

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 INSPECTION

REQUEST FOR RELIEF

FOR

BOSTON EDISON COMPANY

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

1.0 INTRODUCTION

Inservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel (B&PV) Code (the Code) and applicable addenda as required by Title 10 of the <u>Code of Federal Regulations</u> (10 CFR) Part 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Title 10 of the <u>Code of Federal Regulation</u> (10 CFR) Part 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the Nuclear Regulatory Commission (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 difficulty 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 pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nucles" 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 lates, edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable edition of Section XI of the ASME Code for the Pilgrim Nuclear Power Station (PNPS) is the 10 general section XI of the ASME B & PV Code.

By letter dated August 20, 1998, Boston Edison Company, submitted to the NRC its proposed alternative to the Code requirements in Relief Request PRR-13, Revision 2, for the pressure testing of the containment penetration piping examination specified in Table IWC-2500-1 for

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PNPS during the third 10-year interval. The licensee has proposed the use of Code Case N-522, and its Appendix J Testing, in lieu of Table IWC-2500-1, pressure testing of containment penetration piping. The staff has reviewed and evaluated the licensee's proposed alternative and the supporting information, pursuant to 10 CFR 50.55a(a)(3)(i) for PNPS.

2.0 EVALUATION

The staff with technical assistance from its contractor, the Idaho National Engineering and Environmental Laboratory (INEEL), has evaluated the information provided by the licensee in support of its request for an alternative to the Code requirements during the third 10-year inservice inspection interval. While INEEL and the staff reached the same conclusion, the staff had a different basis for the denial. The staff's evaluation is provided below.

Request for Relief PRR-13 (Revision 2): This relief request involves the use of Code Case N-522, Pressure Testing of Containment Penetration Piping, Table IWC-2500-1, Examination Category C-H, All Pressure Retaining Components, Item Nos. C7.30 and C7.40

Table IWC-2500-1, Category C-H, requires pressure testing of piping penetrations in accordance with IWC-5221 system pressure test and IWC-5222 system hydrostatic test and accompanying VT-2 examination, and IWC-5222 hydrostatic test may be used in place of IWC-5221 system pressure test for item C7.30. In accordance with 10 CFR 50.55a(a)(3)(i), the licensee proposed to use Code Case N-522, Pressure Testing of Containment Penetration Piping, as an alternative to the Code-required examinations.

The proposed use of Code Case N-522 alone is not sufficient to meet the Code requirements. The Code case only provides for an alternative method for conducting the pressure test to be performed as part of the code examination. Therefore, use of the Code case, in part, only satisfies the pressure testing requirements, and the VT-2 visual examination and acceptance standards for Items C7.30 and C7.40 are still required. Conducting Appendix J testing does not by itself provide reasonable assurance that structural integrity will be maintained since an essential part of this inspection activity involves detection and location of the source of leakage. A containment leak rate test, on the other hand, would be acceptable when the leakage is below an acceptable limit, but would not establish that a length of pipe has not developed any leakage.

The licensee has provided no information on leak detection and location, type of Appendix J Testing (A or B) which will be used, or on associated examination frequencies for PNPS, if Code Case N-522 were to be implemented. In addition, the licensee has not specified how leakage in the piping between containment isolation valves (CIV's) will be identified when pressure testing with air, as water could adversely impact the service life of the CIV's. 3.0 CONCLUSION

On the basis of the preceeding evaluation, the NRC staff has determined that the licensee's proposed alternative in Relief Request PRR-13, Revision 2, provides insufficient information to determine the adequacy of the scope of implementation of the proposed alternative. Consequently, it does not provide reasonable assurance that structural integrity will be maintained. Therefore, request for relief PRR-13, Revision 2, is denied.

Principal Contributor: G. Hatchett

Date: June 29, 1999

TECHNICAL LETTER REPORT ON THIRD 10-YEAR INTERVAL INSERVICE INSPECTION REQUEST FOR RELIEF PRR-13 REVISION 2 FOR BOSTON EDISON COMPANY PILGRIM NUCLEAR POWER STATION DOCKET NO. 50-293

1. INTRODUCTION

By letter dated August 20, 1998, the licensee, Boston Edison Company, submitted Amendment 98-01 to the Pilgrim Inservice Inspection (ISI) Program. Amendment 98-01 included Request for Relief PRR-13, Revision 2, seeking relief from the requirements of the ASME Code, Section XI, for the Pilgrim Nuclear Power Station third 10-year inservice inspection (ISI) interval. The Idaho National Engineering and Environmental Laboratory (INEEL) staff's evaluation of the subject request for relief is in the following section.

