

#### 4.3 REACTOR COOLANT SYSTEM INTEGRITY TESTING

##### Applicability

Applies to test requirements for Reactor Coolant System integrity.

##### Objective

To specify tests for Reactor Coolant System integrity after the system is closed following refueling, repair, replacement or modification.

##### Specification

- a) The Reactor Coolant System shall be tested for leakage at normal operating pressure prior to plant startup following each refueling outage, in accordance with the requirements of ASME Section XI.
- b) Testing of repairs, replacements or modifications for the Reactor Coolant System shall meet the requirements of ASME Section XI.
- c) The Reactor Coolant System leak test temperature-pressure relationship shall be in accordance with the limits of Figure 4.3-1 for heatup for the first 11.00 EFPYs of operations. Figure 4.3-1 will be recalculated periodically. Allowable pressures during cooldown from the leak test temperature shall be in accordance with Figure 3.1-2.

##### Basis

Leak test of the Reactor Coolant System is required by the ASME Boiler and Pressure Vessel Code, Section XI, to ensure leak tightness of the system during operation. The test frequency and conditions are specified in the Code.

For repairs on components, the thorough non-destructive testing gives a very high degree of confidence in the integrity of the system, and will detect any significant defects in and near the new welds. In all cases, the leak test will assure leak tightness during normal operation.

The inservice leak test temperatures are shown on Figure 4.3-1. The temperatures are calculated in accordance with ASME Code Section III, Appendix G. This Code requires that a safety factor of 1.5 times the stress intensity factor caused by pressure be applied to the calculation.

Amendment No. 28, 101, 109, 121,

4.3-1

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ATTACHMENT II TO IPN-96-051  
SAFETY EVALUATION REGARDING  
PROPOSED TECHNICAL SPECIFICATION CHANGES  
FOR REACTOR COOLANT SYSTEM LEAKAGE TEST  
AT NORMAL OPERATING PRESSURE

NEW YORK POWER AUTHORITY  
INDIAN POINT 3 NUCLEAR POWER PLANT  
DOCKET NO. 50-286  
DPR-64

SAFETY EVALUATION OF TECHNICAL SPECIFICATION CHANGES ASSOCIATED WITH  
REACTOR COOLANT SYSTEM LEAK TEST AT NORMAL OPERATING PRESSURE

SECTION I- Description Of Change

This application for amendment to the Indian Point 3 Technical Specifications proposes to amend Section 4.3 and the Basis of Appendix A of the Operating License. The proposed amendment would permit the Reactor Coolant System (RCS) leak test to be performed at normal operating pressure following each refueling outage in lieu of a hydrostatic test at 2335 psig, according to the requirements of the ASME Boiler and Pressure Vessel Code Section XI, and implemented in accordance with 10 CFR 50.55a(g).

The proposed changes are:

Revise "Objective" to delete "normal opening, modification or repair" and read, "To specify ----- refueling, repair, replacement or modification."

Revise Section 4.3.a to read, " The Reactor Coolant System shall be tested for leakage at normal operating pressure prior to plant startup following each refueling outage, in accordance with the requirements of ASME Section XI."

Revise Section 4.3.b to read, " Testing of repairs, replacements or modifications for the Reactor Coolant System shall meet the requirements of ASME Section XI."

Basis Section: Revise the first paragraph to read, " Leak test of the Reactor Coolant System is required by the ASME Boiler and Pressure Vessel Code, Section XI, to ensure leak tightness of the system during operation. The test frequency and conditions are specified in the Code."

SECTION II- Evaluation of Changes

The proposed change permits the performance of the RCS leak test to be controlled by the ASME Boiler and Pressure Vessel Code, Section XI, and implemented in accordance with 10 CFR 50.55a(g). Accordingly, the proposed change would permit the use of a system leakage test at normal operating pressure, in lieu of a hydrostatic pressure test. Further, the change would limit the RCS leak test to each refueling outage, rather than any outage in which RCS boundary is opened for modification or repair. As per Section XI of the Code, if the RCS is opened and closed without any modification or repair performed, no leak testing will be required. Hydrostatic pressure test of the RCS, or its components, will be performed following repairs or modifications to the system boundary, if required by the ASME Code. The Code exempts certain repairs and modifications from the need to perform a hydrostatic test. Further, the Code permits a localized hydrostatic test of the RCS component in lieu of testing the entire RCS.

RCS components are designed for a number of loadings that are postulated to occur under various conditions of plant operation. Hydrostatic pressure testing subjects these components to a small increase in pressure over the normal operating pressure and, therefore, does not present a significant challenge to pressure boundary integrity. Hydrostatic pressure testing is primarily regarded as a means to enhance leakage detection during the examination of components under pressure, rather than solely as a measure to determine the structural integrity of the components. Industry experience has demonstrated that leaks are not discovered as a result of hydrostatic test pressure propagating a pre-existing flaw through wall. In most cases, leaks are discovered when the system is at normal operating pressure. The system leakage test at normal operating pressure, proposed in lieu of a hydrostatic test, will demonstrate leak-tightness of the RCS following each refueling outage.

