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New York Power Authority

November 4, 1994
JPN-94-056

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-137
Washington, DC 20555

Subject: James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
Request for Relief From ASME Code
Section XI Hydrostatic Test Requirements

Dear Sir:

This letter presents two requests for relief from ASME Code, Section XI, requirements to perform hydrostatic tests of Inservice Inspection (ISI) Class 2 and Class 3 systems. The revised inspection program would also apply to the non-ISI systems currently inspected in accordance with the ASME codes. The requests for relief are in accordance with the provisions of 10 CFR 50.55a(a)(3).

The requests for relief apply to the Code requirements for (1) the hydrostatic testing of weld repairs and welded pipe replacements, and (2) the 10-year inspection interval hydrostatic testing requirement for certain portions of the Reactor Core Isolation Cooling System. These requests, along with the bases and proposed alternative examinations, are described in detail in Attachments 1 and 2, respectively. As supported in the attachments, compliance with these code requirements is impractical, and will result in unnecessary personnel radiation exposure and unusual difficulties, without a compensating increase in the level of quality and safety. The alternative examinations proposed, including augmented NDE examinations, meet or exceed the intent of the hydrostatic testing in regards to the verification of system structural integrity and leak-tightness.

The requests for relief are consistent with ASME Section XI testing philosophy espoused in ASME approved Code Cases N-416-1 and N-498-1. The augmented surface and volumetric examinations, proposed in the alternative examinations, more effectively meet the intent of the ASME hydrostatic test requirement, and exceed the provisions of the ASME approved Code Cases. ASME code relief based on code case N-416-1 has received NRC approval at other plants.

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The need for relief from the hydrostatic test requirement for weld repairs and welded pipe replacements are sometimes unexpected as a result of system conditions requiring immediate repair, or repairs required prior to startup as identified during outage related inspections. As a consequence, immediate communication with the NRC for testing relief on a case-by-case basis is necessary to avoid exceeding limiting conditions for operation or startup delays. This places an unnecessary burden on Authority and NRC resources. Approval of the relief request will avoid this situation.

The relief is required prior to the start of the FitzPatrick refueling outage, which starts on November 23, 1994, in order to avoid the difficulties described in the attachments. If permanent approval cannot be granted prior to the start of the outage, the Authority requests that interim approval be granted for the upcoming refueling outage.

If you have any questions, please contact J. A. Gray, Jr.

Very truly yours,

William J. Cahill, Jr.
Executive Vice President and
Chief Nuclear Officer
Nuclear Generation

Attachments: as stated

cc: Regional Administrator
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ATTACHMENT 1 TO JPN-94-056

REQUEST FOR RELIEF

INSERVICE INSPECTION SYSTEM PRESSURE TEST PROGRAM

I. Components For Which Relief Is Requested.

The request for relief applies to the following systems:

Class 2 Systems

1. Residual Heat Removal
2. High Pressure Coolant Injection
3. Core Spray
4. Control Rod Drive
5. Reactor Core Isolation Cooling (Class 2 augmented portion)
6. Standby Liquid Control

Class 3 Systems

1. Reactor Core Isolation Cooling
2. Service Water Systems and Cooling Water Systems

The requested relief would also apply to the portions of non-ISI systems designated as Q1, Q2, and Q3. The Authority has adopted the ASME Section XI NDE requirements for non-ISI systems.

II. ASME Code Requirement From Which Relief Is Requested.

Relief is requested from the hydrostatic pressure test required by paragraph IWA-4000 of the ASME Boiler and Pressure Vessel Code, Section XI, 1980 Edition, Winter 1981 Addenda, for welded repairs or installation of replacement items by welding.

III. Proposed Alternative Examinations.

The following alternative examinations will be performed in lieu of the hydrostatic testing for which relief is requested.

