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Dominion

July 14, 2005

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No.: 05-292A
LR/DEA R0
Docket Nos.: 50-336
50-423
License Nos.: DPR-65
NPF-49

DOMINION NUCLEAR CONNECTICUT, INC. (DNC)
MILLSTONE POWER STATION UNITS 2 AND 3
ADDITIONAL INFORMATION IN SUPPORT OF
LICENSE RENEWAL APPLICATIONS

By letter dated June 2, 2005 (Serial Number 05-292), Dominion Nuclear Connecticut (DNC) supplemented its initial response to Open Item OI-3.0.3.2.18-1 from the Millstone Unit 2 and Unit 3 Safety Evaluation Report (SER) With Open Items. In an email sent to DNC on June 16, 2005, and in a subsequent telephone conference call on June 23, 2005, the Nuclear Regulatory Commission staff asked for further clarifying information on this supplemental response. Attachment 1 provides the supplemental responses to the Open Item and Confirmatory Item associated with this issue.

Should you have any questions regarding this letter, please contact Mr. William D. Corbin, Director, Nuclear Engineering, Dominion Resources Services, Inc., 5000 Dominion Blvd., Glen Allen, VA, 23060.

Very truly yours,

L.N. Hartz
Vice President – Nuclear Engineering

Attachment:

Supplemental Responses to SER Open Item 3.0.3.2.18-1 and Confirmatory Item 3.0.3.2.18-1

Commitments made in this letter: None.

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SN: 05-292A
Docket Nos.: 50-336/423
Subject: Additional Information in Support of License Renewal Applications

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Leslie N. Hartz, who is Vice President - Nuclear Engineering, of Dominion Nuclear Connecticut, Inc. She has affirmed before me that she is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of her knowledge and belief.

Acknowledged before me this 14TH day of July, 2005.

My Commission Expires: May 31, 2006.

Vicki L. Hull
Notary Public

(SEAL)

Attachment

Supplemental Responses to SER Open Item 3.0.3.2.18-1 and Confirmatory Item 3.0.3.2.18-1

Millstone Power Station Units 2 and 3
Dominion Nuclear Connecticut, Inc.

OI-3.0.3.2.18-1 (Section 3.0.3.2.18 - Bolting Integrity Program)

The applicant states that the bolting integrity program is consistent with the aging management program described in GALL AMP XI.M18, with the following exception related to loss of preload. The applicant states that the operating temperature for all other in scope bolted connections are well below the threshold temperature at which stress relaxation of pressure boundary bolting would occur. The staff finds that other factors such as vibration can contribute to loss of preload. The applicant needs to address other factors, which can contribute to loss of preload and justify if loss of preload is an aging effect requiring management for all bolting within the scope of license renewal. This is Open Item 3.0.3.2.18-1.

Supplemental Dominion Response:

In response to RAI 3.3.11-A-1, the Millstone Bolting Integrity AMP was included in DNC letter, Serial Number 04-720, dated December 3, 2004. The staff's "Safety Evaluation Report With Open Items Related to the License Renewal of Millstone Power Station, Units 2 and 3" dated February 24, 2005, included Open Item 3.0.3.2.18-1, Bolting Integrity Program. Dominion Nuclear Connecticut responded to this open item in two letters to the staff, Serial Number 05-080 (dated April 1, 2005) and Serial Number 05-292 (dated June 2, 2005). Dominion Nuclear Connecticut is submitting this additional response to address remaining staff issues and close the open item.

Dominion Nuclear Connecticut reviewed the past five years of Millstone operating experience related to the loss of preload for in-scope bolting. Although examples of loss of preload were identified for non-class 1 bolting, none of these instances were determined to be the result of aging. The evaluations that were performed determined the cause to be either inadequate torque being established at assembly or inadequate design. We consider this review did not identify loss of preload as an aging effect requiring management at Millstone.

However, DNC understands that the staff is requiring that management of loss of preload be included as part of an aging management program(s) for the period of extended operation. Therefore, the Millstone Bolting Integrity AMP has been revised to manage loss of preload as an applicable aging effect for in-scope bolting consistent with NUREG-1801. The revised Bolting Integrity AMP description is provided in the response to CI-3.0.3.2.18-1 included within this letter.

