October 5, 2001

Mr. J. A. Price
Vice President - Nuclear Technical Services - Millstone
Dominion Nuclear Connecticut, Inc.
c/o Mr. David A. Smith
Rope Ferry Road
Waterford, CT 06385

SUBJECT: MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3 - COMPLETION OF LICENSING ACTIVITY FOR GENERIC LETTER (GL) 96-06, "ASSURANCE OF EQUIPMENT OPERABILITY AND CONTAINMENT INTEGRITY DURING DESIGN-BASIS ACCIDENTS" (TAC NO. M96834)

Dear Mr. Price:

The U.S. Nuclear Regulatory Commission (NRC) staff issued GL 96-06 on September 30, 1996, to all holders of operating licenses for nuclear power reactors, except for those licenses that have been amended to possession-only status. GL 96-06 requested information from licensees related to two concerns: (1) water hammer and two-phase flow in the cooling water systems that serve the containment air coolers, and (2) thermally induced overpressurization of isolated water-filled piping sections in containment. On November 13, 1997, the staff issued Supplement 1 to GL 96-06, informing licensees about ongoing efforts and new developments associated with GL 96-06 and providing additional guidance for completing corrective actions. You responded in letters dated January 28, 1997; May 11, July 30, and August 31, 1998; January 5, 1999; December 11, 2000, and July 11, 2001. The results of the NRC's review of your responses to GL 96-06 follow.

Water Hammer and Two-Phase Flow

You provided an assessment for the water hammer and two-phase flow issues for Millstone Nuclear Power Station, Unit No. 3 (Millstone Unit 3) in a letter dated January 28, 1997, and additional information was submitted in letters dated August 31, 1998, and January 5, 1999.

Your letters indicated that the static pressure in the Reactor Plant Component Cooling Water System (RPCCW) is sufficient to prevent boiling during the design-basis loss-of-coolant accident (LOCA) and main steamline break (MSLB) scenarios. Annunciation is available in the control room to alert operators to low RPCCW surge tank level, and redundant safety-related isolation valves automatically isolate the containment air recirculation (CAR) coolers in the event of a low RPCCW surge tank level. This design feature also prevents the containment isolation valves from being opened until surge tank level is restored.

Based on the above understanding, the NRC staff is satisfied with your response and considers the water hammer and two-phase flow issues of GL 96-06 to be closed.

Thermally Induced Overpressurization

You provided an assessment for the issue of thermally induced overpressurization of piping runs penetrating the containment for Millstone Unit 3 in a letter dated January 28, 1997. Additional information was submitted in letters dated May 11, 1998, December 11, 2000, and July 11, 2001. In your letter dated January 28, 1997, you committed to submit a written report prior to unit startup that would determine if any piping sections are vulnerable to a water solid volume that would be subjected to an increase in pressure due to heating of the trapped fluid. In your letter dated May 11, 1998, you determined that all systems penetrating containment were not susceptible to thermally induced pressurization, with the exception of two general cases. The first case is when piping inside the containment could pressurize and damage inboard containment isolation valves (CIVs). The second case is when various vent and drain branch lines could be thermally pressurized where the lines are isolated by two manual valves or a single valve and an end plug. In all cases, you determined that the piping sections were operable. In your letter dated December 11, 2000, you provided the results of the detailed evaluations performed for the above two cases where pressurization could occur, as described below.

For the first case, you determined the specific locations which were susceptible to pressurization. In all but three locations, you determined that damage to the CIVs would be prevented by globe or plug valves which lift when trapped fluid expands under the valve seats. For one of three locations (penetration 24), you found that the normal system operating temperature is greater than the design-basis accident temperature environment; therefore, pressurization will not occur. For another location (penetration 62), you implemented a procedural change to ensure the isolated piping is not water solid. For the third location (penetration 56), you found that the thermally induced pressure which could occur in the fire protection lines would exceed the CIV pressure limit prior to creating a relief path when sprinkler heads open at 175 °F. However, you determined that the lines were not water solid and that sufficient leakage existed past the CIV to relieve overpressure based on local leak rate testing data.

For the second case, you identified 10 vent and drain branch lines located within the containment isolation boundary which may be subject to thermally induced pressurization. You found all of these lines to be acceptable by meeting the limits of Appendix F of Section III of the American Society of Mechanical Engineers (ASME) Code.

The NRC staff finds that your evaluation and corrective actions for the penetrations in the above two cases are acceptable for addressing the issue of thermally induced pressurization; however, the staff recommends that you consider a followup activity regarding penetration 56. For this penetration, your evaluation is based on observations of the water volume present in the lines and the measured CIV seat leakage. Therefore, following any repairs, replacements, maintenance, or adjustments which may be made to the currently leaking valve, you should verify that sufficient valve leakage exists or verify that the piping is not filled with water. Other methods, which relieve or prevent the thermally induced pressurization condition and do not depend on these observations or measurements, may also be appropriate. To address this, you wrote a Condition Report (CR-01-05586) to document the staff's findings, as described in your July 11, 2001, letter.

The staff concludes that your evaluation and corrective actions provide an acceptable resolution for the issue of thermally induced pressurization of piping runs penetrating the containment.

Summary

The NRC staff has reviewed your responses to GL 96-06 and finds that all of the requested information has been provided; and, that the responses are an acceptable resolution for the issues of water hammer and two-phase flow, and thermally induced overpressurization of piping runs penetrating the containment. The staff also recommends that you consider the noted recommendation for penetration 56. Therefore, the NRC considers GL 96-06 to be closed for Millstone Unit 3.

Sincerely,

/RA/

Victor Nerses, Sr. Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-423

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Unit 3

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The staff concludes that your evaluation and corrective actions provide an acceptable resolution for the issue of thermally induced pressurization of piping runs penetrating the containment.

Summary

The NRC staff has reviewed your responses to GL 96-06 and finds that all of the requested information has been provided; and, that the responses are an acceptable resolution for the issues of water hammer and two-phase flow, and thermally induced overpressurization of piping runs penetrating the containment. The staff also recommends that you consider the noted recommendation for penetration 56. Therefore, the NRC considers GL 96-06 to be closed for Millstone Unit 3.

Sincerely,

/RA/

Victor Nerses, Sr. Project Manager, Section 2
Project Directorate I
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