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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

OF THE THIRD 10-YEAR INTERVAL INSERVICE TESTING PROGRAM

REQUESTS FOR RELIEF

FOR

ROCHESTER GAS AND ELECTRIC CORPORATION

R. E. GINNA NUCLEAR POWER PLANT

DOCKET NUMBER 50-244

1.0 INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a, requires that inservice testing (IST) of certain American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the ASME Code and applicable addenda, except where relief has been requested and granted or proposed alternatives have been authorized by the Commission pursuant to 10 CFR 50.55a (f)(6)(i), (a)(3)(i), or (a)(3)(ii). In order to obtain authorization or relief, the licensee must demonstrate that: (1) conformance is impractical for its facility; (2) the proposed alternative provides an acceptable level of quality and safety; or (3) compliance would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety. Section 50.55a(f)(4)(iv) provides that inservice tests of pumps and valves may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in 10 CFR 50.55a(b), subject to the limitations and modifications listed, and subject to Commission approval. NRC guidance contained in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," provided alternatives to the ASME Code requirements determined to be acceptable to the NRC staff and authorized the use of the alternatives in Positions 1, 2, 6, 7, 9, and 10 provided the licensee follow the guidance delineated in the applicable position. When an alternative is proposed which is in accordance with GL 89-04 guidance and is documented in the IST program, no further evaluation is required; however, implementation of the alternative is subject to NRC inspection.

Section 50.55a authorizes the Commission to grant relief from ASME Code requirements or to approve proposed alternatives upon making the necessary findings. The NRC staff's findings with respect to granting or not granting the relief requested or authorizing the proposed alternative as part of the licensee's IST program are contained in this safety evaluation (SE).

Enclosure

2.0 BACKGROUND

Revision 2 of the R. E. Ginna Nuclear Power Plant IST Program for pumps and valves was submitted in Rochester Gas and Electric Corporation's (RG&E or the licensee) letter dated April 15, 1994. Revision 2 incorporates all of the actions taken to address IST program anomalies identified in NRC's SEs dated April 15, 1991, and October 20, 1992, with NRC review completed in the SE issued November 4, 1993. Additionally, Revision 2 included two new relief requests involving leakage testing of containment isolation valves added to the IST program, which are evaluated below. The IST program was developed to the 1986 Edition of Section XI, of the ASME Code.
The two new relief requests included in Revision 2 relate to leakage testing of containment isolation valves. Position 10 in GL 89-04 indicated that it is the NRC staff's position that all containment isolation valves that are included in the Appendix J, leak testing program should be included in the IST program as Category A or A/C valves and that the Appendix J test method requirements were equivalent to the requirements of IWV-3421 through IWV-3425; therefore, RG&E has added these valves to the IST program. The evaluations below relate to the IST aspects of the leakage testing of the applicable valves and not to the adequacy of the alternatives to meet the requirements of Appendix J. In fact, if the methods have been determined to be acceptable for Appendix J, the intent of GL 89-04, Position 10, is met. If RG&E determines that an exemption from meeting the requirements of Appendix J is needed, appropriate actions should be taken.

3.0 RELIEF REQUEST VR-31

The applicable containment spray system containment isolation valves are designated Category A and subject to leakage testing for IST. Two-inch valves 859A, B, and C, and 3/4" valves 864A and B are manually-operated, normally closed, isolation valves in the test line for the containment spray pumps. Valves 2829 and 2830 are 3/4" manually-operated, normally closed, isolation valves in abandoned test connection lines with welded caps, located off each spray header outside containment. RG&E has determined that certain code requirements are impractical for the subject valves and has provided its basis as described below. Relief from the requirements of IWV-3426 and IWV-3427 for analysis of leakage rates and corrective action (specifically assigning leakage rate acceptance criteria for individual valves) is requested based on limitations in the design of the piping system which necessitate analysis of the leakage rates of groups of valves.

