

October 22, 2003

Mr. David A. Christian
Sr. Vice President and Chief Nuclear Officer
Dominion Nuclear Connecticut, Inc.
Innsbrook Technical Center
5000 Dominion Boulevard
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SUBJECT: SAFETY EVALUATION OF RELIEF REQUEST RR-89-42, VISUAL
EXAMINATION OF PRESSURE-RETAINING SURFACES OF THE REACTOR
VESSEL BOTTOM HEAD AREA, MILLSTONE POWER STATION, UNIT NO. 2
(TAC NO. MC0282)

Dear Mr. Christian:

By letter dated August 11, 2003, Dominion Nuclear Connecticut, Inc. submitted Relief Request RR-89-42 for Millstone Power Station, Unit No. 2. Your submittal requested approval to perform the visual examination of the pressure-retaining surfaces of the reactor vessel bottom head area at different plant conditions than those required by the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code).

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of the subject relief request. The staff's Safety Evaluation (SE) is enclosed. Our SE concludes that: (1) the proposed alternative to the ASME Code requirements described in Relief Request RR-89-42 will provide reasonable assurance of detecting leakage of the reactor vessel bottom head area; and (2) complying with the ASME Code requirements would result in hardship without a compensatory increase in the level of quality and safety. Therefore, the proposed alternative is authorized pursuant to Section 50.55a(a)(3)(ii) of Title 10 of the *Code of Federal Regulations* for the remainder of the third ten-year inservice inspection interval.

The NRC staff considers that the non-timely submittal of your request (August 11, 2003, with a licensee need date of October 31, 2003) created an unacceptable short staff review time and did not contribute toward the NRC's goal of efficient and effective use of staff resources. I have discussed this issue with Mr. David Dodson of your staff.

Sincerely,

/RA/

James W. Clifford, Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-336

Enclosure: Safety Evaluation

cc w/encl: See next page

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Millstone Power Station, Unit No. 2

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Millstone Power Station, Unit No. 2

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUEST RR-89-42

VISUAL EXAMINATION OF PRESSURE-RETAINING SURFACES OF THE

REACTOR VESSEL BOTTOM HEAD AREA

MILLSTONE POWER STATION, UNIT NO. 2

DOMINION NUCLEAR CONNECTICUT, INC.

DOCKET NO. 50-336

1.0 INTRODUCTION

By letter dated August 11, 2003, Dominion Nuclear Connecticut, Inc. (DNC or the licensee) submitted Relief Request RR-89-42 for Millstone Power Station, Unit No. 2 (MP2). Pursuant to the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(ii), DNC requested approval to perform the visual examination of the pressure-retaining surfaces of the reactor vessel bottom head area at different plant conditions than those required by Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code). The proposed alternative was requested for the remainder of the third 10-year inservice inspection (ISI) interval for MP2, which began on April 1, 1999, and ends on March 31, 2009.

2.0 REGULATORY REQUIREMENTS

The ISI of ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code and applicable edition and addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the U.S. Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i). Pursuant to 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the licensee demonstrates that: (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 preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear 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 latest 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 code of record for the third 10-year ISI interval at MP2 is the ASME Code, Section XI, 1989 Edition, no Addenda.

3.0 RELIEF REQUEST RR-89-42

Sections 3.1 through 3.4 of this Safety Evaluation provide information regarding the licensee's relief request RR-89-42.

3.1 Code Requirements

The 1989 Edition of ASME Code Section XI, Table IWB-2500-1, Examination Category B-P, Item Nos. B15.10 and B15.11, require a VT-2 visual examination of the bottom of the reactor vessel during the system leakage test of IWB-5221 and during the system hydrostatic test of IWB-5222, respectively.

Code Case N-498-1 has been approved for use at MP2. This Code Case allows the normal operating pressure and temperature requirements of IWB-5221 to be used during the system hydrostatic test as an alternative to the elevated hydrostatic pressure requirements of IWB-5222.

3.2 ASME Code Components Affected

Component: Pressure-Retaining Surfaces of the Reactor Vessel Bottom Head Area

Code Class: 1

3.3 Licensee's Relief Request and Reason For Request

Pursuant to the provisions of 10 CFR 50.55a(a)(3)(ii), DNC requested approval to perform the VT-2 visual examination of the pressure-retaining surfaces of the reactor vessel bottom head area at different plant conditions than those required by Section XI of the ASME Code. The ASME Code requires examination of these areas during the system leakage and hydrostatic test at normal operating pressure and temperature (NOP/NOT). The licensee's submittal states that due to the harsh conditions in these areas at NOP/NOT, and the ability to achieve the objectives of the required examination at different conditions during refueling outages when temperatures are less harsh, the ASME Code requirement represents an undue hardship without a commensurate safety benefit.

