UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 25, 2018

Mr. Daniel G. Stoddard
Senior Vice President and Chief Nuclear Officer
Dominion Nuclear
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: MILLSTONE POWER STATION, UNIT NO. 2 – ISSUANCE OF AMENDMENT NO. 335 REGARDING REVISION TO THE INTEGRATED LEAK RATE TYPE A AND TYPE C TEST INTERVALS (EPID L-2017-LLA-0316)

Dear Mr. Stoddard:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 335 to Renewed Facility Operating License No. DPR-65 for the Millstone Power Station, Unit No. 2 (Millstone 2), in response to your application dated October 4, 2017, as supplemented by letters dated May 24, 2018, and June 14, 2018.

The amendment revises Millstone 2 Technical Specification (TS) 6.19, "Containment Leakage Rate Testing Program," by replacing the reference to Regulatory Guide (RG) 1.163, Performance-Based Containment Leak-Test Program," dated September 1995, with a reference to Nuclear Energy Institute (NEI) Topical Report NEI 94-01, Revision 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," and the conditions and limitations specified in NEI 94-01, Revision 2-A. The amendment allows Dominion Energy Nuclear Connecticut, Inc. to extend the Type A primary containment integrated leak rate test interval for Millstone 2 from 10 years to 15 years and the Type C local leak rate test interval from 60 months to 75 months, and incorporates the regulatory positions stated in RG 1.163.

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

Sincerely,

Richard V. Guzman, Senior Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-336

Enclosures:
1. Amendment No. 335 to DPR-65
2. Safety Evaluation

cc: Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DOMINION ENERGY NUCLEAR CONNECTICUT, INC.

DOCKET NO. 50-336

MILLSTONE POWER STATION, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 335
Renewed License No. DPR-65

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

   A. The application for amendment by Dominion Energy Nuclear Connecticut, Inc. (the licensee) dated October 4, 2017, as supplemented by letters dated May 24, 2018, and June 14, 2018, 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 Renewed 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. 335 are hereby incorporated in the renewed 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

James G. Danna, Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Facility Operating License
and Technical Specifications

Date of Issuance: September 25, 2018

ATTACHMENT TO LICENSE AMENDMENT NO. 335

MILLSTONE POWER STATION, UNIT NO. 2

RENEWED FACILITY OPERATING LICENSE NO. DPR-65

DOCKET NO. 50-336

Replace the following page of the Renewed Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Remove	Insert
3	3

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 a marginal line indicating the area of change.

Remove	Insert
6-26	6-26

Connecticut, in accordance with the procedures and limitations set forth in this renewed operating license;

(2) Pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as supplemented and amended;

(3) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(4) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form for sample analysis or instrument and equipment calibration or associated with radioactive apparatus or components;

(5) Pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter 1: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Section 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The licensee is authorized to operate the facility at steady-state reactor core power levels not in excess of 2700 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 335 are hereby incorporated in the renewed license. The licensee shall operate the facility in accordance with the Technical Specifications.

6.19 CONTAINMENT LEAKAGE RATE TESTING PROGRAM

A program shall be established to implement the leakage rate testing of the primary containment as required by 10CFR50.54(o) and 10CFR50, Appendix J, Option B as modified by approved exemptions. This program shall be in accordance with the guidelines contained in NEI 94-01, Revision 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," dated July 2012 and the limitations and conditions specified in NEI 94-01, Revision 2-A, dated October 2008.

The peak calculated primary Containment internal pressure for the design basis loss of coolant accident is P_a. P_a is 53 psig. Containment leakage rate testing will be performed at the containment design pressure of 54 psig or higher.

The maximum allowable primary containment leakage rate, L_a, at P_a, is 0.5% of primary containment air weight per day.

Leakage rate acceptance criteria are:

a. Primary containment overall leakage rate acceptance criterion is $< 1.0\ L_a$. During the first unit startup following testing in accordance with this program, the leakage rate acceptance criteria are $< 0.60\ L_a$ for the combined Type B and Type C tests, and $< 0.75\ L_a$ for Type A tests;

b. Air lock testing acceptance criteria are:

   1. Overall air lock leakage rate is $\leq 0.05\ L_a$ when tested at $\geq P_a$.

   2. For each door, leakage rate is $\leq 0.01\ L_a$ when pressurized to ≥ 25 psig.

The provisions of SR 4.0.2 do not apply for test frequencies specified in the Primary Containment Leakage Rate Testing Program.

The provisions of SR 4.0.3 are applicable to the Primary Containment Leakage Rate Testing Program.

6.20 RADIOACTIVE EFFLUENT CONTROLS PROGRAM

This program conforms to 10 CFR 50.36a for the control of radioactive effluents and for maintaining the doses to members of the public from radioactive effluents as low as reasonably achievable. The program shall be contained in the REMODCM, shall be implemented by procedures, and shall include remedial actions to be taken whenever the program limits are exceeded. The program shall include the following elements:

a. Limitations on the functional capability of radioactive liquid and gaseous monitoring instrumentation including surveillance tests and setpoint determination in accordance with the methodology in the REMODCM;

b. Limitations on the concentrations of radioactive material released in liquid effluents to UNRESTRICTED AREAS, conforming to ten times the concentration values in Appendix B, Table 2, Column 2 to 10CFR 20.1001-20.2402;

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 335

TO RENEWED FACILITY OPERATING LICENSE NO. DPR-65

DOMINION ENERGY NUCLEAR CONNECTICUT, INC.

MILLSTONE POWER STATION, UNIT NO. 2

DOCKET NO. 50-336

1.0 INTRODUCTION

By letter dated October 4, 2017, as supplemented by letters dated May 24, 2018, and June 14, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML17284A179, ML18151A467, and ML18170A093, respectively), Dominion Energy Nuclear Connecticut, Inc. (DENC, the licensee), submitted a license amendment request (LAR) to revise the Technical Specifications (TSs) for Millstone Power Station, Unit No. 2 (Millstone 2).

The amendment revises Millstone 2 TS 6.19, "Containment Leakage Rate Testing Program," by replacing the reference to Regulatory Guide (RG) 1.163, Performance-Based Containment Leak-Test Program," dated September 1995 (ADAMS Accession No. ML003740058), with a reference to Nuclear Energy Institute (NEI) Topical Report (TR) NEI 94-01, Revision 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," (ADAMS Accession No. ML12221A202), and the conditions and limitations specified in NEI 94-01, Revision 2-A, dated November 19, 2008 (ADAMS Accession No. ML100620847). The amendment will allow DENC to extend the Type A primary containment integrated leak rate test interval (ILRT) for Millstone 2 from 10 years to 15 years and the Type C local leak rate test interval from 60 months to 75 months, and incorporates the regulatory positions stated in RG 1.163.

The supplements dated May 24, 2018, and June 14, 2018, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC or the Commission) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on January 2, 2018 (83 FR 163).

2.0 REGULATORY EVALUATION

2.1 Description of Containment

In Section 4.1, "Description of Containment," of Attachment 1 to its LAR dated October 4, 2017, the licensee provided the following as a description of the Millstone 2 containment:

> The containment structure at Millstone 2 consists of a pre-stressed, reinforced concrete cylinder and dome connected to and supported by a massive reinforced concrete foundation slab. The cylindrical portion is pre-stressed by a post-tensioning system composed of horizontal and vertical tendons, with the horizontal tendons placed in three 240 degree systems using three buttresses as supports for the anchorages. The dome has a three-way post-tensioning system. The concrete foundation slab is conventionally reinforced with high strength reinforcing steel. A continuous access gallery is provided beneath the base slab for installation of vertical tendons.
>
> The containment structure has an inside diameter of 130 feet and has an interior vertical height of 175 feet. The cylindrical wall thickness is 3.75 feet, the dome is 3.25 feet thick, and the foundation slab is 8.5 feet thick. A 0.25-inch thick welded steel liner is attached to the inside surface of the concrete shell to ensure a high degree of leaktightness. The floor liner is installed on top of the structural slab and is then covered with concrete. A waterproofing membrane that was installed during construction of the containment is a continuous plain sheet of polyvinyl chloride applied to the concrete surface with an adhesive. The membrane was applied after the forms were stripped. The membrane is composed of an elastomeric material having thickness of 40 mils (minimum). The joints are lapped and the adhesive is applied continuously to the contact surface.
>
> The containment structure completely encloses the reactor, reactor coolant system, and portions of the auxiliary and engineered safety features systems. It ensures that an acceptable upper limit for leakage of radioactive materials to the environment will not be exceeded even if gross failure of the reactor coolant system occurs. [...].
>
> The containment steel liner plate and penetration sleeves are designed to serve as the primary leakage barrier for the containment. The design considered the composite action of the liner and the concrete structure and includes the transient effects of the liner due to temperature changes during construction, normal operation, and the LOCA [loss-of-coolant accident]. [...].
>
> All components of the liner which must resist the full design pressure, such as penetration sleeves, personnel lock, and equipment hatch, are designed to meet the requirements of paragraph N-1211, of Section III, Nuclear Vessels, 1968 Edition through the summer 1969 addenda of the ASME Code, except the external bolting attachments to the equipment hatch which were designed to meet the requirements of Section III, Subsection NE, 1986 Edition.

2.2 Applicable Regulations and Guidance

The regulations in Title 10 of the Code of Federal Regulations (10 CFR) Section 50.54(o) require that the primary reactor containments for water cooled power reactors shall be subject to the requirements set forth in 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." Appendix J to 10 CFR Part 50 includes two options: "Option A – Prescriptive Requirements," and "Option B – Performance-Based Requirements," either of which can be chosen for meeting the requirements of Appendix J.

The testing requirements in 10 CFR Part 50, Appendix J, ensure that: (a) leakage through containments or systems and components penetrating containments does not exceed allowable leakage rates specified in the TS; and (b) integrity of the containment structure is maintained during the service life of the containment. Millstone 2 has voluntarily adopted and has implemented Option B for meeting the requirements of 10 CFR Part 50, Appendix J.

Option B of 10 CFR Part 50, Appendix J, specifies performance-based requirements and criteria for preoperational and subsequent leakage-rate testing. These requirements are met by performing a Type A test to measure the containment system overall integrated leakage rate of the primary containments; Type B, consisting of a pneumatic test to detect and measure local leakage rates across pressure-retaining leakage-limiting boundaries; and Type C, consisting of a pneumatic test to measure containment insolation valve (CIV) leakage rates. After the preoperational tests, these tests are required to be conducted at intervals based on the historical performance of the overall containment system (for Type A tests), and based on the safety significance and historical performance of each boundary and isolation valve (for Type B and Type C tests) to ensure integrity of the overall containment system as a barrier to fission product release.

The leakage rate test results must not exceed the allowable leakage rate (L_a) as specified in the TSs. Option B also requires that a general visual inspection of the accessible interior and exterior surfaces of the containment system, for structural deterioration that may affect the containment leaktight integrity, must be conducted prior to each Type A test, and at a periodic interval between tests.