3.1 RG&E's Basis for Relief

RG&E states:

> The containment spray pump test line and spray header have the necessary containment isolation valves and boundaries; however, the components for which relief is requested cannot be leak tested since there are no available test connections. However, the containment spray headers are normally filled with water to a level at least 45

feet above the elevation of the test lines and containment penetration in order to facilitate faster response of the system during an accident. RG&E [Rochester Gas and Electric] has performed an analysis of the filled spray header and concluded that the water would not boil off during a LOCA [loss-of-coolant accident]. Since the test and drain lines are constantly exposed to this head of water during power operations, any leakage would be observed either during normal operator walkdowns (i.e., indication of water on valve or floor), or during monthly tests of the containment spray pumps which require confirmation of the head of water. Consequently, a verifiable water barrier between the containment atmosphere and the valves will always be in place such that leak testing with air should not be required. Additionally, these valves, with the exception of 859C, are administratively maintained locked closed during power operations and all are opened for periodic testing. RG&E estimates that it would cost approximately $40,000 to install the necessary test connections for these lines. As such, RG&E proposes to fill the Containment Spray injection lines using the RWST [refueling water storage tank] each refueling outage to a minimum level of 66.9 feet (or 29 psig). This is the maximum height of water that can be used without creating the potential for flooding the containment charcoal filter units. Each test and drain line containment isolation valve or boundary would then be evaluated for any observed leakage either through visual inspection or the use of local pressure indications. RG&E believes that this test meets the underlying purpose of Appendix J without creating undue hardships on the licensee.

3.2 Alternative Testing

RG&E proposes:

Leak tightness of 2829 and 2830 shall be verified each refueling outage by visual examination for leakage. Leak tightness of 859A, 859B, 859C, 864A, and 864B shall be verified each refueling outage by observation of pressure drop of the filled containment spray header.

3.3 Evaluation

Pursuant to 10 CFR 50.55a(f)(4)(iv), the NRC may approve the use of portions of later editions of the ASME Code which have been incorporated by reference in 10 CFR 50.55a(b) provided all related requirements of the respective editions or addenda are met. Certain requirements may change in later editions that address previously impractical conditions. The 1989 Edition of the ASME Code, Section XI, was incorporated by reference effective September 1992 and references Part 10, "Inservice Testing of Valves in Light-Water Reactor Power Plants," of the ASME Code Operations and Maintenance Standards, for IST of valves. In incorporation of the 1989 Edition, the NRC issued a limitation on the use of Part 10 for containment isolation valves (CIVs),

specifically requiring that the provisions for leakage testing of valves other than CIVs be applied to CIVs (see 10 CFR 50.55a(b)(2)(vii)). Paragraph 4.2.2.3 of Part 10 includes provisions for leakage testing of valve combinations, as RG&E has proposed in this relief request. Previous editions of Section XI, required leakage testing of individual valves. Part 10 includes such provisions in recognition that, for certain configurations, the leakage rate of individual valves cannot be determined without design modifications, as is the case for the valves in this relief request. Therefore, for IST purposes, the provisions in Part 10 can be applied to the testing of the valve combinations. The provisions of OM-10 cover the issues discussed in RG&E's basis for relief: (1) a pressure decay test is given as an acceptable leakage test method, provided the test pressure is applied in the same direction as when the valve is performing its function (with certain exception listed) and is adjusted to the "function maximum pressure differential value," if necessary; (2) while visual observation is not specifically described in the test methods given, it is similar to measuring leakage through a downstream telltale test connection while pressure is applied on one side of the valve; (3) the owner is responsible for specifying the test medium; (4) the permissible leakage rate for the valve combination is to be specified by the owner or the formula given may be used; and (5) corrective actions are specified if the permissible rates are exceeded.

By Amendment 54 to the R. E. Ginna Nuclear Power Plant Facility Operating License, changes to the technical specifications (TSs), related to CIVs, including the acceptance criteria for leakage of containment isolation boundaries, were approved. TS 4.4.2.2 now states that "Containment isolation boundaries are inoperable from a leakage standpoint when the demonstrated leakage of a single boundary or cumulative total leakage of all boundaries is greater than 0.60 La." This allows the licensee to assign a permissible leakage rate to a combination of valves for containment penetrations.

3.4 Conclusion

The alternative is approved pursuant to the provisions of 10 CFR 50.55a (f)(4)(iv) provided the requirements in paragraph 4.2.2.3 of Part 10 are included in the implementation of the alternative as discussed above. The rules in OM-10 for leak testing valve combinations may not be consistent with the requirements in 10 CFR Part 50, Appendix J; therefore, RG&E should determine if the requirements of Appendix J are met, and if not, take appropriate actions. The approval pursuant to 10 CFR 50.55a(f)(4)(iv) does not constitute approval of an exemption to Appendix J.