CI-3.0.3.2.18-1

The staff finds that the resolution of Open Items 3.0.3.2.18-1 and 3.0.3.2.18-2 may warrant a modification to the FSAR. This issue is identified as Confirmatory Item 3.0.3.2.18-1.

Supplemental Dominion Response:

This supplemental response supercedes the previous responses provided to RAI 3.3.11-A-1 in Attachment 1 of DNC letter, Serial Number 04-720, dated December 3, 2004, Open Item 3.0.3.2.18-1 and Confirmatory Item 3.0.3.2.18-1 in Attachments 1 and 2 of DNC letter, Serial Number 05-080, dated April 1, 2005, respectively; and the response supplements to Open Item 3.0.3.2.18-1 and Confirmatory Item 3.0.3.2.18-1 in Attachment 2 of DNC letter, Serial Number 05-292, dated June 2, 2005.

The following is the Bolting Integrity program descriptions to be included in the LRA Appendix A "FSAR Supplement" and LRA Appendix B for both Millstone Units 2 and 3. These program descriptions are identical to the program descriptions provided in Attachment 1 of DNC letter Serial Number 04-720, dated December 3, 2004 except for the inclusion of loss of preload as an aging effect applicable to in-scope bolting consistent with NUREG-1801. The complete program descriptions have been provided for clarity.

[A.2.1.26 for Unit 2] [A2.1.25 for Unit 3] Bolting Integrity Program

> The *Bolting Integrity* Program corresponds to NUREG-1801, Section XI.M18, "Bolting Integrity". The program manages the aging effects of cracking, loss of material, and loss of preload.
>
> This is accomplished by establishing good bolting practices in accordance with EPRI NP-5067, *Good Bolting Practices, A Reference Manual for Nuclear Power Plant Maintenance Personnel, Volume 1: Large Bolt Manual, and Volume 2: Small Bolts and Threaded Fasteners* and EPRI TR-104213, *Bolted Joint Maintenance and Application Guide*. For ASME Class bolting, aging effects are additionally managed by the performance of inservice examinations in accordance with ASME Section XI, Subsections IWB, IWC, IWD, and IWF.
>
> The engineering evaluations determine if a component needs to be repaired/replaced or is acceptable for continued operation until the next scheduled inspection. Corrective actions for conditions that are adverse to quality are performed in accordance with the Corrective Action Program as part of the Quality Assurance Program. The corrective action process provides reasonable assurance that deficiencies adverse to quality are either promptly corrected or are evaluated to be acceptable.

B.2.1.26 Bolting Integrity Program

The *Bolting Integrity* Program manages the aging effects of cracking, loss of material, and loss of preload. The program includes the good bolting practices established for in scope threaded fasteners in plant procedures in accordance with recognized industry organizations such as EPRI and AISC. The program also includes the inservice inspection requirements established in accordance with ASME Section XI, Subsections IWB, IWC, IWD, and IWF for ASME Class bolting.

Millstone good bolting practices are established in accordance with plant procedures. These procedures include requirements for proper disassembling, inspecting, and assembling of connections with threaded fasteners. The general practices that are established in this procedure are based on EPRI NP-5067, *Good Bolting Practices, A Reference Manual for Nuclear Power Plant Maintenance Personnel, Volume 1: Large Bolt Manual, and Volume 2: Small Bolts and Threaded Fasteners* and EPRI TR-104213, *Bolted Joint Maintenance and Application Guide*.

NUREG-1801 Consistency

The Millstone *Bolting Integrity* Program is an existing program that is consistent with the aging management program described in Chapter XI of NUREG-1801, Section XI.M18, *Bolting Integrity* with the exceptions described below:

Exceptions to NUREG-1801

Exception 1: Basis Documents Referenced in NUREG-1801 for Safety-Related Bolting Are Not Directly Referenced by Millstone *Bolting Integrity* Program.

NUREG-1801 Section XI.M18 states that the program relies on recommendations for a comprehensive bolting integrity program, as delineated in NUREG-1339, and industry recommendations, as delineated in EPRI NP-5769, with exceptions as noted in NUREG-1339 for safety-related bolting.

