

ENCLOSURE I

EVALUATION OF A REQUEST TO USE AN ALTERNATIVE TO THE
HYDROSTATIC TEST REQUIREMENTS OF SECTION XI OF THE ASME CODE

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION, UNIT 1

DOCKET NO. 50-220

1. BACKGROUND INFORMATION

10 CFR 50.55a states, in part, that each operating license for a boiling or pressurized water-cooled nuclear power facility shall be subject to the conditions in paragraph (g), "Inservice Inspection Requirements," and each construction permit for a utilization facility shall be subject to the conditions stated in paragraphs 50.55a(a)(1) through 50.55a(e). Paragraph 50.55a(3) states in part that proposed alternatives to requirements may be used if the applicant demonstrates that (1) the proposed alternatives would provide an acceptable level of quality and safety, or (2) compliance with the specified requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

By letters dated January 18 and March 23, 1989, Niagara Mohawk Power Corporation (licensee) submitted to the NRC an application and additional information to use an alternative to the hydrostatic test requirements of Section XI of the ASME Code after replacing two reactor vessel drain valves at Nine Mile Point Nuclear Station, Unit 1. The staff reviewed the information submitted by the licensee in support of the request under 10 CFR 50.55a(g). This information is evaluated herein to determine if the necessary findings can be made to grant relief from the hydrostatic test requirements pursuant to 10 CFR 50.55a(g)(6)(i).

II. EVALUATION

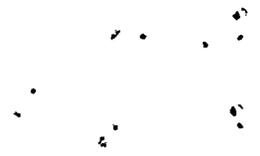
A. Relief Request

Relief is requested from performing a hydrostatic test of welds after replacement of reactor vessel drain valves 37-08R and 37-09R.

B. Requirements (1974 Edition through Summer 1975 Addenda of Section XI of ASME Code)

After repairs by welding on the pressure retaining boundary of components, a hydrostatic test shall be performed. The pressure-retaining components shall be visually examined while the system is under the hydrostatic test pressure and temperature. The test pressure and temperature shall be maintained for at least four hours prior to the performance of visual examinations.

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The system hydrostatic test shall be performed at a test pressure that, for the component located at the highest elevation in the system, is not less than 1.10 times the system nominal operating pressure (Po) which corresponds with 100% rated reactor power, and at a test temperature not less than 100°F. except as may be required to meet the test temperature requirements of IWA-5230. The test pressure may be reduced in accordance with the following table when system hydrostatic testing is required to be conducted at temperatures above 100°F.

Test Temperature	Test Pressure
100F	1.10 Po
200F	1.08 Po
300F	1.06 Po
400F	1.04 Po
500F	1.02 Po