1. A volumetric or surface examination will be performed for all ISI Class 2 and 3 components or pipe welds in accordance with the requirements and acceptance criteria of the applicable Subsection of the 1980 Edition through Winter 1981 Addenda of Section III and Section XI. In addition, when the surface examination method is used for a butt weld on ISI Class 2 and 3 systems, an additional surface examination will be performed on the root (pass) layer.

2. Prior to or immediately upon return to service, a visual examination (VT-2) will be performed in conjunction with a system inservice or functional test, using the 1980 Edition through Winter 1981 Addenda of Section XI, in accordance with IWA-5000, at nominal operating pressure and temperature. The test condition holding times applicable to the hydrostatic tests will be retained for the inservice tests. The holding time requirement will be as follows: 4 hour holding time required after attaining the test pressure and temperature conditions for insulated systems, and 10 minutes for non-insulated systems or components.

IV. Basis For Relief.

1. The hydrostatic test requirement results in unusual difficulties without a compensating increase in the level of quality and safety. The difficulties involve some or all of the following preparation, performance, and restoration activities associated with hydrostatic testing: (1) the erection and removal of scaffolding, (2) the removal and replacement of insulation, (3) the installation and removal of blank flanges, valve internals, and temporary supports, (4) the removal and restoration to service (along with retesting) of electrical components, and (5) the setup and removal of the testing equipment. These activities must be performed during a refueling outage, placing additional demands on manpower resources. These activities are avoided in the performance of inservice tests.

   An example of unusual difficulties that the hydrostatic test requirement imposes on the plant is the fire protection to Emergency Service Water (ESW) cross-tie modification planned for the December 1994 refueling outage. This modification involves installation of a cross-tie flexible hose which will connect the fire protection pumps to the ESW line, providing a backup cooling water source for the Emergency Diesel Generators (EDG). During the performance of the hydrostatic test required by the ASME code, the ESW Loop B, the 2B ESW Pump, and the B and D EDGs will be inoperable. One of the hydrostatic test boundary valves has known seat leakage, and another of the boundary valves is the pump discharge check valve which are typically subject to seat leakage. Leakage of these or other boundary valves may impair the capability to perform the hydrostatic test. Both valves are welded in place, therefore installation of blank flanges is not practical. This is an ISI Class 3 system which requires no NDE inspections. Performance of an augmented surface examination on the root and final weld layer, and a 4 hour inservice test, assures structural integrity.

   A past example of unusual difficulties associated with this testing requirement was the feedwater pump suction piping hydrostatic test during the 1994 maintenance outage. The test required five days involving at least six personnel each shift. Two boundary valves had to be repaired to permit a successful test. The first attempt at performing the test resulted in damage to the feedwater pump seal, requiring its replacement. Additional time and cost was required for the test preparations, the review and approval of test procedures, and the calibration of instrumentation and relief valves.

The request relief would avoid the need to perform a hydrostatic test associated with the following planned modifications:

(a) ESW / fire protection cross-tie installation.
(b) RHR Service Water piping replacement.
(c) Scram Discharge Volume level switch isolation valve replacement.
(d) Two Feedwater heater vent valve replacements. (Non-Q)
(e) Feedwater piping vent valve replacement (Non-Q)
(f) Feedwater pump casing relief valve replacement. (Non-Q)
(g) Feedwater pump discharge check valve replacement. (Non-Q)
(h) Containment Atmospheric Dilution check valve replacement.
(j) Control Rod Drive pump discharge piping valve replacement.

2. Some of the systems for which relief is requested are located in radiation areas, and the application of a hydrostatic test to these systems conflicts with the "as low as reasonably achievable" (ALARA) policy.

3. The purpose of the hydrostatic test is to test the structural integrity of a piping system. Stress analyses show that these systems are substantially overdesigned for hydrostatic loads. Therefore, the hydrostatic test is not an effective test of the structural integrity of the piping. The proposed augmented inspection program, using surface or volumetric examinations, is more effective in the determination of weld integrity.

