



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

March 24, 2011

Mr. David A. Heacock
President and Chief Nuclear Officer
Dominion Nuclear Connecticut, Inc.
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 203060-6711

SUBJECT: MILLSTONE POWER STATION, UNIT NO. 3 – ISSUANCE OF RELIEF
REQUEST IR-3-14 – USE OF RISK-INFORMED INSERVICE INSPECTION
PROGRAM PLAN (TAC NO. ME3528)

Dear Mr. Heacock:

By letter dated March 5, 2010, as supplemented by letter dated December 16, 2010 (Agencywide Document Access and Management System Accession Nos. ML100640456 and ML103550487, respectively), Dominion Nuclear Connecticut, Inc., submitted Relief Request IR-3-14 requesting approval to extend the use of the risk-informed inservice inspection (RI-ISI) program to the third 10-year inservice inspection (ISI) interval at Millstone Power Station, Unit No. 3 (MPS3). The RI-ISI program is an alternative to certain American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section XI, Class 1 ISI piping requirements. Specifically, the proposed alternative maintains the fundamental requirements of the ASME Code with a significant reduction in the number of examination locations.

The Nuclear Regulatory Commission (NRC) staff has reviewed the subject request and concludes, as set forth in the enclosed Safety Evaluation, that use of RI-ISI program as an alternative to the requirements of the ASME Code, Categories B-F and B-J provides an acceptable level of quality and safety.

Therefore, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(a)(3)(i), the NRC staff authorizes the use of Relief Request IR-3-14 for the remainder of the third 10-year ISI interval for MPS3. The third 10-year ISI interval at MPS3 began on April 23, 2009, and is scheduled to be completed on April 22, 2019.

All other ASME Code, Section XI, requirements for which relief was not specifically requested and approved remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

D. Heacock

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If you have any question, please contact the Project Manager, Carleen Sanders, at 301-415-1603.

Sincerely,

A handwritten signature in black ink, appearing to read "Harold K. Chernoff". The signature is fluid and cursive, with a prominent initial "H" and a long, sweeping tail.

Harold K. Chernoff, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosure:
Safety Evaluation

cc w/encl: Distribution via Listserv



UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RISK-INFORMED INSERVICE INSPECTION PROGRAM PLAN

REQUEST FOR RELIEF NO. IR-3-14

MILLSTONE POWER STATION, UNIT NO. 3

DOMINON NUCLEAR CONNECTICUT, INC.

DOCKET NUMBER 50-423

1.0 INTRODUCTION

By letter dated March 5, 2010, as supplemented by letter dated December 16, 2010 (Agencywide Document Access and Management System (ADAMS) Accession Nos. ML100640456 and ML103550487, respectively), Dominion Nuclear Connecticut, Inc. (DNC or the licensee), submitted Relief Request IR-3-14 requesting approval to extend the use of the risk-informed inservice inspection (RI-ISI) program to the third 10-year inservice inspection (ISI) interval at Millstone Power Station, Unit No. 3 (MPS3). The RI-ISI program is an alternative to certain American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code), Section XI, Class 1 ISI piping requirements. Specifically, the proposed alternative maintains the fundamental requirements of the ASME Code with a significant reduction in the number of examination locations.

The proposed alternative RI-ISI program was developed in accordance with the criteria contained in the U.S. Nuclear Regulatory Commission (NRC) staff approved Westinghouse Owners Group Topical Report, WCAP-14572, Revision 1-NP-A, "Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report," (ADAMS Accession No. ML042610469). The licensee received approval from the NRC to implement a RI-ISI program developed in accordance with WCAP-14572, Revision 1-NP-A, for the second 10-year ISI interval at MPS3 by letter dated March 12, 2002 (ADAMS Accession No. ML02057012). Relief Request IR-3-14 contains updates to the previously approved RI-ISI program for implementation during the third 10-year ISI interval. The third 10-year ISI interval began April 23, 2009, and is scheduled to be completed on April 22, 2019.

2.0 REGULATORY EVALUATION

The ISI of ASME Code Class 1, 2, and 3 components is performed in accordance with Section XI of the ASME Code and applicable addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(g), except where specific relief has been granted by the NRC pursuant to 10 CFR 50.55a(g)(6)(i). Section 50.55a(a)(3) of 10 CFR states that alternatives to the requirements of paragraph (g) may be used, when authorized by the

Enclosure

NRC, if the licensee demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety; or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The ASME Code of Record for the third 10-year ISI interval at MPS3 is the 2004 Edition with no Addenda.

