July 10, 2008

Mr. David A. Christian
Sr. Vice President and Chief Nuclear Officer
Dominion Nuclear Connecticut, Inc.
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: MILLSTONE POWER STATION, UNIT NOS. 2 AND 3 - PROPOSED ALTERNATIVES FROM PRESSURE TEST REQUIREMENTS FOR BURIED PIPING (TAC NOS. MD7732 AND MD7733)

Dear Mr. Christian:

By letter dated November 9, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML073230126), Dominion Nuclear Connecticut, Inc. (DNC or the licensee) submitted Relief Request (RR) Nos. IR-2-40, IR-2-41 for the second 10-year interval of Millstone Power Station, Unit No. 3 (MPS3) and RR-89-57 for the third 10-year interval of Millstone Power Station, Unit No. 2 (MPS2) related to the Inservice Inspection (ISI) Program pertaining to system pressure tests. DNC requested relief from performing the American Society of Mechanical Engineers (ASME) Code-required pressure test of the buried portion of quench spray, safety injection, and auxiliary feedwater at MPS3 and service water piping at MPS2 and MPS3 by measuring rate of pressure loss or change in flow between the ends of the buried components. Alternatively, the licensee proposed a test that will confirm that flow during operation is not impaired.

Based on the information provided in RR Nos. IR-2-40, IR-2-41 and RR-89-57, the NRC staff concluded in the enclosed safety evaluation that the licensee's compliance to the ISI Code of Record would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The staff concluded in the enclosed safety evaluation that the proposed alternative provides reasonable assurance of structural integrity. Therefore, pursuant to Title 10 of the *Code of Federal Regulations* 50.55a(a)(3)(ii), the staff authorizes the ISI program alternatives proposed in RR Nos. IR-2-40, IR-2-41 for the second 10-year ISI interval of MPS3 and RR-89-57 for the third 10-year ISI interval of MPS2.

Sincerely,

/ra/

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

Docket Nos.: 50-336 and 50-423

Enclosure: As stated

cc w/encl: See next page

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Sr. Vice President and Chief Nuclear Officer
Dominion Nuclear Connecticut, Inc.
Innsbrook Technical Center
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Harold Chernoff, Chief
Plant Licensing Branch I-2
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE INSPECTION PROGRAM RELIEF REQUESTS IR-2-40, IR-2-41 and RR-89-57

MILLSTONE POWER STATION, UNIT NOS. 2 AND 3

DOMINION NUCLEAR CONNECTICUT, INC

DOCKET NOS. 50-336 AND 50-423

1.0 INTRODUCTION

By letter dated November 9, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML073230126), Dominion Nuclear Connecticut, Inc. (DNC or the licensee) submitted Relief Request Nos. IR-2-40, IR-2-41 for the second 10-year interval of Millstone Power Station, Unit No. 3 (MPS3) and RR-89-57 for the third 10-year interval of Millstone Power Station, Unit No. 2 (MPS2) related to the Inservice Inspection (ISI) Program pertaining to system pressure tests. DNC requested relief from performing the American Society of Mechanical Engineers (ASME) Code-required pressure test of the buried portion of quench spray, safety injection, and auxiliary feedwater at MPS3 and service water piping at MPS2 and MPS3 by measuring rate of pressure loss or change in flow between the ends of the buried components. Alternatively, the licensee proposed a test that will confirm that flow during operation is not impaired.

The integrity of the buried piping will be verified during quarterly pump testing under inservice testing (IST) program for pumps and valves. The NRC staff has reviewed the licensee's proposed alternative pursuant to Title 10 to *Code of Federal Regulations* (10 CFR) 50.55a(a)(3)(ii) since compliance to the Code requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.0 REGULATORY REQUIREMENTS

As required in 10 CFR 50.55a(g), ISI of ASME Code Class 1, 2, and 3 components must be performed in accordance with Section XI of the ASME Code and applicable addenda, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). According to 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph 50.55a(g) may be used, when authorized by the U.S. Nuclear Regulatory Commission, if an applicant demonstrates that the proposed alternatives would provide an acceptable level of quality and safety or if the specified requirement 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 ISI 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 ISI 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 ISI Code of Record for the second 10-year inspection interval of the MPS3 and the third 10-year interval of MPS2 is the 1989 Edition, No Addenda.

3.0 TECHNICAL EVALUATION

System/Component(s) for Which Relief is Requested

The system for which relief is being requested is the buried Class 3 piping in the service water system (SWS) at MPS2 and MPS3, and the buried Class 2 piping in the quench spray system (QSS), safety injection (SI) system, and auxiliary feedwater (AFW) system at MPS3.