The hydrostatic leak test of the RCS at 2335 psig currently required by the Technical Specifications, following each normal opening and closure, could pose a challenge to plant safety, and adds critical path time at the end of each outage, without a compensating increase in the level of safety or quality over the proposed system leakage test at normal operating pressure following each refueling outage. The hydrostatic test requires additional personnel entries into the containment to install test instrumentation. The Power Operated Relief Valves (PORVs) must be temporarily blocked closed or have their setpoints increased to accommodate the hydrostatic test, resulting in a potential challenge to plant safety. During the hold period prior to the visual examination, other activities must be delayed. The proposed system leakage test at normal operating pressure eliminates these unusual difficulties.

The ASME Boiler and Pressure Vessel Code, Section XI, does not require a hydrostatic test of the RCS when the system has been opened to accommodate refueling activities. The ASME Code (Table IWB-2500-1, and IWB-5220) requires a system leakage test at normal operating pressure during each refueling outage. The suitability of a system leakage test at normal operating pressure, as an alternative to a hydrostatic test, is recognized by the NRC in their approval of Code Case N-498 in Regulatory Guide 1.147, Rev. 11, October 1994. Code Case N-498 permits leak tests of Class 1 components at normal operating pressure in lieu of the 10-year hydrostatic test, and is therefore consistent with the proposed amendment.

The proposed change to Section 4.3.b expresses the fact that the requirements of ASME Section XI are not limited to new strength welds.

### Section III - No Significant Hazards Evaluation

Consistent with the criteria of 10 CFR 50.92, the enclosed application is judged to involve no significant hazards based on the following information:

- (1) Does the proposed license amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response:

The proposed license amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated. The change proposes a system leakage test for the RCS that is comparable to the hydrostatic test that it replaces, as acknowledged by the NRC approval of ASME Code Case N-498, "Alternative Rules for 10-Year Hydrostatic Pressure Testing for Class 1 and 2 Systems Section XI, Division 1," and the ASME Boiler and Pressure Vessel Code, Section XI. As discussed in Section 2, "Evaluation of Change," the proposed change to substitute a system leak test at normal operating pressure in lieu of the hydrostatic test at 2335 psig will minimize challenge to plant safety and demonstrate leak tightness of the RCS. Therefore, the proposed change would not involve a significant increase in the probability or consequences of an accident previously evaluated.

- (2) Does the proposed license amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response:

The proposed license amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated. The proposed changes do not involve the addition of any new or different type of equipment, nor do they involve the operation of equipment required for safe operation of the facility in a manner different from those addressed in the Final Safety Analysis Report. As stated in Section 2, based on industry experience, it is expected that any leaks would be discovered by the leak test at normal operating pressure.

- 3) Does the proposed amendment involve a significant reduction in a margin of safety?

Response:

The proposed license amendment does not involve a significant reduction in a margin of safety. The proposed changes do not adversely affect performance of any safety related system or component, instrument operation, or safety system setpoints and do not result in increased severity of any of the accidents considered in the safety analysis. Although the current basis states that if the system does not leak at 2335 psig (operating pressure +100 psig) it will be leak tight during normal operation, industry experience demonstrates that leaks are not discovered as a result of hydrostatic test pressure propagating a pre-existing flaw through wall. In most cases, leaks are discovered when the system is at normal operating pressure. Also, testing will continue to be performed as required by ASME Boiler and Pressure Vessel Code Section XI.

Section IV - Impact of Changes

These changes will not adversely affect the following:  
ALARA Program  
Security and Fire Protection Programs  
Emergency Plan  
FSAR or SER Conclusions  
Overall Plant Operations and the Environment

Section V - Conclusions

The incorporation of this change: a) will not significantly increase the probability nor the consequences of an accident or malfunction of equipment important to safety as previously evaluated in the Safety Analysis Report; b) will not create the possibility of a new or different kind of accident than any evaluated previously in the Safety Analysis Report; c) will not significantly reduce the margin of safety as defined in the bases for any technical specification; and d) involves no significant hazards considerations as defined in 10 CFR 50.92.

Section VI - References

- a) IP3 FSAR
- b) IP3 SER

Summary of Commitments

| Number        | Commitment  | Due Date   |
|---------------|---|--|
| IPN-96-051-01 | Revise RCS leak test procedures to require that the RCS will be leak tested at the appropriate pressure and temperature in accordance with the requirements of ASME Section XI and Tech Spec 4.3. | Within 60 days after approval of the TS Amendment. |