Section V.B.3 of 10 CFR Part 50, Appendix J, Option B, requires that the RG or other implementation document used by a licensee to develop a performance-based leakage testing program must be included, by general reference, in the plant TSs. Furthermore, the submittal for TS revisions must contain justification, including supporting analyses, if the licensee chooses to deviate from methods approved by the NRC and endorsed in an RG.

The NRC staff's final safety evaluation (SE) for NEI 94-01, Revision 2, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," and Electric Power Research Institute (EPRI) Report No. 1009325, Revision 2, dated August 2007, "Risk Impact Assessment of Extended Integrated Leak Rate Testing Intervals," dated June 25, 2008 (ADAMS Accession No. ML081140105) was incorporated into NEI 94-01, Revision 2-A, November 19, 2008. NEI 94-01, Revision 2-A, describes an NRC-approved approach for implementing the optional performance-based requirements of Option B described in 10 CFR Part 50, Appendix J, which includes provisions for extending Type A ILRT intervals to up to 15 years, and incorporates the regulatory positions stated in RG 1.163. NEI 94-01, Revision 2-A, delineates a performance-based approach for determining Type A, Type B, and Type C containment leakage rate surveillance testing frequencies. This method uses industry performance and plant-specific data and risk insights in determining the appropriate testing frequency, and also discusses the

performance factors that licensees must consider in determining test intervals. NEI 94-01, Revision 2-A, includes six specific limitations and conditions listed in Section 4.1 of the SE.

The NRC's staff's final SE dated June 8, 2012 (ADAMS Accession No. ML121030286), of NEI 94-01, Revision 3, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," was incorporated into NEI 94-01, Revision 3-A, dated July 2012. NEI 94-01, Revision 3-A, documents the NRC's evaluation and acceptance of NEI 94-01, Revision 3, and includes two specific limitations and conditions listed in Section 4.0 of the SE.

The regulations in 10 CFR 50.55a "Codes and standards," contain the containment inservice inspection (CISI) requirements that, in conjunction with the requirements of Appendix J, ensure the continued leaktight and structural integrity of the containment during its service life.

The regulations in 10 CFR 50.65(a), "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," require that the licensee shall monitor the performance or condition of structures, systems, or components against licensee-established goals in a manner sufficient to provide reasonable assurance that these structures, systems, and components, as defined in paragraph (b) of this section, are capable of fulfilling their intended functions. These goals shall be established commensurate with safety and, where practical, take into account industrywide operating experience.

The regulations in 10 CFR 50.36, "Technical specifications," state that the TSs include items in five specific categories. These categories include: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting condition for operations; (3) surveillance requirements; (4) design features; and (5) administrative controls. NUREG-1432, Revision 4.0, "Standard Technical Specifications – Combustion Engineering Plants" (ADAMS Accession No. ML12102A169), incorporated the Standard Technical Specifications Task Force Traveler 52, Revision 3 (ADAMS Accession No. ML040400371), which includes guidance for specific changes to TSs for implementation of 10 CFR Part 50, Appendix J, Option B.

A Type A test is an overall ILRT of the containment structure. NEI 94-01, Revision 0, 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, but this "should be used only in cases where refueling schedules have been changed to accommodate other factors." Amendment No. 285 to Facility Operating License No. DPR-65 for Millstone 2 (ADAMS Accession No. ML050730331), allowed a one-time extension of the ILRT interval to 15 years. However, subsequent to this one-time extension, the long-term ILRT test interval requirement in Millstone 2 TS 6.19 remained at 10 years.

The results of the two most recent Millstone 2 Type A tests of June 1995 and November 2009 are reflected in LAR Section 4.2, "Type A (ILRT) Test History." Both Type A tests were successful in that the as found "Corrected Results" test results were less than $1.0L_a$, as specified by the limiting value of Millstone 2 TS 6.19. Both P_a and L_a are defined in Millstone 2 TS 6.19, "Containment Leakage Rate Testing Program."

In accordance with Millstone 2 TS 6.19, the peak calculated primary containment internal pressure for the design-basis loss of coolant accident, P_a, equals 53 pounds per square inch gage (psig), and the maximum allowable primary containment leakage rate, L_a at P_a, equals 0.5 percent of primary containment air weight per day. In March 2016, Millstone 2 License Amendment No. 326 (ADAMS Accession No. ML16068A312) added the TS stipulation that

"Containment leakage rate testing will be performed at the containment design pressure of 54 psig or higher."

Guidance for extending Type A ILRT surveillance intervals beyond 10 years is provided in Section 9.2.3, "Extended Test Intervals," of TR NEI 94-01, Revision 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," July 2012.

Guidance for extending Type C test LLRT surveillance intervals beyond 60 months is provided in Section 10.2.3, "Type C Test Interval," of TR NEI 94-01, Revision 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," July 2012.

The Type A and the combined Type B and Type C test results must not exceed the L_a with margin, as specified in Millstone 2 TS 6.19a, "Leakage Rate Acceptance Criteria." Option B also requires that a general visual inspection of the accessible interior and exterior surfaces of the containment system for structural deterioration, which may affect the containment leaktight integrity, be conducted prior to each Type A test and at a periodic interval between tests based on the performance of the containment system.

DENC proposes to extend the Millstone 2 interval for the containment ILRT to 15 years from the last ILRT. The last Unit No. 2 ILRT was completed during November 2009. The Unit No. 2 required test interval frequency reverted back to 10 years after completion of the ILRT of November 2009. Therefore, the next Unit No. 2 ILRT is currently due for completion before the end of November 2019. Using the proposed interval of 15 years, the next Unit No. 2 ILRT would need to be completed before the end of November 2024.

3.0 TECHNICAL EVALUATION

3.1 Background

By License Amendment No. 203 dated September 20, 1996 (ADAMS Accession No. ML012920217), the NRC authorized the licensee to implement 10 CFR Part 50, Appendix J, Option B, for Types A, B, and C tests.

On April 6, 2005, the NRC staff approved License Amendment No. 285 (ADAMS Accession No. ML050730331) to Millstone 2 TS 6.19, thereby authorizing a one-time Type A test interval extension of 5 years. Amendment No. 285 added an exception to the guidance of Section 9.2.3 of NEI 94-01, Revision 0, "Industry Guideline for Industry Performance-Based Option of 10 CFR Part 50, Appendix J" (ADAMS Accession No. ML11327A025). The exception states, in part, "... The first Type A test performed after the June 10, 1995 Type A test shall be performed no later than June 10, 2010." This exception is deleted as part of the proposed change to TS 6.19.

On March 31, 2016, the NRC staff approved License Amendment No. 326 to Millstone 2 TS 6.19. This amendment, in part, added to the definition of P_a a specific numerical value for P_a and stipulated that leakage rate testing will be performed at a value that is bound by the containment design pressure. Specifically, TS 6.19 states:

> The peak calculated primary Containment internal pressure for the design basis loss of coolant accident is P_a. P_a is 53 psig. Containment leakage rate testing will be performed at the containment design pressure of 54 psig or higher.

Based on the currently required frequency of 10 years, the next Millstone 2 containment ILRT performance is due for completion no later than November 10, 2019. Accordingly, the licensee plans to implement the amendments before the Millstone 2 fall 2018 refueling outage.

3.2 Licensee's Proposed Changes

The first paragraph of Millstone 2 TS 6.19, "Containment Leakage Rate Testing Program," currently states:

> A program shall be established to implement the leakage rate testing of the primary containment as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B as modified by approved exemptions. This program shall be in accordance with the guidelines contained in Regulatory Guide 1.163, "Performance-Based Containment Leak-Test Program," dated September 1995, as modified by the following exception to NEI 94-01, Rev. 0, "Industry Performance-Based Option of 10 CFR Part 50, Appendix J": The first Type A test performed after the June 10, 1995 Type A test shall be performed no later than June 10, 2010.

The proposed change would revise TS 6.19 by deleting the exception to NEI 94-01, Revision 0, and replacing the reference to RG 1.163 with a reference to NEI 94-01, Revision 3-A, and the limitations and conditions specified in NEI 94-01, Revision 2-A. Specifically, the first paragraph of TS 6.19 would be changed to read as follows:

> A program shall be established to implement the leakage rate testing of the primary containment as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B as modified by approved exemptions. This program shall be in accordance with the guidelines contained in NEI 94-01, Revision 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," dated July 2012 and the limitations and conditions specified in NEI 94-01, Revision 2-A, dated October 2008.

3.3 Deterministic Considerations: Structural and Leaktight Integrity of the Containment

The licensee proposed to revise TS 6.19 by replacing the reference to RG 1.163 with a reference to NEI 94-01, Revision 3-A, and the conditions and limitations specified in NEI 94-01, Revision 2-A. Versions of NEI 94-01 TRs would provide for:

- Adopting the use of American National Standards Institute/American Nuclear Society (ANSI/ANS) 56.8-2002, "Containment System Leakage Testing Requirements," and

- Adopting a more conservative grace interval of 9 months, for Type A, Type B and Type C leakage tests in accordance with NEI 94-01, Revision 3-A.

With respect to the deletion of the exception currently contained in Millstone 2 TS 6.19, the NRC staff concurs with the licensee in that the deletion of the one-time exception to NEI 94-01, Revision 0, Section 9.2.3, would be appropriate with the staff's approval of the subject LAR dated October 4, 2017. In particular, this exception states, in part, "The first Type A test performed after the June 10, 1995 Type A test shall be performed no later than June 10, 2010." As indicated in Section 4.2 of the LAR, the first Millstone 2 Type A (ILRT) test after June 10,

1995, was completed on November 10, 2009. Accordingly, the NRC staff approves the deletion of this exception associated with Millstone 2 TS 6.19.

Consistent with the guidance contained in both NEI 94-01, Revision 2-A, and NEI 94-01, Revision 3-A, the licensee justified the proposed changes by demonstrating adequate performance of the Millstone 2 containment based on: (a) the historical plant-specific containment leakage testing program results, (b) the CISI program results, and (c) a Millstone 2 plant-specific risk assessment.

The NRC staff reviewed the Millstone 2 LAR from the perspective of deterministic considerations with regard to containment leaktight integrity. The NRC staff's review and analysis of these changes is conveyed in the following Subsections 3.3.1 and 3.3.2 of this SE.

3.3.1 Type A Integrated Leak Rate Test History

Per TS 6.19, the Millstone 2 containment was designed for a maximum allowable containment leakage rate L_a of 0.5 percent by weight of primary containment air weight per day at the calculated peak pressure, P_a. TS 6.19 indicates that the peak calculated primary containment internal pressure for the design-basis loss of coolant accident, P_a, is 53 psig.