2. EVALUATION

The information provided by Boston Edison Company in support of the request for relief from Code requirements has been evaluated and the basis for disposition is documented below. The Code of record for the Pilgrim Nuclear Power Station, third 10-year ISI interval, which began July 1, 1995, is the 1989 Edition of Section XI of the ASME Boiler and Pressure Vessel Code.

Request for Relief No. PRR-13, Revision 2, Use of Code Case N-522, Pressure Testing of Containment Penetration Piping

<u>Code Requirement</u>: ASME Section XI, Table IWC-2500-1, Examination Category C-H, requires pressure testing of all Class 2 pressure-retaining components in accordance with IWC-5221 and IWC-5222.

Licensee's Proposed Alternative: Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposed to use the alternative requirements contained in Code Case N-522, *Pressure Testing of Containment Penetration Piping*, for the following portions of piping.

PENETRATION

NUMBER	LINE NUMBER	DESCRIPTIONX-32A
1"-DC-45	Rx. Pressure Boundary Lea Gotection System Return Line to Drywel	eX-46D
1"-HCB-45	Drywell Level Line	X-219
4"-HCB-45	HPCI Turbine Exhaust Vacuum and Hydrogen Recumbiner Vent	X-228B
1"-DC-45	Torus Pressure	X-25
18"-HM-45	Vent from Drywell	X-26
18"-HM-9	Vent to Drywell	X-205
20"-HM-45	Torus Purge Inlet	X-227
20"-HM-45	Torus Purge Exhaust Vacuum Relief and Direct Torus Vent	X-29E
1"-DC-45	PASS Train 'A' Drywell Gas Sample Line	X-15E
1"-DC-45	PASS Train 'B' Drywell Gas Sample Line	X-106A-b
1"-DC-45	PASS Train 'A' Drywell Gas Sample Line	X-50A-d

1"-DC-45	PASS Train 'B' Drywell Gas Sample Line	X-46F
1"-DC-45	PASS Train A Drywell Return Line	X-22
3"-HCB-31	Instrument Air	X-228J
1"-DC-45	PASS Train 'A' Torus Gas Sample Line	X-228C
1"-DC-45	PASS Train 'B' Torus Gas Sample Line	Х-228К
1"-DC-45	PASS Train 'B' Torus Return Line	

The licensee stated:

"Boston Edison proposes the use of Code Case N-522 at Pilgrim Nuclear Power Station with the following modifications as an alternative to the Societion XI Category C-H pressure test requirements for piping and valves at containment penetrations where the balance of piping is outside the scope of Section XI:

ÿ "Boston Edison shall perform 10 CFR 50 Appendix J leakage tests on the containment penetration piping and valves listed in Table 1 at the peak calculated containment pressure (45 psig) in accordance with Pilgrim Station procedures as an alternative to the Section XI 40 month system pressure test Code Items C7.30 and C7.70 and VT-2 requirement."

> ^ÿ "Boston Edison shall also perform 10 CFR 50 Appendix J leakage tests on the containment penetration piping and valves listed in Table 1 at the peak calculated containment pressure (45 psig) in accordance with Pilgrim Station procedures. Test procedures will permit the detection and location of through-wall leakage by VT-2 certified examiners on accessible piping as an alternative to the Section XI ten year hydrostatic test, Code Items C7.40 and C7.80 requirement. Piping segments located in areas where direct VT-2 examination is considered impractical are listed in Table 2. These segments shall be tested using Appendix J test procedures but will not be VT-2 visually examined."

Licensee's Basis for Proposed Alternative (as stated):

"This request for relief is based on two issues: 1) Use of Code Case N-522 (with alternate provisions from Draft Regulatory Guide DG-1050) and 2) Inspection limitations based on impracticality or ALARA.

"1) Use of Code Case N-522 (with alternate provisions)

"Code Case N-522 (with alternate provisions from Draft Regulatory Guide DG-1050) allows the use of air instead of water as the test medium and use of the Appendix J peak calculated containment pressure (45 psig at Pilgrim NPS) in lieu of the test pressure required for the 10 year code hydrostatic test. The VT-2 examination requirement for the code 40 month system pressure test is also eliminated.

