

April 6, 2005

Mr. David A. Christian  
Sr. Vice President and Chief Nuclear Officer  
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SUBJECT: MILLSTONE POWER STATION, UNIT NO. 2 - ISSUANCE OF AMENDMENT  
RE: FIVE-YEAR EXTENSION OF TYPE A CONTAINMENT TEST INTERVAL  
(TAC NO. MC3747)

Dear Mr. Christian:

The Commission has issued the enclosed Amendment No. 285 to Facility Operating License No. DPR-65 for the Millstone Power Station, Unit No. 2 (MP2), in response to your application dated July 6, 2004, as supplemented by letters dated September 21, 2004, and December 23, 2004.

By application dated July 6, 2004, and supplemented by letters dated September 21 and December 23, 2004, Dominion Nuclear Connecticut, Inc. (the licensee) requested Nuclear Regulatory Commission (NRC) approval of a change to the MP2 Technical Specifications (TSs). Specifically, the change would allow the licensee a one-time extension of its Appendix J, Type A, Containment Integrated Leak Rate Test from the current 10-year interval to the proposed 15-year interval. The TS revision is based on the risk-informed approach developed using Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis."

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/*

Victor Nerses, Senior 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. 285 to DPR-65  
2. Safety Evaluation

cc w/encls: See next page

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Millstone Power Station, Unit No. 2

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DOMINION NUCLEAR CONNECTICUT, INC.

DOCKET NO. 50-336

MILLSTONE POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 285  
License No. DPR-65

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Dominion Nuclear Connecticut, Inc., dated July 6, 2004, as supplemented by letters dated September 21, and December 23, 2004, 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. 285, 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 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

Darrell J. Roberts, 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: April 6, 2005

ATTACHMENT TO LICENSE AMENDMENT NO. 285

FACILITY OPERATING LICENSE NO. DPR-65

DOCKET NO. 50-336

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

Remove  
6-26

Insert  
6-26

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 285

TO FACILITY OPERATING LICENSE NO. DPR-65

DOMINION NUCLEAR CONNECTICUT, INC.

MILLSTONE POWER STATION, UNIT NO. 2

DOCKET NO. 50-336

1.0 INTRODUCTION

By application dated July 6, 2004, and supplemented by letters dated September 21 and December 23, 2004, Dominion Nuclear Connecticut, Inc. (DNC or the licensee) requested Nuclear Regulatory Commission (NRC or the Commission) approval of a change to the Millstone Power Station, Unit No. 2 (MP2) Technical Specifications (TSs). Specifically, the change would allow the licensee a one-time extension of its Appendix J, Type A, Containment Integrated Leak Rate Test (ILRT) from the current 10-year interval to the proposed 15-year interval. The TS revision is based on the risk-informed approach developed using Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis."

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix J, Option B requires that a Type A test be conducted at a periodic interval based on historical performance of the overall containment system. MP2 TS 6.19, "Containment Leakage Rate Testing Program," requires that leakage rate testing be performed as required by 10 CFR Part 50, Appendix J, Option B, as modified by approved exemptions, and in accordance with the guidelines contained in RG 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995. This RG endorses, with certain exceptions, Nuclear Energy Institute (NEI) report NEI 94-01, Revision 0, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," dated July 26, 1995.

NEI 94-01, Section 11 specifies an initial test interval of 48 months, but allows an extended interval of 10 years, based upon two consecutive successful tests. There is also a provision for extending the test interval an additional 15 months in certain circumstances. The most recent two Type A tests at MP2 have been successful, so the current interval requirement is 10 years.

RG 1.174 describes a risk-informed approach, acceptable to the NRC, for assessing the nature and impact of proposed licensing-basis changes by considering engineering issues and applying risk insights. This RG also provides risk acceptance guidelines for evaluating the results of such evaluations.

Section 50.55a(b)(2)(vi) of 10 CFR requires the licensees to develop and implement a containment inservice inspection program. The rule incorporates by reference the requirements of the 1992 Edition and the 1992 Addenda of Subsections IWE and IWL of Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) for certain modifications and limitations.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Description of Changes

The licensee requested to change TS 6.19 by adding an exception to the guidelines of RG 1.163 and NEI 94-01, Revision 0, regarding the Type A test interval. Specifically, the exception would state that the first Type A test performed after June 10, 1995, shall be performed no later than June 10, 2010.

The local leakage rate tests (Type B and Type C tests), including their schedules, are not affected by this request.

#### 3.2 Deterministic Evaluation

MP2 utilizes a pressurized water reactor (PWR) enclosed in a steel-lined concrete containment. The containment vessel consists of a continuous, and essentially leak-tight, steel membrane. The containment vessel is penetrated by access penetrations, process piping and electrical penetrations. The integrity of the penetrations and isolation valves are verified through Type B and Type C local leak rate tests (LLRTs) as required by 10 CFR Part 50, Appendix J. The overall leak-tight integrity of the primary containment is verified through performing the ILRT. These tests are performed to verify the essentially leak-tight characteristics of the containment at design-basis accident pressure.