ASME Code Requirements

As applicable to MPS2 and MPS3, the 1989 Edition of ASME Code, Section XI, Table IWD-2500-1, Examination Category D-B, Item No. D2.10 and Table IWC-2500-1, Examination Category C-H, Item No. C7.30 requires a system pressure test and a VT-2 visual examination. Subsection IWA-5244*(a)* requires nonredundant/isolable buried components that are isolable by means of valves be tested to determine the rate of pressure loss. Alternatively, the test may determine the change in flow between the ends of the buried components. This edition of the Code, however, has no provision for pressure testing of redundant/isolable buried components such as the case in MPS2 and MPS3. Therefore, the test requirement of Subsection IWA-5244*(a)* was applied.

Licensee's Request for Relief

Relief is requested from performing the system pressure test for buried portions of Class 2 and Class 3 piping that are isolable by means of valves by determining the rate of pressure loss or the change in flow between the ends of buried piping.

Licensee's Basis for Requesting Relief

The buried piping segments of the Class 2 QSS, SI, and AFW systems at MPS3 are provided with a single, normally locked open, valve at their respective storage tanks. These are butterfly-type valves for the QSS and SI piping from the refueling water storage tank (RWST) and gate-type valves for the AFW piping segments from the demineralized water storage tank (DWST). The tanks are of such a large capacity that a small change in level due to leakage through a tank boundary valve could not be detected. The buried piping segments of the Class 3 SWS piping at MPS2 and MPS3 are bounded by butterfly valves that are not designed or expected to provide an adequate leak tight boundary that is necessary for an accurate pressure decay test. A pressure decay test on these buried piping segments that do not have double isolation valves with a drain test connection to quantify internal valve seat leakage, could not differentiate between boundary valve internal seat leakage and external pressure boundary leakage from the buried piping segment. To perform an accurate rate of pressure loss test, extensive maintenance or system modification would be required. For example, the storage tanks would need to be drained and additional valves installed, or the valves would need to be removed from the system and blind flanges installed.

The configuration of the piping segments do not provide for a sufficient straight length of pipe to properly install a flow meter for accurate flow measurement at the ends of the buried pipe segments. Therefore, it is not possible to compare a change in flow between the ends of the buried components. There is no annulus provided, in which the areas at the ends of the buried components could be visually examined, and there is no access to the buried sections without excavation.

Licensee's Proposed Alternative

DNC proposes to use, as an alternative to the requirements of IWA-5244(a) or IWA-5244(b), a verification that flow during operation is not impaired in non-isolable buried piping. For each segment of the buried pipe, periodic flow testing will be performed in accordance with IST program surveillance procedures. These surveillance procedures require that flow is measured, recorded, and compared to established acceptance criteria to provide assurance that flow is not impaired during operation. MPS2 and MPS3 will use the following owner-established minimum flow rate specified in the site IST surveillance as the acceptance criteria for pressure testing of the associated buried segment of piping.

- The flow testing of the two QSS pumps is performed quarterly and will use the established minimum flow rate specified in the IST procedures as the acceptance criteria for the pressure testing of the associated 14-inch QSS buried pipe segments. The flow rate is currently specified to be 3,950 gallons per minute (gpm).

- The flow testing of the two Residual Heat Removal (RHR) system pumps is performed during each cold shutdown and will use the established minimum flow rate specified in the IST procedures as the acceptance criteria for the associated single 24-inch SI buried pipe segment. The flow rate is currently specified to be 4,000 gpm.

- The flow testing of the three AFW pumps is performed each refueling outage (RFO) and will use the established minimum flow rates specified in the IST procedures as the acceptance criteria for the associated 8-inch and 10-inch AFW buried pipe segments. The flow rate of the two motor-driven pumps will be used as the acceptance criteria for the 8-inch segments and the flow rate of the turbine-driven pump will be used as the acceptance criteria for the 10-inch segment. These flow rates are currently specified to be 490 gpm for each of the motor-driven pumps and 750 gpm for the turbine-driven pump.

- The flow testing of three SWS pumps at MPS2 and four pumps at MPS3 is performed quarterly and will use the established minimum flow rate specified in the IST procedures. The current flow rates are specified to be 10,300 gpm for MPS2 and 8,820 gpm for MPS3 and will be used as the acceptance criteria for the SWS buried pipe segments.

- Additionally, internal visual inspection is performed for the buried pipe segments in SWS periodically during plant RFOs to ensure that the piping, coating, or lining is not experiencing unacceptable degradation. For MPS2 and MPS3, the visual inspection is performed on accessible piping that is 18 inches or greater in diameter on alternate trains during each RFO.

If, during the IST surveillance, the minimum flow could not be achieved, the pump(s) would be declared inoperable and a Condition Report (CR) would be initiated in accordance with the Millstone Corrective Action Program (CAP) with further corrective actions as required to restore the pump(s) and/or system to an operable status.

