January 10, 2005

Mr. David A. Christian
Sr. Vice President and Chief Nuclear Officer
Dominion Nuclear Connecticut, Inc.
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: MILLSTONE POWER STATION, UNIT NO. 2 - ISSUANCE OF RELIEF REQUEST RE: USE OF AMERICAN SOCIETY OF MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE CASE N-4-12 (TAC NO. MC4906)

Dear Mr. Christian:

By letter dated October 22, 2004, Dominion Nuclear Connecticut, Inc. (the licensee) submitted a request for relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section III requirements. The licensee requested the Nuclear Regulatory Commission (NRC) approve the use of material as specified in the ASME Code Case N-4-12 as an alternative in the fabrication of control elements drive mechanism (CEDM) motor assembly pressure housings at Millstone Power Station, Unit No. 2 (MP2). The request was made pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i).

Article IWA-4221(b), Construction Code and Owners Requirements, of ASME Code Section XI 1998 Edition specifies that repair and replacement activities shall meet the Construction Code to which the original item was constructed. The original CEDM housings met Section III, 1968 Edition through the Summer 1970 Addenda with ASME Code Case 1337-3 used for the modified Type 403 stainless steel CEDM housing material. The replacement CEDM housings will meet Section III, 1998 Edition, 2000 Addenda (the latest edition the licensee is currently approved to use). The material requirements for the modified Type 403 stainless steel as specified in the ASME Code Case N-4-12 will be used as the proposed alternative.

Based on the information provided in the licensee's submittal, the NRC staff concludes that the licensee has provided an acceptable alternative to the requirements of ASME Code, Section III for the replacement CEDM motor assembly pressure housings at MP2. The provisions of ASME Code Case N-4-12 provide an acceptable alternative to the material requirements specified in ASME Code Section III. Therefore, based on the enclosed Safety Evaluation, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for MP2. All other ASME Code, Section III or XI requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

It should be noted that the use of ASME Code Case N-4-12 is authorized until such time as it is published in a future version of Regulatory Guide (RG) 1.84. At that time, if the licensee intends to continue implementing this ASME Code Case, it must follow all provisions of ASME Code Case N-4-12 with limitations or conditions specified in RG 1.84, if any.

If you need clarification of this approval, please contact the project manager, Mr. Victor Nerses, at (301) 415-1484.

Sincerely,

/RA/

Darrell J. Roberts, Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-336

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST TO USE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

BOILER AND PRESSURE VESSEL CODE CASE N-4-12

MILLSTONE POWER STATION, UNIT NO. 2

DOMINION NUCLEAR CONNECTICUT, INC.

DOCKET NO. 50-336

1.0 INTRODUCTION

By letter dated October 22, 2004, Dominion Nuclear Connecticut, Inc. (the licensee) submitted a request for relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section III requirements. The licensee requested the Nuclear Regulatory Commission (NRC or the Commission) approve the use of material as specified in the ASME Code Case N-4-12 as an alternative in the fabrication of control elements drive mechanism (CEDM) motor assembly pressure housings at Millstone Power Station, Unit No. 2 (MP2). The request was made pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i). The proposed material is included in ASME Code Case N-4-12 which has been published but is not yet included in the NRC Regulatory Guide (RG) 1.84, "Design, Fabrication, and Materials Code Case Acceptability, ASME Section III."

2.0 REGULATORY EVALUATION

Section 50.55a(g) of 10 CFR specifies that inservice inspection (ISI) of nuclear power plant components shall be performed in accordance with the requirements of the ASME Code, Section XI, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Section 50.55a(a)(3) of 10 CFR states that alternatives to the requirements of paragraph (g) may be used, when authorized by the Director of the Office of Nuclear Reactor Regulation, 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.

ASME Code Section XI specifies that repair and replacement activities must meet the construction code to which the original item was constructed. The original CEDM housings were constructed to Section III, 1968 Edition through the Summer 1970 Addenda with ASME Code Case 1337-3 used for the modified Type 403 stainless steel CEDM housing material.