In its July 6, 2004, letter, the licensee stated that the last ILRT was performed in June 1995, and the as-found leakage was 0.2559 weight-percent (%) /day. The licensee also conducted another ILRT in December 12, 1992, and the as-found leakage was 0.2809 weight % /day. These test values are much lower than the acceptance limit of 0.5 weight % /day.

The current regulatory requirement mandated by 10 CFR 50.55a requires licensees to implement a containment inspection program in accordance with the rules and requirements of the 1992 Edition through the 1992 Addenda of ASME Code Section XI, Subsections IWE and IWL, as amended in the regulation. During the May 2000 and November 2003 refueling outages, DNC performed an IWE general visual examination of the containment metal liner (IWE - MC component). All accessible areas were examined. Some localized rust and surface anomalies were detected, most associated with blistering of the liner coating. Repairs meeting ASME Code requirements were made during the past two refueling outages to eliminate most accelerated degradation items classified as Examination Category E-C in Subsection IWE of the ASME Code. Based on the current inspections and the associated engineering evaluations to date, DNC has not classified any areas as Examination Category E-C. The NRC staff considers these recent IWE examination results, repairs, current inspections and engineering evaluations to be positive demonstrations for the integrity of the steel liners. The July 6, 2004, submittal stated that the proposed ILRT period extension would only affect the length of time between Type A testing, not any ASME Code requirements involving inspection frequencies



and methods. This statement assures that the accessible areas of the containment pressure boundary will be periodically monitored for signs of degradation.

The July 6, 2004, submittal stated that, during power operation, control room instrumentation provides constant indication of containment pressure. This monitoring of the containment pressure equates to continuous on-line monitoring of the containment leakage during operation. The NRC staff considers the on-line monitoring system provides reasonable assurance that gross containment leakage that may develop during power operation, will be detected.

### 3.3 Probabilistic Evaluation

The licensee has performed a risk impact assessment of extending the Type A test interval to 15 years. The risk assessment was included in the application dated July 6, 2004. Additional analysis and information were provided by the licensee in letters dated September 21, and December 23, 2004. In performing the risk assessment, the licensee considered the guidelines of NEI 94-01, the methodology used in Electric Power Research Institute (EPRI) TR-104285, "Risk Impact Assessment of Revised Containment Leak Rate Testing," and RG 1.174.

The basis for the current 10-year test interval is provided in Section 11.0 of NEI 94-01, Revision 0, and was established in 1995 during the development of the performance-based Option B to Appendix J. Section 11.0 of NEI 94-01 states that NUREG-1493, "Performance-Based Containment Leak-Test Program," provided the technical basis to revise leakage rate testing requirements contained in Option B to Appendix J. The basis consisted of qualitative and quantitative assessments of the risk impact (in terms of increased public dose) associated with a range of extended leakage rate test intervals. To supplement this basis, industry undertook a similar study. The results of that study are documented in EPRI Research Project Report TR-104285.

The EPRI study used an analytical approach similar to that presented in NUREG-1493 for evaluating the incremental risk associated with increasing the interval for Type A tests. The Appendix J, Option A, requirements that were in effect for MP2 early in the plant's life required a Type A test frequency of three tests in 10 years. The EPRI study estimated that relaxing the test frequency from three tests in 10 years to one test in 10 years would increase the average time that a leak that was detectable only by a Type A test goes undetected from 18 to 60 months. Based on industry leakage rate data gathered from 1987 to 1993, approximately 97% of possible leaks are detectable by local leak rate testing. The remaining 3% of possible leaks are only detectable by Type A tests. Since Type A tests only detect about 3% of leaks, this results in a 10% increase in the overall probability of leakage. The risk contribution of pre-existing leakage for the PWR and boiling water reactor representative plants in the EPRI study confirmed the NUREG-1493 conclusion that a reduction in the frequency of Type A tests from three tests in 10 years to one test in 20 years leads to an "imperceptible" increase in risk that is on the order of 0.2 percent and a fraction of one person-rem per year in increased public dose.

Building upon the methodology of the EPRI study, the licensee assessed the change in the predicted person-rem per year frequency. The licensee quantified the risk from sequences that have the potential to result in large releases if a pre-existing leak were present. Since the Option B rulemaking was completed in 1995, the staff has issued RG 1.174 on the use of probabilistic risk assessment (PRA) in evaluating risk-informed changes to a plant's licensing

basis. The licensee has proposed using RG 1.174 guidance to assess the acceptability of extending the Type A test interval beyond that established during the Option B rulemaking.