Since December 1992, a total of three ILRTs have been performed on the Millstone 2 containment. These three Unit No. 2 ILRTs all had satisfactory leakage rate results. The test results of these three ILRTs were documented in LAR Section 4.2. The three test results are summarized in Table 1 below:

Table 1

Millstone 2 Type A ILRT History

Test Date	Upper 95% Confidence Level (wt% /day) [2]	Line Up Penalties (wt%/day) [2]	Volume Change Correction (wt%/day) [2]	Leakage Savings (wt%/day) [2]	"As Found-Corrected Results" (wt%/day) [2]	ILRT Acceptance Criteria[1], L_a (wt%/day)	"As Left-Performance-Corrected Results" (wt%/day) [2]
Dec. 1992	0.2565	0.0009	0.0003	0.0232	0.2809	0.5	0.2577
June 1995	0.2361	0.00156	0.0	0.01826	0.25592	0.5	0.23766
Nov. 2009	0.1793	0.03589	-0.0004	0.000035	0.214835	0.5	0.2148

[1] Per TS 6.19
[2] Data source LAR Section 4.2

Section 9.1.2 of NEI 94-01, Revision 3-A, states, in part, "The elapsed time between the first and the last tests in a series of consecutive passing tests used to determine performance shall be at least 24 months." The NRC staff confirmed that the requirement of NEI TR Section 9.1.2 has been satisfied based on the test dates shown in Table 1.

TS 6.19 references RG 1.163. Regulatory Position C of RG 1.163 states that NEI 94-01, Revision 0, provides methods acceptable to the NRC staff for complying with the provisions of Option B in Appendix J to 10 CFR Part 50. The third paragraph of Section 9.2.3, "Extended Test Intervals," of NEI 94-01, Revision 0, states, in part:

> In reviewing past performance history, Type A test results may have been calculated and reported using computational techniques other than the Mass Point method from ANSI/ANS-56.8–1994 (e.g., Total Time or Point–to–Point). Reported test results from these previously acceptable Type A tests can be used to establish the performance history. Additionally, a licensee may recalculate past Type A Upper Confidence Limit (UCL) (using the same test intervals as reported) in accordance with ANSI/ANS-56.8–1994 Mass Point methodology and its adjoining Termination criteria in order to determine acceptable performance history. ...

NEI 94-01, Revision 3-A, is nearly identical except the test standard invoked is ANSI/ANS-56.8-2002. The NRC staff notes that NEI 94-01, Revision 3-A, Section 9.2.3, does not mandate that a licensee recalculate past Type A test results to demonstrate conformance with the definition of "performance leakage rate" contained in NEI 94-01, Revision 3-A. The staff also notes that the Millstone 2 ILRT results since December 1992 demonstrated ample margin (i.e., greater than 43 percent) between each "as-found" ILRT value and L_a. Therefore, the staff did not request that the licensee reconstitute the Unit No. 2 Type A test results from before the ILRT of June 1995.

The requirement of TS 6.19.a (i.e., leakage rate acceptance criteria) establishes the maximum limit for the Millstone 2 "as-left" leakage rate for unit startup following completion of Type A testing at less than or equal to (≤) 0.75 L_a, which equals 0.375 percent of containment air weight per day. The Millstone 2 containment was designed for a leakage rate L_a not to exceed 0.5 percent by weight of containment air per day at the calculated peak pressure, P_a. As shown in Table 1, there has been adequate margin to the performance limit as described in TS 6.19 for L_a for the historical ILRTs spanning a period of 18 years.

The past three Millstone 2 ILRT results dating back to 1992 have confirmed that the primary containment leakage rates are acceptable with respect to the design criterion leakage of containment air weight (L_a) per day. Since the last two Type A tests for Millstone 2 had "as found" test results of less than 1.0L_a, a test frequency of 15 years in accordance with NEI 94-01, Revision 3-A, and the conditions and limitations of NEI 94-01, Revision 2-A, is acceptable for Millstone 2. The NRC staff finds that the last two Millstone 2 ILRT test results satisfy the requirements of Sections 9.1.2 of NEI 94-01, Revision 3-A.

3.3.2 Types B and C Leak Rate Test History

Millstone 2 TS 6.19, "Containment Leakage Rate Testing Program," states, in part:

> Leakage Rate acceptance criteria are:
>
> a. Primary containment overall leakage rate acceptance criterion is < 1.0 L_a. During the first unit startup following testing in accordance with this program, the leakage rate acceptance criteria are < 0.60 L_a for the combined Type B and Type C tests, and < 0.75 L_a for Type A tests; ...

The NRC staff reviewed the local leak rate summaries contained in LAR Section 4.3, "Type B and Type C Testing." The licensee indicated in its LAR that, "For Millstone 2, the combined Type B and Type C leakage acceptance criterion is 0.60 L_a or 511,717 standard cubic centimeters per minute (sccm)."

With the use of these L_a values and the data contained in LAR Section 4.3, the NRC staff confirmed the accuracy of the "Fraction of $0.6L_a$" values contained in the LAR and concluded that: (1) the Millstone 2 "as-found" minimum pathway leakage rates for the last three refueling outages since 2014 have an average of 3.74 percent of 0.6 L_a with a high of 4.28 percent 0.6 L_a, and (2) the Millstone 2 "as-left" maximum pathway leakage rates for the last three refueling outages since 2007 have an average of 7.20 percent of 0.6 L_a with a high of 8.26 percent 0.6 L_a.

As indicated in Section 4.3 of the LAR, there were no Type B or Type C penetration test failures during the three most recent refueling outages 2R22, 2R23, or 2R24.

Millstone 2 has a total of 54 Type B component penetrations. Of this total, 48 penetrations remain undisturbed during each refueling outage and is, therefore, eligible for an extended 120month performance-based test interval. Of these residual 48 penetrations, greater than 83 percent (i.e., 44 penetrations) are tested on the extended 120-month performance-based test interval. The four electrical penetrations not on an extended test interval are associated with a reactor coolant pump. These four original electrical penetrations have had historical performance problems and remain on an increased test frequency until their replacement. Originally, there were 12 reactor coolant pump electrical penetrations with this problematic history. Eight of the twelve electrical penetrations have been replaced and are now tested on an extended 120-month performance-based test interval.

Millstone 2 has a total of 59 Type C components. With the exception of the containment purge and exhaust Type C penetrations, all Type C containment isolation valves (CIVs) currently exhibit satisfactory performance and are tested on a 60-month performance-based test interval. The CIVs of the containment purge and exhaust Type C penetrations are required to be tested each refueling outage. Therefore, 100 percent of the eligible Type C tested components are currently on the maximum performance-based test interval of 60 months.

The LAR indicated that during refueling outages 2R22 and 2R23, containment Type C penetrations 38 and 51 were both restored to a 60-month test frequency. The failure mechanism associated with station air inside check valve 2-SA-22 of penetration 38 was attributed to debris on the valve seat. The failure mechanism associated with CIVs 2-GR-11.1 and 2-GR-11.2 of penetration 51 was attributed to debris on the valve internals. Following satisfactory performance of two consecutive LLRTs, each penetration was returned to a 60-month test performance interval. The staff notes that this course of action is consistent with the guidance in NEI 94-01, Revision 0, Section 10.2.3, "Type C Test Interval."

Based on the NRC staff's review of the historical information provided in LAR Section 4.3, "Type B and Type C Testing," the staff observed that there was no indication of the licensee's failure to adequately implement the requirements of its Appendix J, Option B performance-based testing program.

In summary, the licensee provided an adequate explanation about the cause of failure for the only LLRT Type C penetration failures experienced before refueling outage 2R22 (i.e., April 2014). Furthermore, based on the review of LAR Section 4.3, the NRC staff concludes that the aggregate leakage rate results of the "As Found Minimum Pathway" for all Millstone 2 Type B and Type C tests from 2014 through 2017 demonstrate a history of adequate maintenance since the aggregate test results at the end of each operating cycle were all well below (i.e., > 95 percent margin) the Type B and Type C test TS leakage rate acceptance criteria of < 0.60 L_a contained in TS 6.19.a. Therefore, the NRC staff has reasonable assurance that the licensee is compliant with the guidance of both Section 10.2.1, "Type B Test Intervals,"

and Section 10.2.3, "Type C Test Interval," of NEI 94-01, Revision 0. As stated above, greater than 83 percent of the eligible Type B containment penetrations and 100 percent of the eligible Type C Containment penetrations are tested on the extended test intervals. The NRC staff concludes that the licensee has a demonstrated history of adherence to the requirements of 10 CFR Part 50, Appendix J, Option B. This conclusion supports allowing an extended test interval of up to 75 months for the Millstone 2 Type C tested CIVs in accordance with the guidance of NEI 94-01, Revision 3-A.

Based on the above, the NRC staff concludes that: (1) the licensee has been compliant with the guidance of RG 1.163 and NEI 94-01, Revision 0; (2) the recent historical cumulative Type B and Type C test results are substantially below the acceptance limit of TS 6.19a; and (3) the licensee has a corrective action program that appropriately addresses poor performing valves and penetrations. Therefore, the NRC staff finds that the licensee is effectively implementing the Millstone 2 Type B and Type C leakage rate test program, as required by Option B of 10 CFR Part 50, Appendix J.

3.3.3 Containment Inservice Inspection Program

Previous Type A Integrated Leak Rate Testing (ILRT) Results

In its LAR, the licensee stated that Millstone 2 TS 6.19 currently requires Types A, B, and C testing in accordance with RG 1.163, which endorses the methodology for complying with 10 CFR 50, Appendix J, Option B. Since the adoption of Option B, the performance leakage rates are calculated in accordance with NEI 94-01, Section 9.1.1, for Type A testing. The following table lists the past periodic Type A ILRT results for Millstone 2, which was provided in the LAR.

Table 2

Type A – Integrated Leakage Rate Testing History

Test Date	As Found (wt.%/day)	As Left (wt.%/day)	Maximum Allowable (TS limit) (wt.%/day)
December 24, 1992	0.2809	0.2577	0.2809 < 0.5 or 56%
June 10, 1995	0.25592	0.23766	0.2559 < 0.5 or 51%
November 10, 2009	0.214835	0.2148	0.2148 < 0.5 or 43%

Note: TS 6.19, P_a is defined as 53 psig (LOCA is 52.5 psig)
Containment leakage rate testing is performed at the containment design pressure of 54 psig or higher.

Containment Inservice Inspection Program

In its LAR, the licensee stated that prior to initiating a Type A test, a general visual examination of accessible interior and exterior surfaces of the containment system for structural problems that may affect either the containment structure leakage integrity or the performance of the Type A test is performed. This inspection is typically conducted in accordance with the Millstone CISI plan, which implements the requirements of ASME, Section XI, Subsection IWE/IWL. The 2001 Edition with the 2003 Addenda is the current applicable code edition and addenda for the second 10-year IWE/IWL program interval.

IWE Examinations

In its LAR, the licensee stated that Millstone 2 has completed the examination requirements of Interval 2, Period 3 of the containment IWE inservice inspection program. Examinations were performed to the requirements of the 2001 Edition through 2003 Addenda of ASME XI, as modified by the 10 CFR 50.55a(b) limitations.