C. Licensee's Basis for Requesting Relief

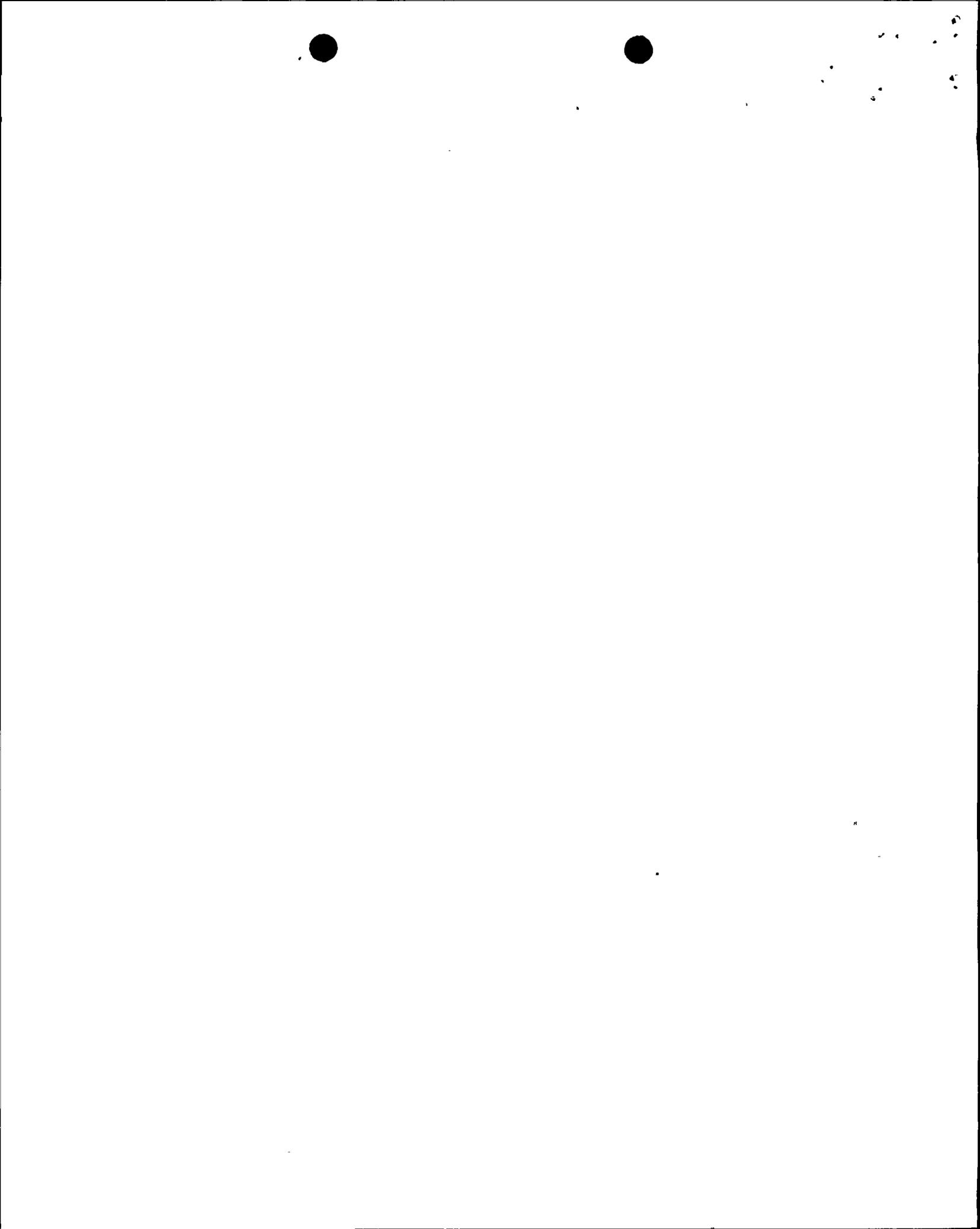
During the current refueling and maintenance outage, Niagara Mohawk replaced two reactor drain valves, 37-08R and 37-09R. The valves are two-inch nominal diameter 1500 pound stainless steel angle globe valves with socket weld connections. The valves are part of the reactor coolant system pressure boundary.

ASME XI Code, subsection IWA-5214, requires a hydrostatic test after repairs or replacements. The hydrostatic test must be performed in accordance with subsection IWB-5222 which requires a hydrostatic test at a pressure above the nominal operating pressure.

The replacement valves were designed and installed in accordance with the requirements of Section III, Subsection IWC of the ASME Code, 1983 Edition, Summer '83 addenda. The socket welds will be 100% surface examined.

The reactor drain valves are located in a section of pipe which has no mechanical connection for the installation of a Hydrostatic Test Pump. The entire reactor system would have to be pressurized to hydrostatically test these valves. The reactor vessel is designed for a limited number of hydrostatic tests during the plant lifetime. These tests are normally performed at the end of the ten year Inservice Inspection Interval or after major maintenance. The reactor coolant pressure boundary was hydrostatically tested during the 1986 refueling outage.

After welded repairs or replacements, a reactor system hydrostatic test is normally performed at a test pressure 1.08 times the nominal operating pressure (1035 psig). The Code specified minimum test temperature corresponding to this test pressure is 200°F (reference Table IWB-5222-1). The minimum temperature for pressurization required by Technical Specification 3.2.2.c is more restrictive (220°F), and therefore, is the governing requirement. The Technical Specification test temperature is based on stress



intensity factors according to Appendix G of ASME Section III. Changing the test temperature does not affect the validity of the pressure test provided the temperature is below saturation. Furthermore, the test temperature is an important parameter for fracture toughness considerations. The reactor is designed for a limited number of hydrostatic pressure tests over the 40-year life of the vessel. The performance of this test has a major impact on the outage schedule. Relief valves have to be gagged to prevent inadvertent operation. After the test, the gags have to be removed. Thus, for minor repairs or replacements, such as replacement of the drain valves, an alternative to the hydrostatic test, a system leakage test, is proposed.