RG 1.174 defines very small changes in the risk-acceptance guidelines as increases in core damage frequency (CDF) less than  $10^{-6}$  per year and increases in large early release frequency (LERF) less than  $10^{-7}$  per year. Since the Type A test does not impact CDF, the relevant criterion is the change in LERF. The licensee has estimated the change in LERF for the proposed change and the cumulative change from the original frequency of three tests in a 10-year interval. RG 1.174 also discusses defense-in-depth and encourages the use of risk analysis techniques to help ensure and show that key principles, such as the defense-in-depth philosophy, are met. The licensee estimated the change in the conditional containment failure probability for the proposed change to demonstrate that the defense-in-depth philosophy is met.

The licensee provided analyses, as discussed below. The following comparisons of risk are based on a change in test frequency from three tests in 10 years (the test frequency under Appendix J, Option A) to one test in 15 years. This bounds the impact of extending the test frequency from one test in 10 years (the current test frequency for MP2 under Appendix J, Option B) to one test in 15 years. The following conclusions can be drawn from the analysis associated with extending the Type A test frequency:

1. Given the change from a three-in-10-year test frequency to a one-in-15-year test frequency, the increase in the total integrated plant risk is estimated to be less than 0.01 person-rem per year. This increase is comparable to that estimated in NUREG-1493, where it was concluded that a reduction in the frequency of tests from three in 10 years to one in 20 years leads to an "imperceptible" increase in risk. Therefore, the increase in the total integrated plant risk for the proposed change is considered small and supportive of the proposed change.
2. The increase in LERF resulting from a change in the Type A test frequency from the original three in 10 years to one in 15 years is estimated to be  $7.8 \times 10^{-7}$  per year based on the internal events probabilistic risk analysis (PRA). However, there is some likelihood that the flaws in the containment estimated as part of the Class 3b frequency would be detected as part of the IWE/IWL visual examination of the containment surfaces (as identified in ASME Code, Section XI, Subsections IWE/IWL). Visual inspections are expected to be effective in detecting large flaws in the visible regions of containment, and this would reduce the impact of the extended test interval on LERF. The licensee's risk analysis considered the potential impact of age-related corrosion/degradation in inaccessible areas of the containment shell on the proposed change. The increase in LERF associated with corrosion events is estimated to be less than  $1 \times 10^{-8}$  per year.

When the calculated increase in LERF is in the range of  $10^{-7}$  per year to  $10^{-6}$  per year, applications are considered if the total LERF is less than  $10^{-5}$  per year. The licensee estimates that the total baseline LERF for internal events is approximately  $7.9 \times 10^{-7}$  per year. This does not include the potential contribution to LERF from the majority of steam generator tube rupture (SGTR) initiated core damage events, i.e., those in which the steam generator relief valves successfully reclose or the break is covered by water on the secondary side. If all SGTR-initiated core damage events are conservatively assumed to contribute to LERF, the baseline LERF would be approximately  $3 \times 10^{-6}$  per year. As described in the staff's review of severe accident mitigation alternatives for the

MP2 license renewal (NUREG-1437, Supplement 22), the core damage frequency for external events is estimated to be approximately 60% of the internal events CDF. Thus, even if the LERF value were doubled to account for external events, the total LERF would remain less than  $10^{-5}$  per year. The staff concludes that increasing the Type A interval to 15 years results in only a small change in LERF and is consistent with the acceptance guidelines of RG 1.174.

3. RG 1.174 also encourages the use of risk analysis techniques to help ensure and show that the proposed change is consistent with the defense-in-depth philosophy. Consistency with the defense-in-depth philosophy is maintained if a reasonable balance is preserved between prevention of core damage, prevention of containment failure, and consequence mitigation. The licensee estimates the change in the conditional containment failure probability to be an increase of approximately one percentage point for the cumulative change of going from a test frequency of three in 10 years to one in 15 years. The staff finds that the defense-in-depth philosophy is maintained based on the small magnitude of the change in the conditional containment failure probability for the proposed amendment.

Based on these conclusions, the staff finds that the increase in predicted risk due to the proposed change is within the acceptance guidelines while maintaining the defense-in-depth philosophy of RG 1.174 and, therefore, is acceptable.

#### 3.4 Technical Conclusion

The NRC staff finds that the increase in predicted risk due to the proposed change is within the acceptance guidelines while maintaining the defense-in-depth philosophy of RG .174. Therefore, the staff finds that the interval until the next Type A test at MP2 may be extended to 15 years, and that the proposed change to TS Section 6.19 is acceptable.

#### 4.0 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 noted: 1) that this amendment is a one-time extension, 2) that it is within the scope of NEI's industry guideline report NEI-94-01, and 3) that the last two such tests at MP2 were successfully performed. The Connecticut State official agreed with the NRC staff's assessment regarding this TS change.

#### 5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes requirements with respect to 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 change 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 (70 FR 5237). 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.

## 6.0 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: J. Pulsipher  
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Date: April 6, 2005