The procedures for ensuring bolting integrity at Millstone identify inspection requirements and general practices for in scope bolting that are consistent with the bolting recommendations identified in Section XI.M18, but do not directly reference EPRI NP-5769 or NUREG-1339 as applicable source documents for these recommendations. However, these procedures do reference and incorporate the good bolting practices identified in EPRI NP-5067. EPRI NP-5769 and EPRI NP-5067 are very closely related documents that cross-reference one another and reference NUREG-1339. EPRI NP-5769, Section 8, *Good Bolting Practices* defers to EPRI NP-5067 for the identification of bolting practices associated with disassembly and assembly of bolted joints, and the methods for minimizing bolted joint problems such

as leaks, vibration loosening, fatigue, and stress corrosion cracking. Because the recommendations of EPRI NP-5769 and EPRI NP-5067 are so closely related, a reference by NUREG-1801, Section XI.M18 to EPRI NP-5769, is essentially a reference to the interrelated recommendations contained in EPRI NP-5067.

Further, NUREG-1801, Section XI.M18 acknowledges EPRI NP-5769 for the identification of the applicable ASME requirements related to bolting integrity. However, as stated in EPRI NP-5769, this document has only compiled the applicable ASME Code examination requirements associated with bolting for the purpose of convenience and clarification, and does not attempt to change or extend these requirements. The Millstone Inservice Inspection requirements as described in the Millstone *Bolting Integrity* Aging Management Program address the necessary examination requirements for ASME Class bolting.

Program Elements Affected

- *Scope of Program*

This program relies on recommendations for a comprehensive bolting integrity program, as delineated in NUREG-1339, and industry recommendations, as delineated in EPRI NP-5769, with exceptions as noted in NUREG-1339 for safety-related bolting.

The procedures for ensuring bolting integrity at Millstone identify inspection requirements and general practices for bolting that are consistent with the bolting recommendations identified in Section XI.M18, but do not directly reference EPRI NP-5769 or NUREG-1339 as applicable source documents for these recommendations. However, these procedures do reference and incorporate the good bolting practices identified in EPRI NP-5067. EPRI NP-5067 and EPRI NP-5769 are very closely related documents that cross-reference one another and reference NUREG-1339. EPRI NP-5769, Section 8, *Good Bolting Practices* defers to EPRI NP-5067 for the identification of bolting practices associated with disassembly and assembly of bolted joints, and the methods for minimizing bolted joint problems such as leaks, vibration loosening, fatigue, and stress corrosion cracking. Because the recommendations of EPRI NP-5769 and EPRI NP-5067 are so closely related, a reference by NUREG-1801, Section XI.M18 to EPRI NP-5769, is essentially a reference to the interrelated recommendations contained in EPRI NP-5067. Further, NUREG-1801, Section XI.M18 acknowledges EPRI NP-5769 for the identification of the applicable ASME requirements related to bolting integrity. However, as stated in EPRI NP-5769, this document has only compiled the applicable ASME Code examination requirements associated with bolting for the purpose of convenience and clarification, and does not attempt to change or extend these requirements. The Millstone Inservice Inspection requirements as described in Millstone *Bolting Integrity*

Aging Management Program address the necessary examination requirements for ASME Class bolting.

- *Preventive Actions*

This program element identifies that selection of lubricants and sealants is in accordance with EPRI NP-5769 and the additional recommendations of NUREG-1339 to prevent or mitigate degradation and failure of safety-related bolting. (NUREG-1339 takes exception to certain items in EPRI NP-5769.)

The procedure for ensuring bolting integrity at Millstone identifies general practices for threaded fasteners, and conforms to the details identified in Section XI.M18, but does not directly reference EPRI NP-5769 as an applicable source document for industry recommendations. However, this procedure does reference and incorporate the good bolting practices identified in EPRI NP-5067, including recommendations for the selection of lubricants. This procedure addresses the proper cleaning of threaded fasteners prior to inspection, using only approved cleaners and solvents. The procedure also addresses the application of approved anti-seize compounds.

- *Detection of Aging Effects*

This program element identifies that the inspection requirements [for ASME Class bolting] include the recommendations of EPRI NP-5769.

