February 1, 2002

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. 2 - ISSUANCE OF AMENDMENT RE: REACTOR COOLANT PUMP FLYWHEEL INSPECTIONS (TAC NO. MB1818)

Dear Mr. Price:

The Commission has issued the enclosed Amendment No. 264 to Facility Operating License No. DPR-65 for the Millstone Nuclear Power Station, Unit No. 2 (MP2), in response to your application dated April 26, 2001.

The amendment revises the Technical Specifications (TSs) and Bases related to reactor coolant pump flywheel inspection requirements and reactor coolant system structural integrity. The changes add Section 6.22, “Reactor Coolant Pump Flywheel Inspection Program” to the TSs and relocate the requirements of TS 3/4.4.10, “Reactor Coolant System, Structural Integrity” to the MP2 Technical Requirements Manual.

A copy of the related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

/RA/

John T. Harrison, Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-336

Enclosures: 1. Amendment No. 264 to DPR-65
2. Safety Evaluation

cc w/encls: See next page

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*SE received 8/22/01; no significant changes
**See previous concurrence

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OFFICE	PDI-2/PM	PDI-2/LA	EMCB*	RTSB**	OGC	PDI-2/SC
NAME	JHarrison	TClark	KWichman	WBeckner	AFernandez	JClifford
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Millstone Nuclear Power Station
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DOMINION NUCLEAR CONNECTICUT, INC.

DOCKET NO. 50-336

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 264
License No. DPR-65

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by the applicant dated April 26, 2001, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-65 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 264, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of issuance, and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

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

Attachment: Changes to the Technical Specifications

Date of Issuance: February 1, 2002

ATTACHMENT TO LICENSE AMENDMENT NO. 264

FACILITY OPERATING LICENSE NO. DPR-65

DOCKET NO. 50-336

Replace the following pages of the Appendix A, Technical Specifications, with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
VI	VI
XII	XII
XVII	XVII
3/4 4-22	3/4 4-22
6-28	6-28
B 3/4 4-7c	B 3/4 4-7c

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 264

TO FACILITY OPERATING LICENSE NO. DPR-65

DOMINION NUCLEAR CONNECTICUT, INC.

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

DOCKET NO. 50-336

1.0 INTRODUCTION

By letter dated April 26, 2001, Dominion Nuclear Connecticut, Inc., (the licensee), submitted a request for changes to the Millstone Nuclear Power Station, Unit No. 2 (MP2) Technical Specifications (TSs) and Bases related to Reactor Coolant Pump (RCP) flywheel inspection requirements and Reactor Coolant System structural integrity. The proposed changes would add Section 6.22, “Reactor Coolant Pump Flywheel Inspection Program” to the TSs and would relocate the requirements of TS 3/4.4.10, “Reactor Coolant System, Structural Integrity” to the MP2 Technical Requirements Manual (TRM).

2.0 BACKGROUND

The function of the RCP in the reactor coolant system (RCS) of a pressurized water reactor (PWR) nuclear power plant is to maintain an adequate cooling flow rate by circulating a large volume of primary coolant water at high temperature and pressure through the RCS. A concern with overspeed of the RCP and its potential for failure led to the issuance of Regulatory Guide (RG) 1.14 in 1971. Since then, all licensees of PWR plants, with very few exceptions, have adopted the guidelines of RG 1.14 to conduct RCP flywheel examinations. These requirements are normally specified in the individual plant's TSs, as is the case for MP2. According to the licensee's application, the proposed change to these requirements will reduce personnel radiation exposure and will also reduce inspection costs.

The purpose of TS 3/4.4.10, RCS Structural Integrity, is to specify the required actions and surveillances to maintain the structural integrity of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 RCS components and the RCP flywheel. The licensee proposes to relocate these requirements to the TRM and states that the portion of the TSs proposed to be relocated does not fulfill any of the criteria in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36, which sets forth the required contents of the TSs. In addition, the licensee states that upon relocating this requirement to the TRM, future changes would be controlled in accordance with 10 CFR 50.59, “Changes, Tests, and Experiments.”

