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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION RELATED TO APPENDIX J, OPTION A, TYPE C TESTING REQUIREMENTS FOR SEVERAL CONTAINMENT PENETRATIONS NORTHEAST NUCLEAR ENERGY COMPANY MILLSTONE NUCLEAR POWER STATION, UNIT 1 DOCKET NO. 50-245

1.0 INTRODUCTION

By letter dated April 20, 1994, Northeast Nuclear Energy Company (NNECO or the licensee) submitted its position regarding the leakage rate testing of several containment penetrations relative to the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix J, at Millstone Nuclear Power Station, Unit No. 1. The licensee asserted that five particular containment penetrations (X-204A, X-204B, X-204C, X-210A, and X-210B) were outside the scope of Appendix J and therefore no Type C (local leakage rate) testing would be performed on the containment isolation valves (CIVs) associated with those penetrations. The licensee's justification for this position was, in part, that the lines terminate below the minimum water level in the suppression pool and, being water-sealed, do not constitute potential leakage pathways for containment atmosphere during a design basis accident.

The staff has reviewed the licensee's submittal and provides its evaluation of the licensee's position below.

2.0 BACKGROUND

Appendix J of 10 CFR Part 50 establishes the requirements for containment leakage rate tests for all operating licenses for water-cooled power reactors. Three tests are specified in Option A of the regulation: Type A (integrated leakage rate), Type B (penetration local leakage rate), and Type C (containment isolation valve (CIV) local leakage rate). A CIV is defined in Appendix J, Option A, as "any valve which is relied upon to perform a containment isolation function."

3.0 EVALUATION

The licensee has proposed that it will not perform 10 CFR Part 50, Appendix J, Option A, Type C leakage rate testing on 14 valves of the low pressure coolant injection (LPCI) and core spray (CS) systems, associated with five containment penetrations (X-204A, X-204B, X-204C, X-210A, and X-210B). The CIVs are CS-2A, CS-2B, CS-14A, CS-14B, LP-2A through 2D, LP-24A through 24D, LP-43A, and LP-43B.

Enclosure

In earlier staff safety evaluations (SEs), dated May 10, 1985, and June 5, 1991, the staff considered the leakage rate testing requirements for these same valves. The staff's review included the licensee's proposal to hydrostatically test the subject CIVs, rather than testing with air or nitrogen. The SE dated May 10, 1985, stated that the proposed hydraulic testing "will establish that the valves will remain water sealed for 30 days following an accident and, therefore, satisfies the requirements of Appendix J." A Technical Evaluation Report (TER), prepared by an NRC contractor and attached to the SE dated May 10, 1985, stated, in part:

> There are a number of liquid-filled systems...which are designed to remain intact after a LOCA. For these systems, the system isolation valves are not relied upon to prevent the leakage of containment air where there is assurance that [the] isolation valves will remain water covered throughout the post-accident period.... In this case, these valves are not containment isolation valves as defined by Section II.B of Appendix J and therefore do not require pneumatic testing. The assurance that the valves will remain water covered may be provided by conducting hydraulic testing with acceptance based upon predetermined liquid leakage limits....
>
> Subsequent pneumatic testing is not required because the valves will not be relied upon to prevent the escape of containment air during the post-accident period....

The SE and TER concluded that the valves need not be tested with air or nitrogen. The liquid leakage from the valves was not to be included in the combined leakage rate for all other containment penetrations and isolation valves, but instead compared to separate limits. However, the licensee now proposes to perform no leakage rate testing, neither pneumatic or hydraulic, under the requirements of Appendix J. The staff's review of this proposal follows.

The piping associated with the subject valves penetrates the suppression pool and terminates approximately 8 feet below the minimum water level of the suppression pool. The suppression pool water level is assured under post-accident conditions, whereby these valves will remain sealed with water for at least 30 days following the postulated accident. The suppression pool level is designed and operated so that the water level is maintained in accordance with Technical Specification 3.7.A.1 and is monitored at least once per shift in accordance with Technical Specification 4.7.A.1. The supply of water in the suppression pool is assured for at least 30 days during all design basis accident (DBA) post-accident modes of operation.

The affected valves may be opened post-accident to support the design function of their associated Emergency Core Cooling Systems. Therefore, containment leakage is limited by the suppression pool water seal and the integrity of the closed system outside containment. The licensee has stated that an operational leak test of the LPCI and CS systems is performed quarterly. A system walkdown, to verify zero leakage, is performed with the pump seals exposed to at least 200 pounds per square inch gauge (psig) pressure and the suction line valve packings exposed to approximately 5 psig. An additional verification of system leak tightness is performed during Type A tests where

the LPCI and CS suction piping is exposed to 43 psig plus the hydrostatic head of the water with an acceptance criterion of zero leakage.

For these reasons, the staff finds that the suppression pool will remain filled with water at a level above the penetrations for the systems discussed. Further, the staff finds that the CIVs associated with these systems do not constitute potential containment atmosphere leak paths following a postulated accident.

The affected penetrations will continue to be subjected to the periodic Type A testing (Containment Integrated Leakage Rate Testing) of 10 CFR Part 50, Appendix J, Option A. Paragraph III.A.1 of 10 CFR Part 50, Appendix J, Option A, lists the pretest requirements for conducting the Type A test. In particular, paragraph III.A.1.(d) describes certain systems that are required to be in a specified condition for the test (i.e., vented, drained, filled with water, operating) and further requires that the containment isolation valves in the systems defined in the paragraph shall be Type C tested. The staff finds that the isolation valves for the systems in the licensee's proposal do not constitute potential containment atmosphere leakage paths and, as such, are not within those defined in paragraph III.A.1.(d) as requiring Type C testing. For these same reasons, the staff finds that the valves under consideration are not within the paragraph II.H. description of containment isolation valves meant to be included in the Type C leakage rate testing.

These findings are consistent with the Nuclear Energy Institute (NEI) guidelines for implementing Option B of 10 CFR Part 50, Appendix J. NEI 94-01, Rev. 0, which is approved by Regulatory Guide 1.163, dated September 1995, as acceptable for complying with Option B of Appendix J, states on page 4 that a Type C leakage rate test is not required for, among other things, "Primary containment boundaries that do not constitute potential primary containment atmospheric pathways during and following a Design Basis Accident (DBA)." The findings are also consistent with the American National Standards Institute/ American Nuclear Society (ANSI/ANS) 56.8-1994, Section 3.3.1, which states, in part, that "Primary containment boundaries not requiring Type B or Type C testing include: (1) Boundaries that do not constitute potential primary containment atmosphere pathways during and following a DBA."

4.0 CONCLUSION

Based on the above evaluation, the staff concludes that the licensee's proposal, to not perform Type C leakage rate testing on the 14 subject CIVs, is acceptable, and that this meets the applicable requirements of 10 CFR Part 50, Appendix J, Option A.

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