The licensee's submittal provided the following discussion regarding the area under the vessel:

This area is classified as a confined space with limited air circulation and limited access. With the Reactor Coolant System (RCS) at NOP/NOT conditions, ambient temperatures in this area are very high due to the uninsulated condition of the vessel. The high temperature levels in this area create a significant safety hazard to personnel entering this space. Additionally, the position of the vessel in the cubicle is relatively low with about a 2-foot distance between the floor and bottom of the vessel. Consequently, the floor elevation poses an additional hazard for personnel in the area to inadvertently contact the uninsulated vessel surface with a potential for a severe burn.

In Mode 3, Cold Shutdown or refueling Modes during a refueling outage, the radiation dose rate in the area is estimated to be at approximately 2 to 4 R/Hr [rads per hour] and consideration to As-Low-As-Reasonably-Achievable (ALARA) Program goals will be applied for the performance of this examination. However, radiation exposure is not included as a reason for the request because no significant reductions in exposures to radiation are expected from this proposal.

3.4 Licensee's Proposed Alternative and Basis For Alternative

The licensee's submittal provided the following discussion regarding the proposed alternative and basis for its use:

DNC proposes to conduct the VT-2 examination of the pressure retaining surfaces of the reactor vessel bottom head following plant cooldown during each refuel outage. With the substantially lower RCS temperatures, the under vessel area will also be at a lower temperature and therefore less hazardous to personnel.

The objective of the required VT-2 visual examination at normal operating pressure and temperature is to detect evidence of leakage and thereby verify the integrity of the RCS pressure boundary. DNC believes that this objective can be achieved by the same VT-2 visual examination performed following the RCS cooldown to support the refueling outage. There is no insulation on the reactor vessel in this area and evidence of leakage and boric acid corrosion occurring during the fuel cycle would be detected by visual examination of this area at the end of the cycle during the outage. This ability to detect evidence of leakage and boric acid corrosion in this area during the refueling outage provides reasonable assurance of leak tight integrity of the reactor vessel bottom head area without exposing personnel to the environmental hazards associated with entry into this area during Mode 3 at normal operating pressure and temperature.

Note that there are no bottom mounted instrumentation nozzles on the reactor vessel at Millstone Unit No. 2. Consequently, degradation in the vessel wall with the potential to challenge the pressure boundary integrity is not expected in the absence of penetrations.

4.0 STAFF EVALUATION

The ASME Code requires that VT-2 visual examinations of the bottom of the reactor vessel be conducted during each hydrostatic and system leakage test of the RCS. Since Code Case N-498-1 has been approved for use at MP2, NOP/NOT can be used for the system hydrostatic test. During the hydrostatic and system leakage tests which are conducted at NOP/NOT, the inspector would be exposed to very high temperatures because the vessel is uninsulated, and there is limited air circulation. The space is confined and there is a potential for the inspector to incur severe burns due to inadvertent contact with the uninsulated vessel. Thus, imposition of the examination requirements would cause a hardship on the licensee.

The licensee proposed, as an alternative, to perform a VT-2 visual examination for evidence of leakage and boric acid corrosion following plant cooldown during each refuel outage. The staff finds that since the vessel bottom head is uninsulated, any evidence of leakage and boric acid corrosion that occurred during the previous fuel cycle can be readily detected by visual

examination of this area during the refueling outage. Therefore, the proposed alternative provides reasonable assurance of detecting leakage of the reactor vessel bottom head area. In addition, the RCS temperatures will be substantially lower following plant cooldown during the refueling outage, which will result in lower temperatures under the vessel, thereby, making the area less hazardous to personnel.

The staff has, therefore, determined that the ASME Code-required examinations of the reactor vessel bottom head area during system leakage and hydrostatic tests at NOP/NOT would result in hardship without a compensating increase in the level of quality and safety.

5.0 CONCLUSION

The NRC staff has completed its review of the subject relief request. The staff concludes that: (1) the proposed alternative to the ASME Code requirements described in Relief Request RR-89-42 will provide reasonable assurance of detecting leakage of the reactor vessel bottom head area; and (2) complying with the ASME Code requirements would result in hardship without a compensatory increase in the level of quality and safety. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for the remainder of the third ten-year inservice inspection interval.

All other requirements of the ASME Code, Sections III and XI for which relief has not been specifically requested and approved remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: G. Cheruvenki

Date: October 22, 2003