The ASME Section XI system leakage test is performed at nominal operating pressure (1035 psig) and at the minimum temperature required by Technical Specification 3.2.2.c (200°F), reference paragraph IWB-5230(a). Performing this test at a higher pressure would be a burden similar to the hydrostatic pressure test. The relief valves would have to be gagged to prevent inadvertent operation. Consequently, there would be no advantage of an elevated pressure system leakage test over performing the ASME Section XI hydrostatic test. An ASME Section XI system leakage test is performed during startup after every refueling outage.

D. Licensee's Proposed Alternative

Niagara Mohawk proposes to perform a system leakage test of these valves at nominal operating pressure in accordance with IWA-5211(c). A system leakage test will be performed at a nominal pressure of 1035 psig and 200°F per paragraphs IWA-5211(c) and IWB-5221(a) of ASME Section XI. This system leakage test, in combination with the nondestructive examinations performed, provides sufficient confidence of the integrity of the piping.

Accordingly, the proposed alternative provides an acceptable level of quality and safety. A reactor coolant system hydrostatic test for a minor modification constitutes a hardship without a compensatory increase in the level of quality and safety.

E. Staff's Evaluation

The information and boundary diagrams transmitted to the NRC by letters dated January 18 and March 23, 1989, indicate that the replacement valves were designed and installed in accordance with the rules of Section III that are applicable to ASME Code Class 2 components although the Reactor Clean-up System Boundary Diagram F-42234-C shows that the valves, 37-08R and 37-09R, are contained within the Code Class 1 boundary. In addition, it appears from the boundary diagrams that the two valves can be isolated and subjected to the hydrostatic test pressure required by Section XI of the ASME Code by (1) closing valves 37-10, 37-11, 37-07, and 67-37, (2) opening valves 37-08R, 37-09R, 67-35, and 67-36, (3) removing the 1" screwed cap on the line containing valves 67-35 and 67-36 and utilizing this line for pressurizing the welds required to be hydrostatically pressure tested.



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The conclusions drawn by the staff after review of the information provided were discussed with the licensee on December 15, 1989. The licensee stated that the replacement valves were designed, fabricated, and installed in accordance with the rules of Section III applicable to Class 1 components and therefore, "Subsection IWC" in Attachment A to the letter dated January 18, 1989, should have been "Subsection NB". The licensee also stated that the reason the welds made during the valves replacement cannot be pressurized to the Code required test pressure (1.08 x 1035 or 1118 psig), as appears possible by the staff's review and conclusion, is that the piping downstream of the valves through which it is possible to use for pressurizing the line containing the replacement valves is designed to 62 psig and 310°F, far below the 1118 psig required by Section XI. The piping specification applicable to this line was reviewed by the staff on December 18, 1989. The staff's review of this specification verified the licensee's determination that meeting the Code requirements was impractical.

Based on the above, the staff agrees with the licensee's determination that it is impractical to comply with Section XI Code requirements for the hydrostatic test of the welds made during replacement of reactor vessel drain valves 37-08R and 37-09R. The system leakage test required by Section XI will be performed at a pressure within 100 psig of that required on three of the four welds made to install the valves. All welds made were examined by surface method with no indications reported. The staff has determined that the examinations performed and the system leakage test with the attendant visual examination of the welds will provide assurance that they are structurally sound. In addition, failure of either of the welds made will not pose a safety concern due to the fact that the valves can be isolated from reactor coolant system pressure boundary by closing valves 37-10 or 37-11.

III. CONCLUSION

Based on the review summarized herein the staff has determined that pursuant to 10 CFR 50.55a(g)(6)(i) granting relief, where the testing requirements are impractical, is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest considering the burden that could result if the requirement was imposed on the facility.

Dated:

PRINCIPAL CONTRIBUTOR:
George Johnson

