the requirements set forth in subsequent editions and

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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 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.

In a letter dated December 21, 1994, the licensee, Rochester Gas and Electric Corporation (RG&E), proposed an alternative examination to the requirements of the ASME Code, Section XI. RG&E requested approval for the implementation of the alternative rules of Section XI, ASME Code Case N-498, dated December 21, 1994, "Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 systems."

2.0 EVALUATION

2.1 Licensee's Request

This submittal is requesting approval pursuant to 10 CFR 50.55a(a)(3) for use of Code Case N-498-1, "Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems."

2.1.1 Licensee's Component Identification

Class 1, 2, and 3 systems subject to hydrostatic testing.

2.1.2 ASME Code, Section XI, Requirements

Section XI, Table IWB-2500-1, Category B-P (for Class 1), Table IWC-2500-1, Category C-H (for Class 2), and Table IWD-2500-1, Categories D-A, D-B, and D-C (for Class 3) contain the requirements for system hydrostatic and leakage testing. The ASME Code requires system hydrostatic testing once per 10-year interval at or near the end of the interval.

2.1.3 Licensee's Proposed Alternative Testing

The licensee proposed to use the alternative contained in Code Case N-498-1, a system leakage test, in lieu of hydrostatic testing, for Class 1, 2, and 3 systems.

2.1.4 Licensee's Basis for Relief

Code Case N-498-1 provides for an alternative to hydrostatic testing which will retain an acceptable level of quality and safety for Class 1, 2, and 3 systems. RG&E previously received permission to use Code Case N-498 (for Class 1 and 2 systems only) via NRC letter S/N BV-91-057, dated December 24, 1991. This code case was revised to include Class 3 systems. The Subcommittee Working Group on Pressure Testing (SWGPT) concluded that, as with Class 1 and 2 systems, no additional benefit would be gained by conducting the existing Class 3 system hydrostatic tests versus performing leak tests at nominal operating pressure. The conclusion of the group was that hydrostatic testing does not verify structural integrity, and in fact, the slightly higher test pressures currently called for in the code could result in operational difficulties as well as extended outages and increased costs. By implementing the alternative testing provisions of Code Case N-498-1, personnel radiation exposure, outage testing time, and costs can be significantly reduced.

Therefore, this submittal is requesting approval pursuant to 10 CFR 50.55a(a)(3) for use of Code Case N-498-1, "Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, and 3 Systems."

2.1.5 Evaluation

Information prepared in conjunction with ASME Code Case N-498-1 notes that the system hydrostatic test is not a test of the structural integrity of the system but rather an enhanced leakage test. This was the original intent as indicated in a paper by S. H. Bush and R. R. Maccary, "Development of Inservice Inspection Safety Philosophy for U.S.A. Nuclear Power Plants," ASME, 1971. Piping components are designed for a number of loadings that would be postulated to occur under the various modes of plant operation. Hydrostatic testing only subjects the piping components to a small increase in pressure over the design pressure and; therefore, does not present a significant challenge to pressure boundary integrity since piping dead weight, thermal expansion, and seismic loads, which may present far greater challenge to the structural integrity of a system than fluid pressure, are not part of the loading imposed during a hydrostatic test. Accordingly, hydrostatic pressure testing is primarily regarded as a means to enhance leakage detection during the examination of components under pressure, rather than as a measure to determine the structural integrity of the components.

RG&E requested approval for the implementation of the alternative rules of Section XI, ASME Code Case N-498-1, dated December 21, 1994, "Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, 2, for 10-year hydrostatic testing of Class 1, 2, and 3 systems." The licensee indicated they already use N-498, "Alternative Rules for 10-Year System Hydrostatic Testing for Class 1, and 2 Systems" since use of Code Case N-498 for Class 1 and 2 systems was previously approved by the NRC in Regulatory Guide 1.147, Rev. 11. The rules for Code Class 1 and 2 in N-498-1 are unchanged from N-498. The staff found N-498 acceptable because the alterative provided

adequate assurance and because compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, this evaluation applies to Class 3 systems.

Revision N-498-1 encompasses Class 3 components and specifies requirements for Class 3 that are identical to those for Class 2 components. In lieu of 10-year hydrostatic pressure testing at or near the end of the 10-year interval, Code Case N-498-1 requires a visual examination (VT-2) be performed in conjunction with a system leakage testing at nominal operating pressure and temperature.

Currently, licensees incur considerable time, radiation dose, and dollar resources carrying out hydrostatic test requirements. A significant amount of effort may be necessary (depending on system, plant configuration, code class, etc.) to temporarily remove or disable code safety and/or relief valves to meet test pressure requirements. The safety assurance provided by the enhanced leakage gained from a slight increase in system pressure during a hydrostatic test may by offset or negated by the following factors: having to gag or remove code safety and/or relief valves, placing the system (and thus the plant) in an off-normal state, erecting temporary supports in steam lines, possible extension of refueling outages, and resource requirements to set up testing with special equipment and gages.

Class 3 systems do not normally receive the amount and/or type of Non-Destructive Examinations that Class 1 and 2 systems receive. While Class 1 and 2 system failures are relatively uncommon, Class 3 leaks occur more frequently and the failure mode typically differs. Based on a review of Class 3 system failures requiring repair for the last 5 years in Licensee Event Reports and the Nuclear Plant Reliability Data System databases, the most common causes of failures are erosion-corrosion (EC), microbiologically induced corrosion (MIC), and general corrosion. Licensees generally have programs in place for prevention, detection, and evaluation of EC and MIC. Leakage from general corrosion is readily apparent to inspectors when performing a VT-2 examination during system pressure tests. The industry indicates that experience has demonstrated that leaks are not being discovered as a result of hydrostatic test pressures propagating a preexisting flaw through wall. They indicate that leaks in most cases are being found when the system is at normal operating pressure.

Giving consideration to the minimal amount of increased assurance provided by the increased pressure associated with a hydrostatic test versus the pressure for the system leakage test and the hardship associated with performing the ASME Code required hydrostatic test, the NRC staff finds that compliance with the Section XI hydrostatic testing requirements results in hardship and/or unusual difficulty for the licensees without a compensating increase in the level of quality and safety. Accordingly, the licensee's proposed alternative, use of Code Case N-498-1 for Code Class 1, 2, and 3, is authorized for Ginna Nuclear Power Plant, pursuant to 10 CFR 50.55a(a)(3)(ii). RG&E's alternative is authorized until such time as the code case is published

in a future revision of Regulatory Guide (RG) 1.147. At that time, if the licensee intends to continue to implement this code case, the licensee is to follow all provisions in Code Case N-498-1, with limitations issued in RG 1.147, if any.

3.0 CONCLUSION

The NRC staff evaluated the information provided by RG&E 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)(ii) as compliance with the specified hydrostatic testing requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

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Date: August 07, 1995