4.0 RELIEF REQUEST VR-32

Valve 9229 is a 4-inch, Class 2, check valve in the fire service water system located inside containment. The valve performs a safety function to close to isolate containment at the associated penetration. It is designated as a Category A/C valve for IST purposes and is, therefore, required to be leak tested in accordance with IWV-3421. RG&E has made a determination that these

4.1 RG&E's Basis for Relief

RG&E states:

> Fire Service Water penetration 307 contains check valve 9229 which is located inside containment. 9229 is leak tested; however, it cannot be assured that all water has been drained from the valve seat prior to Appendix J testing. Its location with respect to the penetration and fire service water header inside containment and the lack of available drain lines prohibit the complete draining of residual water downstream of the check valve. RG&E estimates that it would cost approximately $20,000 to install the necessary drain line to ensure downstream line drainage prior to the Appendix J test. Since valve 9229 is outside the missile shield, it is highly unlikely that the fire service water pipe would break in a location such that all water would be completely drained from the area downstream of the check valve seat. Therefore, testing 9229 in its current configuration is representative of the conditions that the valve would most likely see during an accident (i.e., air pressurizing an entrapped water pocket). Upstream AOV [air-operated valve] 9227 meets all requirements for Ginna Station Technical Specification 3.6.3 if check valve 9229 were declared inoperable.

4.2 Alternative Testing

RG&E proposes:

> RG&E will continue to try and remove as much water as possible before testing 9229 to Appendix J. RG&E will continue to prompt closure test 9229 quarterly which demonstrates that the valve will close when required.

4.3 Evaluation

IWV-3424, "Seat Leakage Measurement," lists two methods of determining valve seat leakage, including: (1) draining the line, closing the valve, bringing one side to test pressure, and measuring leakage through a downstream telltale connection; and (2) measuring the feed rate required to maintain pressure between two valves or between two seats of a gate valve, provided the total apparent leak rate is charged to the valve or gate valve seat being tested, and that the conditions required by IWV-3423 are satisfied. IWV-3423 discusses the direction of the applied pressure and adjustments of the pressure difference to "function maximum pressure differential."

RG&E apparently applies air pressure against the seat of the check valve and monitors the feed rate required to maintain the pressure on the test rig during local leak-rate testing to meet Appendix J. When some amount of water is left in the line, the air injected to perform the test entraps some of the water. The adjustment, which is necessary if the test pressure is lower than the "function maximum pressure differential," may be different with water as

is left in the line, the air injected to perform the test entraps some of the water. The adjustment, which is necessary if the test pressure is lower than the "function maximum pressure differential," may be different with water as the test medium than with air as the test medium. An analysis of the factors that may vary with test medium is included as Appendix A, "Analysis of Liquid and Gas Flow for Valve Leak Testing," in EGG-NTAP-6175, "Inservice Leak Testing of Primary Pressure Isolation Valves."

The report indicates that when testing with air, the flow is assumed to be adiabatic, but actually is somewhere between adiabatic and isothermal as influenced by heat transfer between the flow boundaries and the air. When water is the test medium, the downstream pressure must be sufficiently above saturation pressure at the prevailing temperature to assure that flashing is suppressed because, if flashing does occur, a nonrepresentative leakage rate could result. When testing the subject valve, the temperatures and pressures may be much lower than would be experienced when leak testing pressure isolation valves, but the relief request does not indicate that any adjustments will be made. Therefore, while the relief may be granted because draining all of the water is impractical, the licensee needs to evaluate whether the water remaining in the pipe will have any impact on the measured leakage rate or if any adjustments need to be made to either the measured rate or the acceptance criteria.

4.4 Conclusion

Relief Request VR-32 is granted pursuant to 10 CFR 50.55a(f)(6)(i) based on the impracticality of the design of the piping configuration and the burden of modifying the design if the ASME Code requirements were imposed, provided RG&E performs an evaluation to determine if the measured leakage rate or the acceptance criteria must be adjusted because of the remaining water in the piping. The relief granted is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. The evaluation of this relief request, however, is not applicable to the testing requirements for local leak-rate testing of this valve pursuant to 10 CFR Part 50, Appendix J. If RG&E determines that an exemption to Appendix J is needed and has not been requested, actions should be taken as appropriate.

Principal Contributor: P. Campbell

Date: June 21, 1995

determine that an exemption to Appendix J is needed and has not been requested, actions should be taken as appropriate.

The enclosed SE provides the results of the review and TAC No. M89336 is considered complete.

Sincerely,

Original signed by:

Ledyard B. Marsh, Director
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-244

Enclosure: Safety Evaluation

cc w/encl: See next page

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