"Boston Edison believes that the use of Appendix J test methods in accordance with Code Case N-522 for Class 2 piping and valves at containment penetrations is an acceptable alternative to Section XI pressure testing since the piping and valves listed in Table 1 are categorized as Class 2 due to their containment pressure boundary function. The balance of the systems are outside the scope of Section XI. Appendix J test methods and criteria are the accepted means for the verification of leak-tight integrity of containment pressure boundary components and therefore provide an acceptable level of quality and safety. Use of code hydrostatic test methods with VT-2 examination is not a practical option for the subject piping and valves since the containment isolation valves (CIV) are designed for use in air systems. Pressure testing with water could adversely impact the service life of the CIV's.

"2) Inspection limitations based on impracticality or ALARA

¹¹ are located in areac where access is difficult causing direct VT-2 examination to be impractical. Boston Edison believes this constitutes a hardship with no compensating increase in the level of quality and safety. A significant staging and, in some cases, insulation removal effort would be required for the piping segments listed in Table 2 below to be bubble tested (or tested using equivalent methods) with VT-2 examiners (using Code Case N-522 during Appendix J testing) to detect the source of through-wall leakages. The original design did not anticipate direct visual examination. System pressures and temperatures for these piping segments and valves during normal plant operations are typically low (1.5 psig & 100 degrees F) with the most severe service conditions imposed by periodic Appendix J testing at the peak accident test pressure of 45 psig. There is no known degradation mechanism or normal operating condition that would adversely impact the structural integrity of this piping. Direct VT-2 examination would not significantly increase the level of quality and savety since the method can only detect through-wall defects. A flaw that has not propagated entirely through-wall could conceivably have a negative impact on structural integrity and still not be detected by a VT-2 exam. Therefore, a direct VT-2 examination at nominal operating pressures does not constitute a verification of piping structural integrity, but only of leak-tightness. Appendix J testing of this piping provides an adequate level of quality and safety since it is the accepted means to verify the leak-tight integrity of the primary containment system."

<u>Evaluation</u>: The Code requires a VT-2 visual examination during system pressure testing for all Class 2 pressure-retaining piping, including those segments that penetrate primary containment. As an alternative, the licensee proposed to implement the requirements of Code Case N-522, *Pressure Testing of Containment Penetration Piping*. Code Case N-522 specifies that 10 CFR 50, Appendix J testing may be used as an alternative to Section XI pressure tests for certain containment penetration piping.

Appendix J contains two options for examination requirements. Option A, Prescriptive Requirements, requires that three Type A tests be performed at approximately equal intervals during the 10 year ISI interval, with the third test being done while shutdown for the 10-year plant ISI. Option A also requires Type B and C tests during each refueling outage, but in no case at intervals greater than 2 years. This is more frequent than the periodic pressure tests required by ASME Section XI. Appendix J, Option B, Performance Based Requirements, allows a licensee to perform Type A, B, and C tests at frequencies related to the safety significance and historical performance of the system's isolation capabilities. This could, in effect, allow only one test to be performed during the 10-year ISI interval. The staff's position, as stated in Regulatory Guide 1.163, Performance-Based Containment Leak-Test Program, is that the licensee is to establish test intervals of no greater than 60 months for Type C tests because of uncertainties in historical Type C component performance de la (particularly unquantified leakage rates for test failures, repetitive/common mode failures, and aging effects). While this five-year limit results in an increased time between testing over that required by Section XI (forty months), it is believed that Appendix J tests are more appropriate and provide reasonable assurance of the continued operability of containment penetrations.

The licensee has provided no information on which option (A or B) will be used or on associated examination frequencies for Pilgrim Nuclear Power Station. Thus, it is unclear whether the licensee's proposed test frequencies will exceed the 60 month interval for a Type C test specified in Regulatory Guide 1.163. Therefore, it is recommended that the proposed alternative not be authorized.

3. CONCLUSION

The INEEL staff evaluated Request for Relief PRR-13, Rev. 2, and concluded that the licensee has not supplied an alternative examination providing an acceptable level of quality and safety. Therefore, it is recommended that Request for Relief PRR-13, Rev. 2, not be authorized.

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