Pursuant to 10 CFR 50.55a(g), a certain percentage of ASME Code, Examination Categories B-F, and B-J pressure retaining piping welds must receive ISI during each 10-year ISI interval. The ASME Code requires 100 percent of all B-F welds and 25 percent of all B-J welds greater than 1-inch nominal pipe size be selected for volumetric or surface examination, or both, on the basis of existing stress analyses.

3.0 EVALUATION

3.1 Proposed Alternative

Pursuant to 10 CFR 50.55a(a)(3)(i), DNC requested to use an RI-ISI program as an alternative to the requirements of ASME Code, Section XI, Categories B-F and B-J, examination program of Class 1 piping components for the third 10-year ISI interval at MPS3. Specifically, the licensee proposed to update the RI-ISI program approved for the second 10-year ISI interval and apply the updated program to the third 10-year ISI interval. Other nonrelated portions of the ASME Code, Section XI are unaffected.

3.2 Summary of Proposed Approach

The proposed updated RI-ISI program is based on Westinghouse Owners Group WCAP-14572, Revision 1-NP-A, and WCAP-14572, Revision 1-NP-A, Supplement 1, "Westinghouse Structural Reliability Risk Assessment (SRRA) Model for Piping Risk-Informed Inservice Inspection," (identified together as "WCAP"). The licensee submitted a request using this methodology for the second 10-year ISI interval dated July 25, 2000, as supplemented by letters dated November 16, 2000, and September 26, 2001 (ADAMS Accession Nos. ML003736677, ML003771854, and ML012750204). The request was approved by the NRC on March 12, 2002 (ADAMS Accession No. ML02057312). Table 1 of the proposed updated RI-ISI program contains a summary of the proposed RI-ISI program and a comparison of the approved RI-ISI program, from the second 10-year ISI interval, with the proposed RI-ISI program.

3.3 Technical Evaluation

The licensee has proposed to use the updated RI-ISI program methodology as updated for the third 10-year ISI interval as an alternative to the ASME Code, Section XI, Class 1, Examination Categories B-J and B-F piping requirements. A general description of the proposed changes to the ISI program is provided in the licensee's submittal. Table 1 of the proposed RI-ISI program provides a comparison summary of inspection selections between the approved second 10-year interval RI-ISI program and the proposed third 10-year interval RI-ISI program. The NRC staff has reviewed and evaluated the licensee's proposed alternative RI-ISI program, based on guidance and acceptance criteria provided in Regulatory Guides (RGs) 1.174, 1.178, and 1.200 and the Standard Review Plan Chapter 3.9.8 (References 1, 2, 3, and 4, respectively). As discussed in the guidelines, an acceptable RI-ISI program plan is expected to meet the five key principles of risk-informed decision making criteria:

- Principle 1: The proposed change meets the current regulations unless it is explicitly related to the request for alternatives under 10 CFR 50.55a(a)(3) or a requested exemption or rule change, i.e., a "Specific exemption" under 10 CFR 50.12 or a "petition for rulemaking" under 10 CFR 2.802.
- Principle 2: The proposed change is consistent with the defense-in-depth philosophy.
- Principle 3: The proposed change maintains sufficient safety margins.
- Principle 4: When proposed changes result in an increase in core damage frequency or risk, The increases should be small and consistent with the intent of the Commission's Safety Goal Policy Statement.
- Principle 5: The impact of the proposed change should be monitored by using performance measurement strategies.

The first principle is met by DNC requesting and receiving authorization for the use of IR-3-14 from the NRC staff pursuant to 10 CFR 50.55a(a)(3)(i).

The second and third principles require assurance that the alternative program is consistent with the defense-in-depth philosophy and that sufficient safety margins are maintained. Assurance that the second and third principles are met is based on the application of the approved methodology and not on the particular inspection locations selected. The NRC staff approved the currently proposed RI-ISI methodology on March 12, 2002 (ADAMS Accession No. ML02057312). Therefore, there is assurance that the second and third principles are met.

The fourth principle requires an evaluation of the change in risk between the proposed risk-informed program and the program the licensee would otherwise be required to implement. The NRC staff's assessment of principle four is shown in the next section.

The fifth key principle is that the impact of the proposed change should be monitored by using performance measurement strategies. DNC addressed principal 5 by stating that the RI-ISI program will continue to be reviewed and updated every period during the third 10-year ISI interval.