The licensee also stated that 100 percent of the moisture barrier was replaced and that visual inspection of the liner behind the moisture barrier identified some pitting and degradation resulting from leakage into the moisture barrier. The licensee assessed the corrosion as being minimal, and repairs, other than replacing the moisture barrier, were not required. Prevention of any further intrusion of moisture and elimination of the potential for continued loss of base material and further degradation is achieved by the replacement of the moisture barrier. Subsequent inspections since replacement have verified that the moisture barrier remains in good condition and intact.

The licensee further stated that a complete inspection of all accessible containment liner surface areas is performed each inspection period. Additionally, a trained coating inspector specifically examines the containment liner coating, independent of the IWE examination during each refueling outage. There are no primary containment surface areas that require augmented examination in accordance with ASME Section XI, IWE-1240; however, each period, 100 percent of the accessible primary containment surface area is inspected.

The licensee's Millstone 2 IWE program included the inspection of the accessible leak chase channels and plugs or caps during the general visual examination as a liner boundary. In response to NRC Information Notice 2014-07, "Degradation of Leak Chase Channel System for Floor Welds of Metal Containment Shell and Containment Metallic Liner," the licensee's examination was expanded to include the inspection as an E-A Containment Surfaces, Item No. E130 - Moisture Barriers. This examination identified no deficiencies. The licensee further stated that, at this time, there are no primary containment surface areas that require augmented examinations in accordance with ASME Section XI, IWE-1240.

IWL Examinations

The licensee stated that the second 10-year interval of concrete containment examinations (IWL) has been performed for Millstone 2. In accordance with Category L-A of the 2001 Edition with 2003 Addenda of ASME Section XI, general and detailed visual examinations were completed by the required due date (March 8, 2016). In accordance with Category L-A of the Code, the licensee stated it would perform the similar examination (100 percent of accessible areas) for the third 10-year interval by March 8, 2020, and 2025 (plus or minus 1 year).

The licensee also stated that the 2016 examination indications noted minor spalls, efflorescence, pop-outs, cracks, stains, nails, or metal trapped within the concrete and abandoned anchors/anchor holes. Due to the controlled environment within the enclosure building, there have been no changes in the indications. All indications/conditions identified were minor in nature and did not require excavation or repair. Based on these inspections, the licensee concludes that the Millstone 2 containment structure is in good material condition. The containment structure continues to retain its ability to perform, as designed.

The Table 3 below, provides an approximate schedule for Millstone 2 containment surface examinations, assuming the Type A test frequency is extended to 15 years.

Table 3

Inspection Schedule for IWE, IWL and Associated

Calendar year	Type A Test (ILRT)	Accessible Exterior Surfaces (IWL Visual Inspection)	Tendon Surveillance (IWL Inspection and Testing)	Accessible Interior Liner Surfaces (IWE Visual Inspection)	Containment Liner Coating Inspection
2009	11/10	10/29 (Pre-ILRT)		10/29 (Pre-ILRT)	10/31
2010		12/20	12/30		
2011				4/5	4/22
2012				11/13	11/2
2013					
2014				Note 1 (5/8)	4/25
2015		5/11		10/26	10/9
2016			3/8		
2017					4/19
2018				(Fall)	(Fall)
2019					
2020		(February)	(February)		(Spring)
2021				(Fall)	(Fall)
2022					
2023	(15 Year)	(Pre-ILRT)		(Pre-ILRT)	(Spring)
2024					(Fall)
2025		(February)	(February)		
2026				(Spring)	(Spring)

Note 1: The 2009 Self-Assessment was performed to assess potential gaps to ASME RA-Sb-2005/RG 1.200, Revision 1 requirements. Per NEI 05-04, Revision 3, no reevaluation against ASME RA-Sa-2009/ RG 1.200, Revision 2, is required for this supporting requirement.

Type B and Type C LLRT Program

In its LAR, the licensee stated that Millstone 2, Appendix J, Types B and C testing program requires testing of electrical penetrations, airlocks, hatches, flanges, and valves within the scope of the program as required by 10 CFR Part 50, Appendix J, Option B, and TS 6.19.

A review of the most recent Type B and Type C test results and their comparison with the allowable leakage rate was performed. For Millstone 2, the combined Type B and Type C leakage acceptance criterion is 0.60 L_a or 511,717 sccm). The maximum and minimum pathway leak rate summary totals for the last three refueling outages are shown in Table 4 below.

Table 4

Types B and C LLRT Combined As-Found/As-Left Trend Summary

Refueling Outage (Year)	2R24 April 2017	2R23 October 2015	2R22 April 2014
As-Found Min Path (sccm)	19,309 (3. 778% of 0.6L_a)	16,249 (3.179% of 0.6La)	21,903 (4.286% of 0.6La)
As-Left Min Path (sccm)	20,131 (3.939% of 0.6L_a)	16,448 (3.218% of 0.6La)	21,584 (4.224% of 0.6La)
As-Left Max Path (sccm)	36,989 (7.238% of 0.6La)	31,313 (6.127% of 0.6La)	42,198 (8.258% of 0.6La)

3.3.4 Deterministic Review Summary

Based on the preceding regulatory and technical evaluations, the NRC staff finds that the licensee has submitted its CISI schedule and has adequately implemented its primary containment leakage rate testing program consisting of ILRT and LLRT. The results of the recent ILRT and LLRT combined totals demonstrate acceptable performance and support a conclusion that the structural and leaktight integrity of the primary containment vessel is adequately managed and will continue to be periodically monitored and managed by the ILRTs and LLRTs.

The NRC staff finds that there is reasonable assurance that the structural and leaktight integrity of the Millstone 2 primary containment will continue to be monitored and maintained with the performance-based Type A test interval extended up to one test in 15 years, without undue risk to public health and safety. Therefore, the NRC staff concludes that the licensee's containment inspection programs support extension of the ILRT frequency as requested in the licensee's submittal of October 4, 2017.

3.4 NRC Staff Evaluation of the Conditions and Limitations

3.4.1 Conditions and Limitations in NEI 94-01, Revision 2-A

In its SE for NEI 94-01, Revision 2, dated June 25, 2008, the NRC staff concluded that the guidance in NEI 94-01, Revision 2, is acceptable for reference by licensees proposing to amend its TSs regarding containment leakage rate testing subject to six conditions and limitations. The requirements of NEI 94-01 stayed essentially the same from the original version through Revision 2, except that the regulatory positions of RG 1.163 were incorporated, and the maximum ILRT interval was extended to 15 years. The licensee's response to each of the six conditions and limitations from NEI 94-01, Revision 2-A (Section 4.1 of the SE), is listed in the table contained in the attachment of its LAR, Section 4.0. The NRC staff evaluated the licensee's application to determine whether the licensee adequately addressed these conditions.

NEI 94-01, Revision 2-A, Condition 1

Condition 1 is derived from Sections 3.1.1.1 and 4.1 of the NRC SE dated June 25, 2008, and stipulates that for calculating the Type A leakage rate, the licensee should use the definition in NEI 94-01, Revision 2-A, in lieu of the definition in ANSI/ANS-56.8-2002. In Section 4.0 of its LAR, the licensee stated:

> Following the NRC approval of this license amendment request, DNC [DENC] will use the definition in Section 5.0 of NEI 94-01, Revision 3-A (and Revision 2-A), for calculating the Type A leakage rate when future Millstone 2 Type A tests are performed.

The NRC staff reviewed the definitions of "performance leakage rate" contained in NEI 94-01, Revisions 2 and 3-A. The staff notes that the definition in NEI 94-01 Revision 2-A, Section 5.0, remained the same in NEI 94-01, Revision 3-A. The staff finds that the licensee will use the definition found in Section 5.0 of NEI 94-01, Revision 2 for calculating the Type A leakage rate in the Millstone 2 "Containment Leakage Rate Testing Program." Therefore, the staff concludes that this definition is acceptable and that the licensee has sufficiently addressed Condition 1.

NEI 94-01, Revision 2-A, Condition 2

Condition 2 is derived from Sections 3.1.1.3 and 4.1 of the NRC SE dated June 25, 2008, and stipulates that the licensee submits a schedule of containment inspections to be performed prior to and between Type A tests. In Section 4.4.2 of its LAR, the licensee provided the Millstone 2 schedule of containment inspections.

The NRC staff reviewed LAR Section 4.4, "Supplemental Inspection Requirements," and the table contained in LAR Section 4.4.2, "IWL Examinations." The staff finds that the table provides the scheduled dates for 100 percent completion of each required IWE and IWL inspection and each pre-ILRT inspection. Based on its review, the staff has confirmed that the IWE/IWL inspection requirements and the pre-ILRT primary containment inspection requirement of NRC staff SE Section 3.1.1.3 for NEI 94-01, Revision 2, can be satisfied for Millstone 2. Therefore, the staff concludes that the licensee can satisfy the guidance contained in NEI 94-01, Revision 3-A, Sections 9.2.1 and 9.2.3.2, and the provisions in Section 3.1.1.3 of the NRC SE dated June 25, 2008. Accordingly, the NRC staff finds that the licensee has adequately addressed sufficiently addressed NEI 94-01, Revision 2-A, Condition 2.

NEI 94-01, Revision 2-A, Condition 3

Condition 3 is derived from Sections 3.1.3 and 4.1 (in the enclosure, page 19) of the NRC SE dated June 25, 2008, and stipulates that the licensee addresses the areas of the containment structure potentially subjected to degradation. In Section 4.0 of its LAR, the licensee stated:

> General visual examination of accessible interior and exterior surfaces of the containment system for structural problems is typically conducted in accordance with the Millstone IWE/IWL Containment Inservice Inspection Plans which implement the requirements of the ASME, Section XI, Subsections IWE and IWL, as required by 10 CFR 50.55a(g).
>
> Previously, the Millstone IWE Program had inspected the accessible leak chase channels and plugs or caps during the general visual examination as a liner boundary. In response to NRC Information Notice 2014-07, "Degradation of Leak Chase Channel System for Floor Welds of Metal Containment Shell and Containment Metallic Liner," the examination was expanded to include the inspection as an E-A Containment Surfaces, Item No. E130 - Moisture Barriers. This examination identified no deficiencies. At this time there are no primary containment surface areas that require augmented examinations in accordance with ASME Section XI, IWE-1240.
>
> Within the Millstone IWL Program, no repairs were required and the containment structure was found in good material condition. No significant defects or concerns were observed on the exterior concrete and the observed indications were due to original construction. Taken together or individually, the indications do not represent a significant structural concern. The containment structure continues to retain its ability to perform, as designed.