The replacement CEDM housings will meet Section III, 1998 Edition, 2000 Addenda, and ASME Code Case N-4-12 is being used for the modified Type 403 stainless steel CEDM housing material.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Evaluation

3.1.1 Applicable Code Edition and Addenda:

MP2 is currently in the third 10-year ISI, which started on April 1, 1999. The 1989 Edition of Section XI with no Addenda applies to the ISI program and the 1998 Edition of Section XI with no Addenda is used as the primary ASME Code Edition for Section XI repair/replacement program activities. Article IWA-4221(b), "Construction Code and Owners Requirements," of ASME Code Section XI 1989 Edition specifies that repair and replacement activities shall meet the construction code to which the original item was constructed.

The original CEDM housings were constructed in accordance with Section III, 1968 Edition through the Summer 1970 Addenda with ASME Code Case 1337-3 used for the modified Type 403 stainless steel CEDM housing material. Subject to NRC approval of this relief request, the replacement CEDM housings will meet Section III, 1998 Edition, 2000 Addenda, with the proposed alternative minimum material requirements contained in ASME Code Case N-4-12.

3.1.2 Reason for Request:

Because of the reduced need for CEDM material after early reactor pressure vessel head (RPVH) fabrication in the 1960s and 1970s, the CEDM material requirements, which were used for the housing at MP2, were never incorporated into ASME Code Section III. Consequently, there are no applicable material requirements for the replacement CEDM motor assembly pressure housings at MP2 in ASME Code Section III. The licensee is submitting this request to allow the use of ASME Code Case N-4-12, which will provide alternative minimum material requirements that are needed to N-stamp the housings in January 2005, which supports the RPVH replacement project scheduled for the upcoming spring 2005 outage.

3.1.3 Proposed Alternative and Basis for Use:

The material for the original CEDM housings was fabricated using ASME Code Case 1337-3 with a process that involved piercing a forging into a tubular housing shaped product form and then machining the CEDM housing into its final form. That process resulted in certain material properties that cannot be achieved today based on a limited number of suppliers that use this process. As an alternative, suppliers have been found who will fabricate a solid tubular forging and machine the entire CEDM housing from that forging without the piercing operation. Other suppliers using this non-piercing process have provided original CEDMs to the following plants and these CEDMs have been in operation for many years with acceptable service:

- Arkansas Nuclear One – Unit 2
- Palo Verde 2
- Saint Lucie 1
- Saint Lucie 2
- Waterford 3

The material requirements that were used for the CEDM housings at these plants were contained in the ASME Code Cases (1334-2, 1334-3) that later became ASME Code Case N-2. ASME Code Case N-2 was annulled by the ASME in Supplement 4 of the 1980 Edition of Nuclear Code Cases in January 1981. Because ASME Code Case N-2 was annulled and could no longer be used unless a licensee had previously obtained approval for its use, the licensee requested that the ASME revised Code Case N-4-12 be used to incorporate these material requirements for the MP2 CEDM housings.

The MP2 CEDM housings will meet the minimum material requirements of ASME Code Case N-4-12. With the use of these requirements, all other requirements, both technical and administrative, of Section III will be met upon approval of this request.

The use of the alternative requirements contained in ASME Code Case N-4-12 has been assessed against the applicable requirements of ASME Code Section III, 1998 Edition with the 2000 Addenda and the plant design and service conditions for the CEDM housings and found to be acceptable. This acceptance is based on the fact that the requirements for the materials used in this application have all been acceptable for use within the industry and are now included under one ASME approved Code Case N-4-12. Considering this assessment and the history of successful use of these material requirements at other installations, this alternative is considered to provide an acceptable level of quality and safety, consistent with criteria for alternative requests under 10 CFR 50.55a(a)(3)(i).

Subject to approval of this request, the alternative minimum material requirements in ASME Code Case N-4-12 will be used to reconcile the design records and to N-stamp the new CEDM housings in January 2005, which supports the upcoming spring 2005 RPVH replacement project.

3.1.4 Duration of Proposed Alternative:

Since this request applies to the replacement of the RPVH, and is specific to the material requirements for the replacement CEDM housings, it is intended that approval of this request will apply for the life of the CEDM housings.

3.2 Staff Evaluation

By letter dated October 22, 2004, the licensee requested approval, pursuant to 10 CFR 50.55a(a)(3)(i), to use an alternative to the material requirements of the ASME Code, Section III, 1998 Edition with the 2000 Addenda for the CEDM motor assembly pressure housings to be installed at MP2. The proposed material is included in ASME Code Case N-4-12 which has been published but is not yet included in NRC RG 1.84.