3.0 RCP FLYWHEEL EVALUATION

RCP flywheel inspections were addressed in the ABB Combustion Engineering topical report SIR-94-080A, "Relaxation of Reactor Coolant Pump Flywheel Inspection Requirements," which was approved by the Nuclear Regulatory Commission (NRC) with certain conditions. These conditions are specified in the NRC's safety evaluation report (SER) dated May 21, 1997, for SIR-94-080A. The licensee intended to apply this topical report to MP2 and change its RCP flywheels inspection intervals in accordance with the conclusion of the SER to SIR-94-080A.

In the SER to SIR-94-080A, the staff concluded, "(1) all flywheels meet the proposed non-ductile fracture criteria and will have adequate fracture toughness during their service periods, and (2) all flywheels except those for Waterford 3 satisfy the excessive deformation criterion of RG 1.14." This conclusion was based on the fracture toughness (K_{Ic}) values reported in SIR-94-080A for all participating plants, including MP2. In the SER to SIR-94-080A, the staff required the applicant to verify the reference temperature RT_{NDT}, and to justify the use of the K_{Ic} versus ($T-RT_{NDT}$) curve in Appendix A of Section XI of the ASME Code for flywheels made of materials other than SA 533 B and SA 508.

The licensee indicated in the submittal that the original MP2 RCP flywheels were made from low carbon steels equivalent to ASTM A-516 material, and the replacement RCP flywheels were made from ASTM A-508 material. The following Table listed the RT_{NDT} values reported by the licensee for the MP2 flywheels:

Table RT_{NDT} values for flywheel materials

	Original Flywheels	Replacement Flywheel 1	Replacement Flywheel 2
Material	A-516 Equivalent	A-508	A-508
RT_{NDT}	40°F	-31°F	-40°F

The RT_{NDT} values for the replacement flywheels were determined using NB-2331 of Section III of the ASME Code. However, due to insufficient data for determining the RT_{NDT} value via NB-2331 for the original flywheels, the licensee applied, alternatively, the staff position, MTEB 5-2, in establishing the RT_{NDT} value for the original flywheels.

Since the K_{Ic} versus ($T-RT_{NDT}$) curve in the ASME Code (the ASME K_{Ic} curve) was derived from test data for A-533 and A-508 materials and might not be applicable to A-516 material, the licensee employed alternative approaches to derive the K_{Ic} values for the original flywheels. Two formulas, one by Corten and Sailors and the other by Roberts and Newton, were used to derive K_{Ic} values from test Charpy energies provided in the submittal for the original flywheels. The lowest K_{Ic} value calculated by the licensee from using these two formulas was 106.4 ksi$\sqrt{}$inch. For comparison, the licensee also derived the K_{Ic} value using the ASME K_{Ic} curve for an operating temperature of 100 °F and found it to be 102 ksi$\sqrt{}$inch. Since this value (either 106.4 ksi$\sqrt{}$inch or 102 ksi$\sqrt{}$inch) exceeds the K_{Ic} value of 90 ksi$\sqrt{}$inch that was assumed in the fracture mechanics evaluation of the MP2 flywheels in SIR-94-080A, the licensee concluded that the RT_{NDT} and K_{Ic} values for the MP2 flywheels are acceptable.

The staff examined all Charpy energy data provided by the licensee and confirmed that the licensee's determination of RT_{NDT} values for replacement flywheels were either in accordance with, or more conservative than, NB-2331. Further, the staff verified that the licensee had applied MTEB 5-2 appropriately in determining the RT_{NDT} values for the original flywheels. Therefore, all RT_{NDT} values are acceptable for use in establishing their corresponding K_{Ic} values.

For replacement flywheels that were made of A-508 material, the ASME K_{Ic} curve could be used directly. This gave a K_{Ic} value above 200 ksi$\sqrt{inch}$. For original flywheels that were made of A-516 material, the licensee used the Corten and Sailors formula and the Roberts and Newton formula to derive K_{Ic} values from the test Charpy energies provided in the submittal. Without a comprehensive study using extensive Charpy and K_{Ic} data, the staff cannot endorse these empirical formulas for all applications. However, because these formulas were conservatively derived excluding the strain-rate effect and there is about 18% additional margin (106.4 ksi$\sqrt{inch}$ versus 90 ksi$\sqrt{inch}$) to account for uncertainties associated with using these formulas, the staff concluded that the RT_{NDT} and K_{Ic} values for the MP2 flywheels have provided adequate resistence to fracture for using a revised 10-year inspection interval.