The NRC staff reviewed the information contained in LAR Section 4.4, "Supplemental Inspection Requirements." The NRC SE for NEI 94-01, Revision 2, dated June 25, 2008, states, in part:

> ...In approving for Type A tests the one-time extension from 10 years to 15 years, the NRC staff has identified areas that need to be specifically addressed during the IWE and IWL inspections including a number of containment pressure-retaining boundary components (e.g., seals and gaskets of mechanical and electrical penetrations, bolting, penetration bellows) and a number of the accessible and inaccessible areas of the containment structures (e.g., moisture barriers, steel shells, and liners backed by concrete, inaccessible areas of ice condenser containments that are potentially subject to corrosion)....

General visual examinations of the accessible surfaces of containment are performed to assess the general condition of the containment surfaces. In conformance with 10 CFR 50.55a, the current applicable code edition and addenda for the Millstone 2 second 10-year inservice inspection interval is the 2001 Edition with the 2003 Addenda, Subsections IWE and IWL. This plan applies to the containment vessel. In particular:

- IWE deals with Class MC pressure retaining components and their integral attachment, and Class CC metallic shell I penetration liners.

- IWL deals with Class CC reinforced concrete and post-tensioning systems.

Inaccessible Areas/Augmented Examinations

The programmatic requirements for Class MC application inaccessible areas as specified in 10 CFR 50.55a(b)(2)(ix)(A) are:

> (1) The licensee shall evaluate the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of or result in degradation to such inaccessible areas.
> (2) For each inaccessible area identified, the licensee shall provide the following in the ISI Summary Report as required by IWA-6000:
>
> i. A description of the type and estimated extent of degradation, and the conditions that led to the degradation;
> ii. An evaluation of each area, and the result of the evaluation; and
> iii. A description of necessary corrective actions.

In LAR Section 4.4, the licensee indicated that the Millstone 2 primary containment examinations are performed in accordance with the IWE/IWL program and satisfy the general visual examination requirements specified in 10 CFR Part 50, Appendix J, Option B, as follows: "Identification and evaluation of inaccessible areas are addressed in accordance with the requirements of 10 CFR 50.55a(b)(2)(ix)(A) and (E)."

LAR Section 4.4.1, "IWE Examinations," states, in part:

> A review was conducted for Millstone 2 per IWE-1241, Examination Surface Areas (1992 Edition with 1992 Addenda of ASME XI) for the initial 10-year Category E-C examination requirements. No areas were deemed susceptible to accelerated degradation and aging; therefore, augmented examinations per Category E-C were not required....At this time, no augmented Category E-C examinations are planned for Millstone 2.

Bellows

The Millstone 2 Type B and Type C testing program consists of local leak rate testing of penetrations with expansion bellows that serve as a barrier to the release of the post-accident containment atmosphere. The results of the test program are used to demonstrate that proper maintenance and repairs are made on these components throughout their service life.

Electrical Penetrations

The Type B and Type C testing program requires testing of the 48 Millstone 2 Type B electrical penetrations in accordance with 10 CFR Part 50, Appendix J, Option B, and RG 1.163. The results of the test program are used to demonstrate that proper maintenance and repairs are made on these components throughout their service life. See SE Section 3.1.2, "Types B and C Leak Rate Test History," for additional detail about the monitoring of these electrical penetrations.

Bolting

The licensee performs bolting examinations in accordance with the IWE/IWL program. This program satisfies the general visual examination requirements specified in 10 CFR Part 50, Appendix J, Option B. Examination of pressure-retaining bolted connections and evaluation of containment bolting flaws or degradation are performed in accordance with the requirements of 10 CFR 50.55a(b)(ix)(G) and 10 CFR 50.55a(b)(ix)(H).

Moisture Barriers

LAR Section 4.4.1, "IWE Examinations," states, in part:

> One hundred percent of the moisture barrier was replaced (50% in 2000 and 50% in 2003). Visual inspection of the liner behind the moisture barrier identified some pitting and degradation resulting from leakage into the moisture barrier. Ultrasonic thickness examinations (five locations in 2000 and four locations in 2003) of the metal liner behind the moisture barrier material were performed to confirm that the containment liner thickness (minimum thickness 0.198 inches) significantly exceeded the minimum required wall thickness (0.0625 inches). The corrosion was minimal and repairs, other than replacing the moisture barrier, were not required. Replacement of the moisture barrier prevents any further intrusion of moisture and eliminates the potential for continued loss of base material and further degradation. Subsequent inspections since replacement have verified that the moisture barrier remains in good condition and intact.

Containment Liner Backed By Concrete

The NRC staff notes that in accordance with the requirements of ASME IWE, a complete inspection of all accessible Millstone 2 primary containment liner surface areas is performed in each of the three periods that make up each 10-year CISI interval .

LAR Section 4.4.1, "IWE Examinations," states, in part:

> Since the exterior containment concrete is fully enclosed and in a dry environment, no wicking potential from outside to the backside of the liner

> exists. ... There are no primary containment surface areas that require augmented examination in accordance with ASME Section XI, IWE-1240. However, each period 100 percent of the accessible primary containment surface area is inspected. If any significant changes or potential concerns are identified, a detailed inspection would be performed at that time.

Containment Concrete Structure

LAR Section 4.4.2, "IWL Examinations," states, in part:

> The 2016 examinations of the concrete exterior were conducted by a Quality Control inspector and the responsible engineer, using the approved Code visual methods. During the examinations, indications noted were minor spalls, efflorescence, pop-outs, cracks, stains, nails or metal trapped within the concrete and abandoned anchors/anchor holes. Due to the controlled environment within the enclosure building, there have been no changes in the indications.

In summary, the NRC staff finds that based on the information contained in LAR Section 4.4, the licensee has an established CISI program that can satisfy the issues in Section 3.1.3 of the NRC SE dated June 25, 2008. Accordingly, the NRC staff concludes that the licensee has adequately addressed NEI 94-01, Revision 2-A, Condition 3.

NEI 94-01, Revision 2-A, Condition 4

Condition 4 is derived from Sections 3.1.4 and 4.1 (in the enclosure, page 19) of the NRC SE dated June 25, 2008, and stipulates that the licensee addresses any tests and inspections performed following major modifications to the containment structure, as applicable. In Section 4.0 of its LAR, the licensee stated:

> No major modifications to the Millstone 2 containment structure have been performed. Steam generator and reactor vessel head replacements were performed without requiring any modification to the containment structure.

The NRC SE Section 3.1.4 for NEI 94-01, Revision 2, states:

> Section 9.2.4 of NEI TR 94-01, Revision 2, states that: "Repairs and modifications that affect the containment leakage integrity require LLRT or short duration structural tests as appropriate to provide assurance of containment integrity following the modification or repair. This testing shall be performed prior to returning the containment to operation." Article IWE-5000 of the ASME Code, Section XI, Subsection IWE (up to the 2001 Edition and the 2003 Addenda), would require a Type A test after major repair or modifications to the containment.
>
> In general, the NRC staff considers the cutting of a large hole in the containment for replacement of steam generators or reactor vessel heads, replacement of large penetrations, as major repair or modifications to the containment structure.

This condition is intended to verify any major modification or maintenance repair of the containment since the last ILRT has been appropriately accompanied by either a structural integrity test or ILRT and that any plans for such major modification also includes appropriate pressure testing. As stated in the licensee's response to Condition 4, no major repairs or

modifications have been performed to the Millstone 2 primary containment. Additionally, the licensee does not indicate any future major repairs or modifications. The NRC staff notes that by adopting the limitations and conditions specified in NEI 94-01, Revision 2-A, as a basis for its 10 CFR Part 50, Appendix J, Option B program, the licensee is also bound by the incorporated related guidance of SE Section 3.1.4. Therefore, the NRC staff concludes that the licensee has adequately addressed the issues related to Condition 4, as described in the NRC SE for NEI 94-01, Revision 2.

NEI 94-01, Revision 2-A, Condition 5

Condition 5 is derived from Sections 3.1.1.2 and 4.1 of the NRC SE dated June 25, 2008, and stipulates that the normal Type A test interval should be less than 15 years. If a licensee has to utilize the provision of Section 9.1 of NEI 94-01, Revision 2, related to extending the ILRT interval beyond 15 years, then the licensee must demonstrate to the NRC staff that it is an unforeseen emergent condition. In Section 4.0 of its LAR, the licensee stated:

> DENC acknowledges and accepts this NRC staff position, as communicated to the nuclear industry in Regulatory Issue Summary (RIS) 2008-27 dated December 8, 2008.

The NRC SE Section 3.1.1.2 for NEI 94-01, Revision 2, states:

> As noted above, Section 9.2.3, NEI TR 94-01, Revision 2, states, "Type A testing shall be performed during a period of reactor shutdown at a frequency of at least once per 15 years based on acceptable performance history." However, Section 9.1 states that the "required surveillance intervals for recommended Type A testing given in this section may be extended by up to 9 months to accommodate unforeseen emergent conditions but should not be used for routine scheduling and planning purposes." The NRC staff believes that extensions of the performance-based Type A test interval beyond the required 15 years should be infrequent and used only for compelling reasons. Therefore, if a licensee wants to use the provisions of Section 9.1 in TR NEI 94-01, Revision 2, the licensee will have to demonstrate to the NRC staff that an unforeseen emergent condition exists.

The licensee stated in its response that DENC acknowledges and accepts the NRC staff position, as communicated to the nuclear industry in RIS 2008-27 dated December 8, 2008 (ADAMS Accession No. ML080020394). The above passage from SE Section 3.1.1.2 accurately reflects the RIS NRC staff position.

The NRC staff finds the licensee has demonstrated its understanding that any extension of the Type A test interval beyond the upper-bound performance-based limit of 15 years should be infrequent and that any requested permission (i.e., for such an extension) will demonstrate to the NRC staff that an unforeseen emergent condition exists. Based on the above review, the NRC staff finds that the licensee has adequately addressed NEI 94-01, Revision 2-A, Condition 5.

NEI 94-01, Revision 2-A, Condition 6

Condition 6 is derived from Section 4.1 of the NRC SE dated June 25, 2008, and stipulates that for plants licensed under 10 CFR Part 52, applicants requesting a permanent extension of the

ILRT surveillance interval to 15 years should be deferred until after the construction and testing of containments for that design have been completed and applicants have confirmed the applicability of NEI 94-01, Revision 2-A, and Electric Power Research Institute (EPRI) Report No. 1009325, Revision 2, including the use of past containment ILRT data. The licensee stated in its LAR, Section 4.0, that this is not applicable because Millstone 2 was not licensed under 10 CFR Part 52. The NRC staff is in agreement that NEI 94-01, Revision 2-A, Condition 6, is not applicable to Millstone 2

Summary of Conditions and Limitations in NEI 94-01, Revision 2-A

Based on the above evaluation of each condition of NEI 94-01, Revision 2-A, the NRC staff has determined that the licensee has adequately addressed the six conditions identified in Section 4.1 of the NRC SE for NEI 94-01, Revision 2. Therefore, the NRC staff concludes it is acceptable for DENC to adopt the six conditions and limitations of NEI 94-01, Revision 2-A, as part of the implementation documents in TS 6.19, "Containment Leakage Rate Testing Program," for Millstone 2.