ASME Code Section III, which contains requirements for materials, states that pressure-

retaining material shall conform to the requirements of one of the specifications for material given in ASME Code Section II.

As noted previously, Article IWA-4221(b), of ASME Code Section XI 1989 Edition (the latest edition of the ASME Code that currently applies to MP2) specifies that repair and replacement activities shall meet the Construction Code to which the original item was constructed. As stated by the licensee, the CEDM motor assembly pressure housings for MP2 were originally fabricated in accordance with the ASME Code Case 1337-3 and made of modified Type 403 stainless steel. The original CEDM housings met Section III, 1968 Edition through the summer 1970 Addenda with ASME Code Case 1337-3 used for the modified Type 403 stainless steel CEDM housing material. The licensee stated that the replacement CEDM housings will meet Section III, 1998 Edition, 2000 Addenda, and proposed to use the alternative material requirements for modified Type 403 stainless steel as specified in the ASME Code Case N-4-12.

As stated by the licensee, the material for the original CEDM housings was fabricated using a process that involved piercing a forging into a tubular housing shaped product form and then machining the CEDM housing into its final form. Because of the limited number of suppliers that use this process, the licensee cannot obtain tubular housings fabricated by piercing. As an alternative, the licensee proposed to use suppliers who will fabricate a solid tubular forging and machine the entire CEDM housing from that forging without the piercing operation. CEDM housings fabricated using the non-piercing process have been installed in nuclear power plants such as Arkansas Nuclear One, Unit 2, Palo Verde 2, Saint Lucie 1, Saint Lucie 2, and Waterford 3. These CEDMs have been in operation for many years with acceptable service.

The NRC staff finds the proposed alternative acceptable because CEDM housings fabricated using the non-piercing process have successfully operated at nuclear power plants for many years and thus the CEDMs have demonstrated an acceptable level of quality and safety.

Further, the material requirements that were used for the non-piercing fabrication of the CEDM housings were included in the ASME Code Cases 1334-2 and 1334-3 that later became Code Case N-2. ASME Code Case N-2 had been endorsed by the NRC staff in its RG 1.85, Materials Code Case Acceptability ASME Code Section III Division 1. However, ASME Code Case N-2 was annulled by the ASME in January 1981 and the NRC removed the reference to Code Case N-2 from its RG 1.85. As a result, ASME Code Case N-2 could no longer be used unless a licensee had previously obtained approval for its use. It should be noted that the removal of ASME Code Case N-2 from RG 1.85 by the NRC was done to document the annulment of ASME Code Case N-2 by the ASME and not because modified Type 403 stainless material is not acceptable material for use in nuclear power plants. Subsequently, the ASME revised the NRC-approved ASME Code Case N-4-11 to incorporate the material requirements of Case N-2. The revised ASME Code Case was published as ASME Code Case N-4-12, “Special Type 403 Modified Forgings or Bars Class 1 and CS Section III, Division 1.”

Therefore, the modified Type 403 stainless steel material that the licensee is proposing to use in the fabrication of CEDM housings have been reinstated as an approved material by the ASME Code, Section III.

The NRC staff finds the licensee’s reasoning in support of its request for relief acceptable. This finding is based on: (1) the fact that the staff has previously reviewed and accepted the

materials requirements of ASME Code Case N-2 for Type 403 modified stainless steel and, (2) the CEDM housings fabricated using the non-piercing process have successfully operated at nuclear power plants for many years. Further the ASME Code has included the materials requirements of ASME Code Case N-2 in the newly published ASME Code Case N-4-12 which the licensee has committed to use. Therefore, the NRC staff concludes that the proposed alternative is acceptable for use at MP2. It should be noted that the use of ASME Code Case N-4-12 is authorized until such time as it is published in a future version of RG 1.84. At that time, if the licensee intends to continue implementing this ASME Code Case, it must follow all provisions of ASME Code Case N-4-12 with limitations or conditions specified in RG 1.84, if any.

3.0 CONCLUSION

Based on the information provided in the licensee's submittal, the NRC staff concludes that the licensee has provided an acceptable alternative to the requirements of ASME Code, Section III for the replacement CEDM motor assembly pressure housings at MP2. The provisions of ASME Code Case N-4-12 provide an acceptable alternative to the material requirements specified in ASME Code Section III. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for MP2. All other ASME Code, Section III or XI, requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: G. Georgiev

Date: January 10, 2005