4. Since the hydrostatic test is not an effective test of the structural integrity of the piping systems, as discussed above, its value is limited to a leakage test of the systems. However, system inservice tests, as proposed for the alternative examinations, fully demonstrate leak-tightness, and therefore, meets the intent of the piping code examination requirements. The inservice test is performed at operating pressure, and unlike a hydrostatic test, at operating temperature. By duplicating actual operating conditions, an inservice test is more likely to identify the existence of system leakage.

6. These systems are not designed to accommodate hydrostatic testing as evidence by the interferences which exist with other systems and the difficulty of installing temporary closures (blank flanges, etc.). The installation of temporary closures will create additional local stresses which may result in local yielding at elbows and flange connections. These temporary installations increase the possibility that other safety-related components will be damage or improperly reinstalled.

7. The request for relief is consistent with ASME Code Case N-416-1 (Rev. 1 of N-416), dated February 16, 1994. As of this date, the NRC has not endorsed N-416-1 by its incorporation into Regulatory Guide 1.147. The augmented NDE proposed in the alternative examinations exceed the inspection requirements of Code Case N-416-1.

V. Summary.

Compliance with the ASME Section XI Code hydrostatic test requirement for the repair or installation of welded replacement items is impractical, and will result in unnecessary personnel radiation exposure and unusual difficulties, without a compensating increase in the level of quality and safety. The alternative examinations proposed meet or exceed the intent of the hydrostatic testing in regards to the verification of system structural integrity and leak-tightness. Further, the alternative examinations proposed exceed the testing requirements recommended by ASME Code Case 416-1. Similar relief was approved for the Ginna Nuclear Power Plant (Reference 1) and Surry Nuclear Power Plant (Reference 2).

VI. References.

1. NRC letter, W. R. Butler to R. C. Mecredy, "Ginna Nuclear Power Station - Third 10-year Inservice Inspection Program Relief Requests 25 and 26 (TAC Nos. M88416 and M88417)," dated April 11, 1994.

2. NRC letter, M. C. Thadani to J. P. O'Hanlon, "Surry Power Station, Units 1 and 2, Requesting Approval of Code Case N-416-1 As An Alternative To The Required Hydrostatic Pressure Test (TAC Nos. M89884 and M89885)," dated October 14, 1994.

ATTACHMENT 2 TO JPN-94-056

REQUEST FOR RELIEF

INSERVICE INSPECTION SYSTEM PRESSURE TEST PROGRAM

I. Components For Which Relief Is Requested.

The requested relief applies to the portions of the Reactor Core Isolation Cooling System (RCIC) piping for which relief from the hydrostatic test requirements has not been previously granted by the NRC. The portions of the RCIC system for which relief is requested are ISI Class 3. The relief would apply to the RCIC steam supply piping, and RCIC suction and discharge piping. Relief was previously granted for the RCIC steam exhaust piping (Reference 1).

II. ASME Code Requirement From Which Relief Is Requested.

Relief is requested from the requirements specified in Table IWD-2500-1 and section IWD-5223 of the ASME Boiler and Pressure Vessel Code, Section XI, 1980 Edition through Winter 1981 Addenda. Table IWD-2500-1 requires a system hydrostatic test of the pressure retaining components of Class 3 systems, such as the RCIC system, once during each 10 year inspection interval. Section IWD-5223 identifies the hydrostatic pressure required for the test.

III. Proposed Alternative Examinations.

The following alternative examinations will be performed in lieu of the hydrostatic testing for which relief is requested.

1. A system inservice test will be performed in accordance with the provisions of ASME Code Case N-498-1. The system inservice test will conform with the ASME code approved for the current 10-year inspection interval (1980 Edition through Winter 1981 Addenda).

2. Additionally, the following augmented inspection program will be performed:

   (a) RCIC Steam Supply and Pump Discharge Piping:

   A 10% volumetric examination sample of welds will be performed. Expansion, for service related defects, will be in accordance with IWC-2430.

   (b) RCIC Pump Suction Piping:

   A 10% surface examination sample of welds will be performed. This is the suction piping from the Suppression Chamber. Expansion, for service related defects, will be in accordance with IWC-2430.