3.4.2 NEI 94-01, Revision 3-A, Conditions Satisfied

In its SE dated June 8, 2012, for NEI 94-01, Revision 3, the NRC staff concluded that the guidance in NEI 94-01, Revision 3 is acceptable for reference by licensees proposing to amend their TSs in regards to containment leakage rate testing, subject to the following two conditions and limitations.

The licensee indicated in the LAR that Millstone 2 will meet the limitations and conditions of NEI 94-01 Revision 3-A, Section 4.0. Accordingly, Millstone 2 will be adopting in part the testing criteria ANSI/ANS 56.8–2002 as part of its licensing basis. As stated in Section 2.0, "Purpose And Scope" of NEI 94-01 Revision 3-A, where technical guidance overlaps between NEI 94-01, Revision 3-A and ANSI/ANS 56.8–2002, the guidance of NEI 94-01, Revision 3-A takes precedence.

NEI 94-01, Revision 3-A, Condition 1

Section 4.0 of Enclosure 1 of the SE to the NRC letter dated June 8, 2012, for Condition 2 stipulates that:

> NEI TR 94-01, Revision 3, is requesting that the allowable extended interval for Type C LLRTs be increased to 75 months, with a permissible extension (for non-routine emergent conditions) of nine months (84 months total). The staff is allowing the extended interval for Type C LLRTs be increased to 75 months with the requirement that a licensee's post-outage report include the margin between the Type B and Type C leakage rate summation and its regulatory limit. In addition, a corrective action plan shall be developed to restore the margin to an acceptable level. The staff is also allowing the non-routine emergent extension out to 84-months as applied to Type C valves at a site, with some exceptions that must be detailed in NEI 94-01, Revision 3. At no time shall an extension be allowed for Type C valves that are restricted categorically (e.g. BWR MSIVs), and those valves with a history of leakage, or any valves held to either a less than maximum interval or to the base refueling cycle interval. Only non-routine emergent conditions allow an extension to 84 months.

Condition 1 presents three separate issues that are required to be addressed:

1) The allowance of an extended interval for Type C LLRTs of 75 months carries the requirement that a licensee's post-outage report include the margin between the Type B and Type C leakage rate summation and its regulatory limit.

2) A corrective action plan shall be developed to restore the margin to an acceptable level.

3) Use of the allowed 9-month extension for eligible Type C valves is only authorized for non-routine emergent conditions with exceptions as detailed in NEI 94-01, Revision 3-A, Section 10.1, "Introduction."

In Section 4.0 of its LAR, the licensee stated:

> Following approval of this amendment and consistent with the guidance of NEI 94-01, Rev. 3-A, DNC [DENC] will assess and monitor margin between the Type B and C leakage rate summation and the regulatory limit and include this margin in a post outage report. This will include corrective actions to restore margin to an acceptable level, if required.

The NRC staff has reviewed the requirements of NEI TR 94-01, Revision 3, against the DENC response for Issues (1), (2), and (3) of TR Condition 1. The licensee's response indicates that following approval of the subject amendment, DENC's actions will be consistent with the guidance of NEI TR 94-01, Revision 3-A. The staff notes that revised guidance contained in Revision 3-A, Section 10.1, "Introduction"; Section 10.2.3, "Corrective Actions"; Section 11.3.2, "Programmatic Controls"; and Section 12.1, "Report Requirements," reflects the staff's SE input pertaining to Issues (1), (2), and (3). Based on the above, the NRC staff finds that DENC acknowledges all the requirements of Condition 1 and that it has established its intent for Millstone 2 to comply with these requirements. Therefore, the NRC staff concludes that the licensee has sufficiently addressed Condition 1 of NEI 94-01, Revision 3-A.

NEI 94-01, Revision 3-A, Condition 2

Section 4.0 of Enclosure 1 of the SE to the NRC letter dated June 8, 2012, for Condition 2 stipulates that:

> The basis for acceptability of extending the ILRT interval out to once per 15 years was the enhanced and robust containment inspection program and the local leakage rate testing of penetrations. Most of the primary containment leakage experienced has been attributed to penetration leakage and penetrations are thought to be the most likely location of most containment leakage at any time. The containment leakage condition monitoring regime involves a portion of the penetrations being tested each refueling outage, nearly all LLRTs being performed during plant outages. For the purposes of assessing and monitoring or trending overall containment leakage potential, the as-found minimum pathway leakage rates for the just tested penetrations are summed with the as-left minimum pathway leakage rates for penetrations tested during the previous 1 or 2 or even 3 refueling outages. Type C tests involve valves, which in the aggregate, will show increasing leakage potential due to normal wear and tear, some predictable and some not so predictable. Routine and appropriate maintenance may extend this increasing leakage potential. Allowing for longer intervals

> between LLRTs means that more leakage rate test results from farther back in time are summed with fewer just tested penetrations and that total is used to assess the current containment leakage potential. This leads to the possibility that the LLRT totals calculated understate the actual leakage potential of the penetrations. Given the required margin included with the performance criterion and the considerable extra margin most plants consistently show with their testing, any understatement of the LLRT total using a 5-year test frequency is thought to be conservatively accounted for. Extending the LLRT intervals beyond 5 years to a 75-month interval should be similarly conservative provided an estimate is made of the potential understatement and its acceptability determined as part of the trending specified in NEI TR 94-01, Revision 3, Section 12.1.
>
> When routinely scheduling any LLRT valve interval beyond 60-months and up to 75-months, the primary containment leakage rate testing program trending or monitoring must include an estimate of the amount of understatement in the Types B & C total [leakage], and must be included in a licensee's post-outage report. The report must include the reasoning and determination of the acceptability of the extension, demonstrating that the LLRT totals calculated represent the actual leakage potential of the penetrations.

Condition 2 presents two separate issues that are required to be addressed:

1) Extending the Type C, LLRT intervals beyond 5 years to a 75-month interval should be similarly conservative, provided an estimate is made of the potential understatement and its acceptability determined as part of the trending specified in NEI TR 94-01, Revision 3, Section 12.1, "Report Requirements."

2) When routinely scheduling any LLRT valve interval beyond 60 months and up to 75 months, the primary containment leakage rate testing program trending or monitoring must include an estimate of the amount of understatement in the Type B and Type C total, and must be included in a licensee's post-outage report. The report must include the reasoning and determination of the acceptability of the extension, demonstrating that the LLRT totals calculated represent the actual leakage potential of the penetrations.

In LAR Section 4.0, the licensee stated:

> Following approval of this amendment and consistent with the guidance of Section 11.3.2 of NEI 94-01, Rev. 3-A, DNC [DENC] will estimate the amount of understatement in the Type B & C total and include determination of the acceptability in a post outage report.

The NRC staff has reviewed the requirements of NEI TR 94-01, Revision 3, against the DENC response for Issues (1) and (2) of TR Condition 2. The licensee's response indicates that following approval of the subject amendment, DENC's actions will be consistent with the guidance of NEI TR 94-01, Revision 3-A. The staff notes that revised guidance contained in Revision 3-A, Section 11.3.2, "Programmatic Controls," and Section 12.1, "Report Requirements," reflects the staff's SE input pertaining to both Issues (1) and (2). Based on the above, the NRC staff finds that DENC acknowledges all the requirements of Condition 2 and that it has established its intent for Millstone 2 to comply with these requirements. Therefore, the NRC staff concludes that the licensee has sufficiently addressed Condition 2 of NEI 94-01, Revision 3-A.

3.4.3 Limitations and Conditions Summary

The NRC staff finds that the licensee has addressed the NRC conditions to demonstrate acceptability of adopting NEI 94-01, Revision 3-A, and the limitations and conditions identified in the staff's SE incorporated in NEI 94-01, Revision 2-A. Therefore, the staff finds that the proposed changes to Millstone 2 TS 6.19 regarding the primary containment leakage rate testing program are acceptable.

3.5 Probabilistic Risk Assessment Review

3.5.1 Risk-Informed Considerations

The risk-informed considerations presented below addresses the fourth and fifth key principles of the staff's standards for risk-informed decisionmaking, which concern the change in risk and monitoring the impact of the licensing basis change.

The licensee performed a risk impact assessment for extending the Type A containment ILRT interval to once in 15 years. The risk assessment was provided in Attachment 3 of the licensee's LAR dated October 4, 2017. The licensee provided additional information in response to NRC requests for additional information (RAIs) in letters dated May 24, 2018, and June 14, 2018.

In Section 4.6 of Attachment 3 to the LAR, the licensee stated that the plant-specific risk assessment follows the guidance in NEI 94-01, Revision 2-A[1]; the methodology described in TR-1009325, Revision 2-A; and the NRC regulatory guidance outlined in RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis." In addition, the licensee applied the methodology from Calvert Cliffs Nuclear Power Plant RAI letter dated March 27, 2002 (ADAMS Accession No. ML020920100) to assess the risk from undetected containment leaks due to steel liner corrosion.

Section 9.2.3.1, "General Requirements for ILRT Interval Extensions beyond Ten Years," of NEI 94-01, Revision 3 A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," states that plant-specific confirmatory analyses are required when extending the Type A ILRT interval beyond 10 years. Section 9.2.3.4, "Plant-Specific Confirmatory Analyses," of NEI 94-01, states that the assessment should be performed using the approach and methodology described in EPRI Technical Report (TR) 10182431[2], "Risk Impact Assessment of Extended Integrated Leak Rate Testing Intervals." The analysis is to be performed by the licensee and retained in the plant documentation and records as part of the basis for extending the ILRT interval.

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[1] NEI 94-01, Revision 3-A (ADAMS Accession No. ML12221A202), added guidance for extending Type C LLRT surveillance intervals beyond 60 months. The guidance for extending Type A ILRT surveillance intervals beyond 10 years is the same as that in Revision 2-A.

[2] EPRI TR-1018243 is also identified as EPRI TR-1009325, Revision 2-A. This report is publicly available and can be found at www.epri.com by typing "1018243" in the search field box.

3.5.2 Key Principle 4: Change in Risk is Consistent with the Commission's Policy Statement on Safety Goals

Key Principle 4 is centered on risk considerations and is evaluated using the risk-informed decisionmaking framework for TSs described in the Standard Review Plan (SRP) Chapter 16.1, RG 1.200, and RG 1.174, as well as ILRT guidance contained NEI 94-01, Revision 3-A.

In its SE dated June 25, 2008, the NRC staff found the methodology in EPRI TR-1009325, Revision 2, acceptable for referencing by licensees proposing to amend their TSs to permanently extend the ILRT interval to 15 years, provided certain conditions are satisfied. These conditions, which are set forth in Section 4.2 of the SE for EPRI TR-1009325, Revision 2, stipulate that:

1. The licensee submits documentation indicating that the technical adequacy of its probabilistic risk assessment (PRA) is consistent with the requirements of RG 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," dated March 2009 (ADAMS Accession No. ML090410014) relevant to the ILRT extension application.