The staff has determined that the analysis in the submittal meets the intent of the ABB Combustion Engineering Topical Report SIR-94-080A since there is still moderate margin to account for the uncertainty associated with predicting K_{Ic} by using the alternate formulas described in the proceeding paragraph. Therefore, the staff finds the licensee's proposed RCP flywheel inspection changes acceptable. In addition, the staff finds that the supporting TS changes to the Index and Bases are consistent with the changes described above.

4.0 RCS STRUCTURAL INTEGRITY EVALUATION

Section 182a of the Atomic Energy Act, as amended (the Act), requires applicants for nuclear power plant operating licenses to incorporate TSs as part of the license. The Commission's regulatory requirements related to the content of the TSs are set forth in 10 CFR 50.36. That regulation requires that the TSs include items in five categories, including: (1) safety limits, limiting safety system settings, and limiting control settings, (2) limiting condition for operation, (3) surveillance requirements, (4) design features, and (5) administrative controls.

Pursuant to 10 CFR 50.36(c)(2)(ii), a TS is required for a Limiting Condition of Operation (LCO) meeting one or more of the following criteria:

(1) Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary;

(2) A process variable, design feature, or operating restriction that is an initial condition of a design-basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier;

(3) A structure, system or component that is part of the primary success path and which functions or actuates to mitigate a design-basis accident or transient that either assumes the failure of, or represents a challenge to the integrity of a fission product barrier; and

(4) A structure, system or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

As a result, existing LCO requirements which fall within or satisfy any of the criteria in 10 CFR 50.36(c)(2)(ii) must be retained in the TSs, while those LCO requirements which do not fall within or satisfy these criteria may be relocated to other licensee-controlled documents.

For Criterion 1 above, the RCS ASME Class 1, 2, and 3 components do not include any instrumentation. Therefore, the staff finds that this TS does not meet Criterion 1.

For Criterion 2, structural integrity is neither a process variable, design feature, or operating restriction that is an initial condition of a design-basis analysis (DBA) or transient analysis. Structural integrity is not monitored or controlled during plant operation; it is verified during periodic inspections. Therefore, the staff finds that this TS does not meet Criterion 2.

For Criterion 3, ASME Code Class 1, 2, and 3 components which are part of the primary success path and function to mitigate DBAs or transients that either assume the failure of, or present a challenge to, the integrity/operability of these components, are included in the individual specifications that cover these components. The portion of this TS that is proposed to be relocated to the TRM addresses only the passive pressure boundary function of these components. Therefore, the staff finds that this TS does not meet Criterion 3.

For Criterion 4, the requirements covered by this TS that are being relocated to the TRM have not been shown to be risk significant to public health and safety by either operating experience or probabilistic safety assessment. In addition, failure modes of applicable structures, systems, or components (SSCs) would not be identified from the requirements of this TS. Furthermore, the requirements of this TS do not affect the risk review/unavailability monitoring of applicable SSCs. Therefore, the staff finds that this specification does not meet Criterion 4.

The review for the structural integrity LCO relocation was actually performed and presented in a split report from the Director of NRR, Thomas Murley, on May 8, 1988. Originally, NUREG-0212, “Standard Technical Specifications for Combustion Engineering Plants” contained provisions for the limiting conditions of operation and surveillance requirements in reference to the structural integrity of ASME Code Class 1, 2, and 3 components. This split report identified Section 3/4.4.10 “Structural Integrity” as not meeting the criterion for 10 CFR 50.36 and was therefore removed from subsequent revisions of the Standard Technical Specifications.

Therefore, since this TS does not fulfill any of the 10 CFR 50.36c(2)(ii) criteria for items which TSs must be established, the staff finds that relocating TS 3/4.4.10 and the associated Bases to the TRM is acceptable. This change is also consistent with NUREG-1432, Revision 2, “Standard Technical Specifications for Combustion Engineering Plants.” In addition, the staff finds that the supporting changes to the TS Index and Bases are consistent with the changes described above.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Connecticut State official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (66 FR 29351). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: S. Sheng
J. Harrison

Date: February 1, 2002