EPRI NP-5769 has only compiled the applicable ASME Section XI Code examination requirements associated with bolting for the purpose of convenience and clarification, and does not attempt to change or extend these requirements. The Millstone Inservice Inspection requirements, as described in Millstone *Bolting Integrity* Aging Management Program, address the necessary examination requirements for ASME Class bolting.

- *Corrective Actions*

This program element identifies that the repair and replacement requirements [for ASME Class Bolting] are in conformance with the recommendations of EPRI NP-5769.

EPRI NP-5769 has only compiled the applicable ASME Section XI Code examination requirements associated with bolting for the purpose of convenience and clarification, and does not attempt to change or extend these requirements. The Millstone Inservice Inspection Plans, as described

in the Millstone *Bolting Integrity* Aging Management Program, address the necessary repair and replacement requirements for ASME Class bolting as defined by ASME Section XI.

Exception 2: Use of Different Code Year than Identified in NUREG-1801

NUREG-1801, Section XI.M18 identifies inservice inspection requirements in accordance with Table IWB-2500-1 and the 1995 Edition through the 1996 Addenda of ASME Section XI. The Millstone ISI Program is based on the 1989 Edition with no addenda. There are no differences between these code years with respect to examination requirements for ASME Class 1, 2, and 3 bolting and their support bolting.

Program Elements Affected

- *Detection of Aging Effects*

NUREG-1801, Section XI.M18 identifies inservice inspection requirements in accordance with the 1995 Edition through the 1996 Addenda of ASME Section XI. The Millstone ISI Program is based on the 1989 Edition with no addenda. There are no differences between these code years with respect to examination requirements for ASME Class 1, 2, and 3 bolting and their support bolting.

Enhancements

The *Bolting Integrity* Program does not require enhancement to be consistent with the aging management program described in NUREG-1801, Chapter XI, Section M18, "Bolting Integrity".

Operating Experience

Operating experience indicates that the inspections, good bolting practices, and corrective action activities have successfully maintained the integrity of bolting within the scope of license renewal. Extensive operating experience and ASME Section XI inspection histories have indicated a minimal number of leaks at the reactor coolant pressure boundary and other in scope pressure retaining locations. Degradation of closure bolting, support bolting, and structural bolting that is found through these inspections is recorded and corrected as directed by engineering evaluation to maintain component intended functions.

In reviewing operating experience at Millstone Units 2 and 3, the following occurrences were noted and considered in evaluating the effectiveness of the program:

Support Does Not Meet Acceptance Criteria as Specified in Procedure

During performance of a VT-3 visual examination on Unit 2, the procedural acceptance criteria were not met for a support located on the suction piping to the turbine driven auxiliary feedwater pump. One anchor bolt did not have full thread engagement (i.e., one thread short of being flush). Design Engineering performed a walkdown and evaluated the support. The condition was determined to be acceptable as is. The anchor bolt was accepted based upon a referenced calculation. The analysis concluded that neither the structural integrity of the support nor the safety function of the suction piping for the turbine driven auxiliary feedwater pump were impacted.

Bolting for Containment Airlock Pillow Bearing Is Degraded

A mechanic observed that the bolting associated with the inner and outer door of the personnel airlock for Millstone Unit 2 was failing. The nuts for holding the pillow block bearing in place were being pulled into the bolthole, allowing the pillow block bearing to be pulled out of position. The pillow block bearing provides support for the upper portion of the door hinge pin, which allows the main upper bearing to support the weight of the door. An Engineering evaluation was performed and determined that the bolted configuration for the pillow block required repair. The bolting was replaced as part of this repair.

Diesel Engine Air Cooler Heat Exchanger Found to Have 4 Bolts Deteriorated

While repairing a service water leak on the end cover of the "B" diesel air cooler heat exchanger, the mechanic observed that four of the bolts were deteriorated. The System Engineer was contacted to aid in evaluating the condition. An Engineering evaluation was performed, which determined that the bolting had not failed but was sufficiently degraded such that replacement was warranted. All the bolting on the end cover was replaced.

Conclusion

The *Bolting Integrity* Program ensures that the effects of aging associated with the in-scope components will be adequately managed so that there is reasonable assurance that their intended functions will be maintained consistent with the current licensing basis throughout the period of extended operation.