2. The licensee submits documentation indicating that the estimated risk increase associated with permanently extending the ILRT surveillance interval to 15 years is small and consistent with the clarification provided in Section 3.2.4.6 of the SE for EPRI TR-1009325, Revision 2.

3. The methodology in EPRI TR-1009325, Revision 2 is acceptable provided the average leak rate for the pre-existing containment large leak accident case (i.e., accident case 3b) used by licensees is assigned a value of 100 times the maximum allowable leakage rate (L_a) instead of 35 L_a.

4. An LAR is required in instances where containment over-pressure is relied upon for emergency core cooling system (ECCS) performance.

The licensee addressed each of the four conditions for the use of EPRI TR-1009325, Revision 2, which are listed in Section 4.2 of the NRC SE. A summary of how the licensee meets each condition is provided in the sections below.

3.5.2.1 Technical Adequacy of the PRA

The first condition in Section 4.2 of the SE for EPRI TR-1009325, Revision 2, stipulates that the licensee submit documentation indicating that the technical adequacy of its PRA is consistent with the requirements of RG 1.200 relevant to the ILRT extension application.

Consistent with the information provided in RIS 2007-06, "Regulatory Guide 1.200 Implementation," dated March 22, 2007 (ADAMS Accession No. ML070650428), the NRC staff will use Revision 2 of RG 1.200 to assess technical adequacy of the PRA used to support risk-informed applications received after March 2010. In Section 3.2.4.1 of the SE for NEI 94-01, Revision 2, and EPRI TR-1009325, Revision 2, the NRC staff states that Capability Category (CC) I of the American Society of Mechanical Engineers (ASME) PRA standard shall be applied as the standard for assessing PRA quality for ILRT extension applications, since approximate values of core damage frequency (CDF) and large early release frequency (LERF),

and their distribution among release categories, are sufficient to support the evaluation of changes to ILRT frequencies.

Internal Events and Internal Flooding

As discussed in Section 4.6.1 of Attachment 1 to the LAR, the Millstone risk assessment performed to support the ILRT application uses the current Unit No. 2 Level 1 and Level 2 internal events PRA (IEPRA) model of record, which includes consideration for internal flooding, model Millstone 2-R05e. In its supplemental letter dated May 24, 2018, the licensee provided updated risk assessment results using its newly revised IEPRA model, model Millstone 2-R05g. In Section 4 of Attachment 4 to the LAR, the licensee describes the process used to maintain configuration control of the Millstone PRA models, data, and software. In addition, the licensee states that it has administrative mechanisms in place to assure that plant modifications, procedure changes, system operation changes, and industry operating experiences are appropriately screened, dispositioned, and scheduled for incorporation into the model in order to assure that the Millstone PRA reflects the as-built, as-operated plant within the limitations of the PRA methodology. In response to RAI-01, as provided in Attachment 1 to the licensee's letter dated June 14, 1028, the licensee summarizes the changes (including a justification for the categorization of the change) made to the Millstone PRA model between the 2000 full-scope peer review and the 2018 focused-scope peer review that were not subject to either the 2012 or 2018 focused-scope peer review. The licensee states that none of the changes meet the definition of a PRA upgrade and that no upgrades were identified that have not received a peer review.

In the LAR, the licensee stated that the Millstone IEPRA underwent a peer review by the Combustion Engineering Owners Group (CEOG) in 2000 using the NEI 00-02, "Probabilistic Risk Assessment (PRA) Peer Review Process Guidance" (ADAMS Accession No. ML003728023). In response to RAI-02.a, the licensee clarified that the Millstone PRA model was originally peer reviewed in 2000 using the CEOG peer review process, not NEI 00-02. However, focused-scope peer reviews were performed in 2012 and 2018 against the ASME/ANS PRA Standard RA-Sa-2009 and RG 1.200, Revision 2.

The licensee stated that the 2012 peer review was focused on the changes to the model that the licensee made (to address facts and observations (F&Os) from the peer review and self-assessments) that were considered upgrades in accordance with ASME/ANS RA-Sa-2009 and RG 1.200, Revision 2. As shown in Table 6-3 of Attachment 4 to the LAR, the 2012 focused scope peer review addressed all supporting requirements (SRs) related to the LERF analysis (LE) and internal flooding (IF) technical elements, and a subset of SRs related to initiating events (IE), accident sequences (AS), systems analysis (SY), human reliability analysis (HR), data analysis (DA), and quantification technical elements. As provided in response to RAI-06.a and Table 2 of Attachment 2 to the licensee's letter dated May 24, 2018, the 2018 focused-scope peer review addressed all SRs under the following technical elements: AS, HR, SY, internal flood scenarios, internal flood-induced events, internal flood accident sequences and quantification, and quantification. The licensee also performed a self-assessment in 2007 against the ASME PRA standard RA-Sb-2005 in accordance with RG 1.200, Revision 1, and a self-assessment in 2011 against the ASME/American Nuclear Society (ANS) PRA standard RA-Sa-2009 and RG 1.200, Revision 2, as clarified in response to RAI-02.b. As summarized in Table 4 of Attachment 2 to letter dated May 24, 2018, there are few remaining SRs that have not been peer reviewed against RG 1.200, Revision 2, all SRs related to success criteria, and the majority of SRs related to DA and IE technical elements. However, since the scope and impact of changes to ILRT frequencies only necessitates

approximate values of CDF and LERF, and because of the rigor and scope of the licensee's self-assessments and focused-scope peer reviews, this should not affect the results of the ILRT frequency change evaluation and is sufficient for this application.

In response to RAI-03 dated June 14, 2018, the licensee clarified that the F&Os from the 2000 peer review listed in Table 7-2 of Attachment 4 of the LAR were considered resolved but not closed. In response to RAI-06 dated May 24, 2018, the licensee stated that it performed an F&O closure review in March 2018 in accordance with Appendix X to NEI 05-04/07-12/12-[13], "Close Out of Facts and Observations (F&Os)" (ADAMS Accession No. ML17086A451), as accepted by the NRC, with conditions, in the letter dated May 3, 2017, U.S. Nuclear Regulatory commission Acceptance on Nuclear Energy Institute Appendix X to Guidance 05-04, 07-12, and 12-13, Close-out of Facts and Observations (F&Os) (ADAMS Accession No. ML17079A427). The licensee stated that the independent assessment team evaluated open F&Os for closure by reviewing the F&O dispositions and the licensee's resolutions, including related documentation, to confirm that the related SRs of the ASME/ANS PRA Standard RA-Sa-2009 are met at CC-II or greater. For the F&Os from the 2000 full-scope peer review, the licensee stated that it mapped the CEOG peer review F&Os to SRs from the ASME/ANS PRA Standard RA-Sa-2009 to ensure that the SRs were properly accounted for during the F&O closure process. In addition, the licensee stated that it provided the independent assessment team dispositions of whether the model changes applied to resolve F&Os were considered upgrades to the PRA model or were considered to be PRA model maintenance per the definitions in the PRA standard. The model changes associated with resolving 24 of the F&Os were determined to be upgrades that require a focused scope peer review for closure.

The licensee stated in response to RAI-06 dated May 24, 2018, that it conducted a focused-scope peer review, concurrent with the F&O closure review, to address the 24 F&Os that were determined to be upgrades. The licensee stated that the peer review team reviewed the upgrades against the applicable ASME/ANS RA-Sa-2009 PRA standard elements and SRs to confirm the model upgrades meet the PRA standard. Following the F&O closure review and focused-scope peer review, ten F&Os remain open, which were provided by the licensee in Attachment 2 of the May 24, 2018 letter. Two F&Os were associated with SRs not met, and eight F&Os were associated with SRs met at CC-II or higher. The NRC staff reviewed these open F&Os and their associated dispositions provided in Attachment 2 of letter dated May 24, 2018 and determined that they have minimal impact on the ILRT application.

External Events

In Section 3.2.4.2 of the SE for NEI 94-01, Revision 2, dated June 25, 2008, and EPRI TR-1009325, Revision 2, the NRC staff states that:

> Although the emphasis of the quantitative evaluation is on the risk impact from internal events, the guidance in EPRI Report No. 1009325, Revision 2, Section 4.2.7, "External Events," states that: "Where possible, the analysis should include a quantitative assessment of the contribution of external events (e.g., fire and seismic) in the risk impact assessment for extended ILRT intervals." This section also states that: "If the external event analysis is not of sufficient quality or detail to directly apply the methodology provided in this document [(i.e., EPRI Report No. 1009325, Revision 2)], the quality or detail will be increased or a suitable estimate of the risk impact from the external events should be performed." This assessment can be taken from existing, previously submitted and approved analyses or other alternate method of assessing an

order-of-magnitude estimate for contribution of the external event to the impact of the changed interval.

The staff's review of the contribution of external events for this application is framed by the context that an order-of-magnitude estimate for the corresponding risk contribution is sufficient. The licensee performed an analysis of the impact of external events in Section 5.7 of Attachment 3 of the LAR. The licensee included a quantitative evaluation of internal fires and seismic risk and screened other external events, as discussed below. Section 5.7 of Attachment 3 to the LAR states that the method chosen to account for external events contributions is similar to the approach used to calculate the change in LERF for the internal events using the guidance in EPRI TR-1018243.

To assess the internal fire risk the licensee used an updated version of the individual plant examination of external events (IPEEE) analysis. The licensee stated that the IPEEE quantified the fire risk for Millstone 2 using a combination of the fire-induced vulnerability evaluation methodology and fire PRA. The licensee stated that fire-induced vulnerability evaluation data and methods were used to (1) calculate area fire ignition frequencies, (2) screen areas, and (3) provide hazards analysis for the resulting identified critical areas. The fire PRA was used for the quantification of the core damage frequencies. The licensee stated that the fire procedures for Millstone 2 have been updated since the IPEEE analysis was performed. The licensee stated that it performed a review of the Millstone 2 fire mitigation strategies and concluded that most of the fire scenarios evaluated in the IPEEE adequately reflect the as-operated plant. However, the licensee identified three Appendix R fire areas that required updating. With these updates, the licensee estimated the fire CDF to be 3.0E-05/reactor-year. Because the licensee performed a review of the IPEEE analysis and updated it as necessary, and because sufficient margin exists to the acceptance criteria for the ILRT extension as discussed in Section 3.2.2 of this SE, the NRC staff concludes that the licensee's order-of-magnitude estimate for the contribution of internal fire risk is acceptable for the application.