MPS3's code of record for the second 10-year ISI interval was the 1989 Edition with no addenda of the ASME Code. MPS3's code of record for the third 10-year interval is the 2004 Edition with no addenda. No changes in the requirements of examination methods or locations for Category B-F occurred between the two editions of the ASME Code. No changes in the requirements of examination methods for Category B-J occurred between the two editions of the ASME Code, however the 2004 Edition has eliminated examination of longitudinal welds. Longitudinal welds in piping greater than 4 inches are uncommon in Class 1 applications. However, the terminal ends of longitudinal welds that may exist are included in the circumferential weld examinations. Since this was an elimination of requirements, the NRC staff finds that this proposed change to the RI-ISI program is acceptable.

3.3.1 Probabilistic Risk Assessment (PRA)

The MPS3 ISI program for the examination of Class I piping is in accordance with a risk-informed process that was approved by the NRC staff in a letter dated March 12, 2002. This request for an alternative to ASME Code required examination of Categories B-F and B-J welds for the third 10-year ISI interval at MPS3 uses the currently NRC staff-approved RI-ISI methodology.

The submittal states that significant changes made to the PRA model include: (1) Updates to reliability and initiating event frequencies, (2) Model updates to meet PRA standards described in RG 1.200, Revision 1, (3) Updates to Internal flooding and spurious safety injection, and (4) human factors development. A self assessment of the MPS3 PRA against the ASME PRA Standard was performed by the licensee in late 2007 using the guidance provided in NRC RG 1.200, Revision 1. As a result of the assessment several improvements were incorporated into the model. The MPS3 PRA model is maintained as a living program and is routinely updated to reflect the as-built, as-operated plant.

MPS3 used the RI-ISI methodology defined in WCAP-14572 Revision 1-NP-A to produce alternative ISI requirements. Risk significance information was used during the development of the RI-ISI program to support consequence assessment, risk ranking and delta risk evaluation. The quantitative results from the risk evaluation along with deterministic insights were presented to an expert panel in an integrated decision making process. The licensee states that the expert panel represented (with some experts in multiple areas) all expertise listed in WCAP-14572, Revision 1-NP-A.

Based on the results of the revised risk analysis and expert panel evaluation, the total number of high significant safety piping segments increased from 62 to 68. One additional segment was added to the reactor coolant system and five were added to high pressure safety injection system.

An uncertainty analysis was performed as described in WCAP-14572, Revision 1-NP-A. As a result of the uncertainty analysis, the risk reduction worth of no segments increased from below 1.001 to greater than or equal to 1.005.

The licensee stated that an updated change in risk evaluation was performed for the current program, and the risk from the current program continues to remain lower when compared to the last deterministic ASME Section XI inspection program. The change in risk calculations was performed according to the applicable guidelines provided in Section 4.4.2 of WCAP-14572,

Revision 1-NP-A with one deviation. Based on the use of the approved methodology and the reported results, the NRC staff finds that any change in risk associated with the implementation of the RI-ISI program will be small and consistent with the intent of the Commission's Policy Statement and consistent with RG 1.178, thus satisfying Principle 4.

4.0 CONCLUSION

Section 50.55a(a)(3)(i) of 10 CFR permits alternatives to regulatory requirements when authorized by the NRC staff if the applicant demonstrates that the alternative provides an acceptable level of quality and safety. Based on the review provided above, the NRC staff has determined that the proposed alternative provides an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC staff authorizes the use of Relief Request IR-3-14 for the remainder of the third 10-year ISI interval for MPS3. The third 10-year ISI interval at MPS3 began on April 23, 2009, and is scheduled to be completed on April 22, 2019.

All other requirements of the ASME Code, Section XI for which relief has not been specifically requested and approved remain applicable, including a third party review by the Authorized Nuclear Inservice Inspector.

5.0 REFERENCES

1. NRC Regulatory Guide 1.174, *An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis*, July 1998.
2. NRC Regulatory Guide 1.178, *An Approach for Plant-Specific Risk-Informed Decision Making: Inservice Inspection of Piping*, September 1998.
3. NRC Regulatory Guide 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," Revision 2, March 2009.
4. NRC NUREG-0800, Chapter 3.9.8, *Standard Review Plan for Trial Use for the Review of Risk-Informed Inservice Inspection of Piping*, May 1998.

Principal Contributors: J. Patel
D. Naujock

Date: March 24, 2011

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If you have any question, please contact the Project Manager, Carleen Sanders, at 301-415-1603.

Sincerely,
/RA/

Harold K. Chernoff, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-423

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Safety Evaluation

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