IV. Basis For Relief.

1. The hydrostatic test requirement results in unusual difficulties without a compensating increase in the level of quality and safety. The difficulties are associated with the installation of blank flanges to isolate the tested portion from connecting systems, the removal of check valve internals, and the erection of temporary supports to allow the use of water as the as the hydrostatic fluid for the RCIC steam piping. Additional activities included in this effort are the erection and removal of scaffolding, the removal and replacement of insulation, the removal and restoration to service (along with retesting) of electrical components, the setup and removal of the testing equipment, and the return of the system to its normal configuration. Three separate hydrostatic tests will be necessary to test all portions of the RCIC system. The entire activity involving preparation, testing, and restoration is expected to take ten days. These activities must be performed during a refueling outage, placing additional demands on manpower resources. These difficulties are avoided in the performance of inservice tests.

2. The application of a hydrostatic test to the RCIC system conflicts with the "as low as reasonably achievable" (ALARA) policy. The activities described above will result in additional personnel radiation exposure, estimated at 12 person-rem.

3. The purpose of the hydrostatic test is to test the structural integrity of a piping system. Stress analysis analyses on the RCIC system show that the system is substantially overdesigned for hydrostatic loads. RCIC system stresses during a hydrostatic test are 18% of allowable. Therefore, the hydrostatic test is not an effective test of the structural integrity of the piping. The proposed augmented inspection program, using volumetric or surface examinations, is more effective in the determination of weld integrity.

4. Since the hydrostatic test is not an effective test of the structural integrity of the piping system, as discussed above, its value is limited to a leakage test of the system. However, system inservice tests, as proposed for the alternative examinations, fully demonstrate leak-tightness, and therefore, meets the intent of the piping code examination requirements. The inservice test is performed at operating pressure, and unlike a hydrostatic test, at operating temperature. By duplicating actual operating conditions, an inservice test is more likely to identify the existence of system leakage.

5. Unlike the hydrostatic test, the inservice test includes the complete RCIC system boundary, including exempt components such as the RCIC turbine. A hydrostatic test would not be performed on the RCIC turbine section in consideration of the possibility of damage to the pump seals and the gland seal exhauster.

6. The RCIC system was not designed to accommodate hydrostatic testing as evidence by the interferences which exist with other systems and the difficulty of installing temporary closures (blank flanges, etc.). The installation of temporary closures will create additional local stresses which may result in local yielding at elbows and flange connections. These temporary installations increase the possibility that other safety-related components will be damage or improperly reinstalled.

7. ASME Code Case N-498, as approved by the NRC, permits the substitution of an inservice test for the hydrostatic test for ASME Class 1 and 2 systems. The requested relief would permit the same alternative for a Class 3 system (RCIC). The ASME approved Code Case N-498-1 (Rev. 1 of N-498) on May 11, 1994, which extended the provisions of Code Case 498 to Class 3 systems. As of this date, the NRC has not endorsed N-498-1 by its incorporation into Regulatory Guide 1.147. The alternative examinations proposed in this request for relief either conform with Code Case N-498-1, or augment the code case requirements with additional NDE examinations.

V. Summary.

Compliance with the ASME Section XI Code hydrostatic test requirement for the RCIC system is impractical, and will result in unnecessary personnel radiation exposure and unusual difficulties without a compensating increase in the level of quality and safety. The alternative examinations proposed meet or exceed the intent of the hydrostatic testing in regards to the verification of RCIC system structural integrity and leak-tightness. The request for relief exceeds the testing requirements recommended by ASME Code Case 498-1, and is consistent with similar relief approved by the NRC for Class 1 and 2 systems.

VI. Reference.

1. NRC letter, R. A. Capra to J. C. Brons, NYPA, "Relief From HPCI and RCIC ASME Code Section XI Hydrostatic Test Requirements (TAC 67828), dated November 10, 1988.