To assess the seismic risk, the licensee provided a bounding seismic CDF value of 1.1E-5/reactor-year based on the NRC staff's Generic Issue 199, "Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants: Safety/Risk Assessment" (ADAMS Accession No. ML101970221), and "Appendix D – Seismic Core Damage Frequencies" (ADAMS Accession No. ML100270756), which contain the postulated CDF using the updated 2008 U.S. Geological Survey seismic hazard curves. The staff noted that based on the seismic hazard reevaluation performed in response to Recommendation 2.1 of the Near-Term Task Force, the staff concluded that a seismic risk reevaluation is not merited (NRC letter dated October 27, 2015; ADAMS Accession No. ML15194A015). As a result, the Generic Issue 199 analysis represents the most recent available estimate of the seismic risk for Millstone. Therefore, the NRC staff finds that the licensee's use of this seismic CDF to provide an order-of-magnitude estimate of the seismic risk contribution is acceptable for this application.

The licensee did not include in the LAR a discussion of or justification for, screening out all other external hazards (high winds, external flooding, transportation events, aircraft, industrial facilities, and other external hazard groups) and therefore in RAI-05 dated May 17, 2018, ADAMS Accession No. ML18137A313, the NRC staff requested the licensee to provide a justification. In response to RAI-05 dated June 14, 2018, the licensee stated that external hazards other than seismic and internal fire were screened from applicability to Millstone in the IPEEE. The licensee provided a summary of an updated screening using the progressive screening approach specified in ASME/ANS PRA Standard RA-Sa-2009 and any new

information available since the IPEEE and concluded that all other external events remain screened (i.e. no further evaluation required). The NRC staff reviewed the licensee's screening summary and justifications and concludes that the risk associated with other external events remains negligible for the ILRT application.

Based on the above considerations, the NRC staff finds the licensee's analysis of the impact of external events acceptable for the ILRT application. Furthermore, the licensee has evaluated its internal events PRA (including internal flooding) against the current PRA standard and Revision 2 of RG 1.200. The NRC staff finds that the licensee has addressed the findings from the peer reviews and that they have no impact on the results of this application. The NRC staff concludes that the internal events PRA model used by the licensee is of sufficient technical adequacy to support the evaluation of changes to ILRT frequencies. Accordingly, the first condition in Section 4.2 of the SE for EPRI TR-1009325, Revision 2 is met.

3.5.2.2 Estimated Risk Increase

The second condition in Section 4.2 of the SE for EPRI TR-1009325, Revision 2 stipulates that the licensee submit documentation indicating that the estimated risk increase associated with permanently extending the ILRT interval to 15 years is small, and consistent with the guidance in RG 1.174 and the clarification provided in Section 3.2.4.5 of the NRC SE for NEI 94-01, Revision 2, and EPRI TR-1009325, Revision 2. Specifically, a small increase in population dose should be defined as an increase in population dose of less than or equal to either 1.0 person-rem per year or 1 percent of the total population dose, whichever is less restrictive. In addition, a small increase in conditional containment failure probability (CCFP) should be defined as a value marginally greater than that accepted in previous one-time 15-year ILRT extension requests. This would require that the increase in CCFP be less than or equal to 1.5 percentage points. Additionally, for plants that rely on containment overpressure for net positive suction head for ECCS injection, both CDF and LERF will be considered in the ILRT evaluation and compared with the risk acceptance guidelines in RG 1.174. As discussed in Section 3.2.4 of this SE, Millstone does not rely on containment overpressure for ECCS performance. Thus, the associated risk metrics include LERF, population dose, and CCFP.

The licensee reported the results of the plant-specific risk assessment in Section 4.6.3 of Attachment 1 to the LAR with details of the licensee's risk assessment provided in Attachment 4 to the LAR. In response dated May 24, 2018, to RAI-06, the licensee provided updated results of the plant-specific risk assessment. The reported risk impacts are based on a change in the Type A containment ILRT frequency from three tests in 10 years (the test frequency under 10 CFR Part 50, Appendix J, Option A) to one test in 15 years and also account for the risk from undetected containment leaks due to steel liner corrosion. The following conclusions can be drawn from the licensee's analysis associated with extending the Type A ILRT frequency:

1. The reported increase in LERF for internal events, which includes corrosion, is 1.82E-07/reactor-year. The increase in LERF for combined internal and external events is 5.55E-07/year. The risk contribution from external events includes the effects of internal fires and seismic events, as discussed in Section 3.2.1 of this SE. These changes in risk are considered to be "small" (i.e., between 1E-06/year and 1E-07/year) per the acceptance guidelines in RG 1.174. An assessment of total baseline LERF is required to show that the total LERF is less than 1E-05/reactor-year. The licensee estimated the total LERF for internal and external events as 4.49E-06/reactor-year. The total LERF, which includes the increase in ILRT interval, is below the acceptance guideline of 1E-05/reactor-year in RG 1.174 for a "small" change.

2. The reported change is in dose risk for changing the Type A ILRT frequency from three in 10 years to once in 15 years, measured as an increase in the total integrated dose risk from all accident sequences, is 5.74E-04 person-rem/year or 0.009 percent of the total population dose. The reported increase in total population dose is below the values provided in EPRI TR-1009325, Revision 2-A, and defined in Section 3.2.4.6 of the NRC SE for NEI 94-01, Revision 2. Therefore, the increase in the total integrated plant risk for the proposed change is considered small and supportive of the proposed change.

3. The increase in CCFP due to change in test frequency from three in 10 years to once in 15 years is 0.027 percent.. This value is below the acceptance guidelines in Section 3.2.4.6 of the NRC SE for NEI 94-01, Revision 2. Therefore, the increase in the CCFP for the proposed change is considered small and supportive of the proposed change.

Based on the risk assessment results, the NRC staff concludes that the increase in LERF is small and consistent with the acceptance guidelines of RG 1.174, and the increase in the total population dose and the magnitude of the change in the CCFP for the proposed change are small and supportive of the LAR. The defense-in-depth philosophy is maintained, as the independence of barriers will not be degraded as a result of the requested change, and the use of the three quantitative risk metrics collectively ensures that the balance between prevention of core damage, prevention of containment failure, and consequence mitigation is preserved. Accordingly, the second condition in Section 4.2 of the SE for EPRI TR-1009325, Revision 2, and Key Principle 4 in RG 1.174 3 is met.

3.5.2.3 Leak Rate for the Large Preexisting Containment Leak Rate Case

The third condition in Section 4.2 of the SE for EPRI TR-1009325, Revision 2, stipulates that in order to make the methodology in EPRI TR-1009325, Revision 2, acceptable, the average leak rate for the preexisting containment large leak rate accident case (i.e., accident case 3b) used by the licensees shall be 100 La instead of 35 L_a. As noted by the licensee in the table in Section 4.6.1 of Attachment 1 to the LAR, the methodology in EPRI TR 1009325, Revision 2 A, incorporated the use of 100 L_a as the average leak rate for the preexisting containment large leakage rate accident case (accident case 3b), and this value has been used in the Millstone plant-specific risk assessment. Accordingly, the third condition in Section 4.2 of the SE for EPRI TR-1009325, Revision 2, is met.

3.5.2.4 Applicability if Containment Overpressure is Credited for ECCS Performance

The fourth condition in Section 4.2 of the SE for EPRI TR-1009325, Revision 2, stipulates that in instances where containment overpressure is relied upon for ECCS performance, an LAR is required to be submitted. In the table in Section 4.6.1 of Attachment 1 of the LAR, the licensee states that containment overpressure is not relied upon for ECCS performance at Millstone. Accordingly, the fourth condition in Section 4.2 of the SE for EPRI TR-1009325, Revision 2, is not applicable.

3.5.3 Key Principle 5: Monitor the Impact of the Proposed Change

The NRC staff's SE incorporated into Revision 3-A of NEI 94-01 and Revision 2-A of NEI 94-01 contains a section entitled, "The Impact of the Proposed Change Should be Monitored Using Performance Measurements Strategies," which states:

In addition to maintaining the defense-in-depth philosophy as described in Section 3.1.2 of this SE [for Key Principle 2], the applicants for TS amendments will continue to perform containment inspections during the Type A test interval in Sections 3.1.3 and 3.1.4 of this SE [as discussed below].

As documented in NUREG-1493, industry experience has shown that most ILRT failures result from leakage that is detectable by local leakage rate testing [LLRT] (Type B and C testing). Specific testing frequencies for the local leak rate tests are reviewed prior to every refueling outage (18-month cycle). An outage scope document is issued to document the local leak rate test periodically and to ensure that all pre-maintenance and post-maintenance testing is complete. The post-outage report provides a written record of the extended testing interval changes and the reasons for the changes based on testing results and maintenance history. Based on the above measures, the LLRT program will provide continuing assurance that the most likely sources of leakage will be identified and repaired.

ANSI/ANS-56.8-2002, Section 6.4.4, also specifies surveillance acceptance criteria for Type B and Type C tests and states that: "The combined [as-found] leakage rate of all Type B and Type C tests shall be less than 0.6 La when evaluated on a minimum pathway leakage rate basis, at all times when containment operability is required." It states, moreover, that: "The combined leakage rate for all penetrations subject to Type B and Type C test shall be less than or equal to 0.6 La as determined on an maximum pathway leakage rate basis from the as-left LLRT results." These combined leakage rate determinations shall be done with the latest leakage rate test data available, and shall be kept as a running summation of the leakage rates."

The containment components' monitoring and maintenance activities will be conducted according to the requirements of 10 CFR 50, Appendix J, and 10 CFR 50.55a.

The above provisions are considered to be acceptable performance monitoring strategies for assuring that the risk of the proposed change will remain small. Accordingly, Key Principle 5 is met.

3.6 Technical Evaluation Summary

Based on the preceding regulatory and technical evaluations, the NRC staff concludes that the licensee has adequately implemented its primary containment leakage rate testing program consisting of ILRT and LLRT. The results of the recent ILRT and the LLRT (Type B and Type C tests) combined totals demonstrate acceptable performance and support a conclusion that the structural and leaktight integrity of the primary containment vessel is adequately managed and will continue to be periodically monitored and managed effectively. The NRC staff concludes that the licensee has addressed the NRC conditions to demonstrate acceptability of adopting TR NEI 94-01, Revision 3-A, and the limitations and conditions identified in the staff's SE that were incorporated into NEI 94-01, Revision 2-A. The NRC staff concludes that the risk impact for extending the integrated leak rate testing intervals is consistent with the acceptance guidelines of RG 1.174. Therefore, the NRC staff concludes that the proposed changes to

Millstone TS 6.19 regarding the primary containment leakage rate testing program are acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Connecticut State official was notified on August 20, 2018, of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve 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 this finding (January 2, 2018; 83 FR 163). 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) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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Date of issuance: September 25, 2018

D. Stoddard

SUBJECT: MILLSTONE POWER STATION, UNIT NO. 2 – ISSUANCE OF AMENDMENT NO. 335 REGARDING REVISION TO THE INTEGRATED LEAK RATE TYPE A AND TYPE C TEST INTERVALS (EPID L-2017-LLA-0316) DATED SEPTEMBER 25, 2018

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