4.0 STAFF EVALUATION

The Code of Record requires a system pressure test for the buried portion of the QSS, SI, AFW, and SWS piping that will determine either a rate of pressure loss or a change in flow at the ends of the buried piping. The buried piping at MPS2 and MPS3 uses butterfly valves at the ends, which were not designed for pressure isolation and therefore, are unsuitable to determine meaningful rate of pressure loss. One end of the buried piping is not instrumented for flow measurement which does not permit measurement of change in flow at the ends of the buried pipe. Therefore, the Code-required test cannot be performed. In order to comply with the Code requirement, additional instrumentation needs to be installed in the buried piping which would result in hardship to the licensee. The Code, however, allows for nonisolable buried components to confirm that flow during operation is not impaired. The NRC staff agrees with the licensee's approach that unimpaired flow in the buried piping can be qualitatively assessed during quarterly IST surveillance of pumps in the affected systems. At MPS3, the QSS, and the RHR pumps take suction from the RWST, and, the AFW pumps take suction from the DWST. The suction lines from these tanks are buried in the yard. The staff concurs that the licensee's proposed test performed under the IST program will ensure that there is unimpaired flow in the buried piping if the specified flow from each of the pumps is available, notwithstanding any pump degradation. The licensee has stated, however, that if during the IST surveillance, the minimum flow could not be achieved, the pump(s) would be declared inoperable and a CR would be initiated in accordance with the Millstone CAP with further corrective actions as required to restore the pump(s) and/or system to an operable status. Therefore, the licensee's proposed alternative in Relief Request No. IR-2-40 for MPS3 would provide a reasonable assurance of operational readiness and structural integrity.

In regard to the buried SWS piping at MPS2 in RR No. RR-89-57 and at MPS3 in RR No. IR-2-41, the licensee will confirm that flow during operation is not impaired during IST surveillance of SWS pumps. Unlike buried piping in the suction line to the QSS, RHR, and AFW pumps, the SWS pumps discharge piping are buried. Therefore, flow measurement at the pump discharge will not necessarily ensure unimpaired flow in buried piping downstream of flow instrument. However, the NRC staff believes that a meaningful assessment of significant loss of service water in the buried piping downstream of the pump can invariably be made during quarterly IST surveillance of SWS pumps. While using the downstream flow instrument, a reference flow corresponds to a target pump head. As the pump degrades, the developed head decreases at the reference flow. However, a decrease in pump head may also indicate increase in flow due to any through-wall leakage from the buried piping. If the head loss (pressure drop) is trended during a pump test at a reference flow, an assessment can be made of any major loss of service water in the buried piping. The licensee has further stated that if during an IST surveillance, the minimum flow could not be achieved, the pump would be declared inoperable and a CR will be generated in accordance with the Millstone CAP as required by the existing IST surveillance. Further corrective actions (e.g., maintenance on the pump, system walk downs, etc.) would be initiated, as required, to restore the pump and/or the system to an operable status.

Additionally, internal visual inspection will be performed for the buried pipe segments in SWS periodically during plant RFOs to ensure that the piping, coating, or lining is not experiencing unacceptable degradation. For MPS2 and MPS3, the visual inspection will be performed on 18-inch diameter piping or greater on alternate trains during each RFO. The visual inspection will further ensure structural integrity of buried SWS piping.

The staff has determined that the licensee's proposed alternative to test the buried portion of service water piping in conjunction with quarterly testing of service water pumps would detect significant through-wall leakage if present in the subject line and would provide a reasonable assurance of operational readiness and structural integrity. Compliance with the Code requirement would require installation of additional flow measuring devices at the inlet end of buried piping, which results in hardship without a compensating increase in the level of quality and safety.

5.0 CONCLUSION

The NRC staff concludes that for the buried portion of the QSS, SI, AFW, and SWS piping, compliance to the Code requirement to perform a test that determines the rate of pressure loss or the change in flow would result in hardship to the licensee without a compensating increase in the level of quality and safety. The licensee's proposed alternative provides reasonable assurance of operational readiness and structural integrity. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternatives in Relief Request No. IR-2-40 for MPS3 and in RR Nos. RR-89-57 and IR-2-41 for MPS2 and MPS3, are authorized for the current ISI interval. All other requirements of the ASME Code, Section XI for which relief has not been specifically requested remain applicable, including a third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: P. Patnaik

Date: July 10, 2008

Millstone Power Station, Unit Nos. 2 and 3

cc:

Lillian M. Cuoco, Esquire
Senior Counsel
Dominion Resources Services, Inc.
Building 475, 5th Floor
Rope Ferry Road
Waterford, CT 06385

Edward L. Wilds, Jr., Ph.D.
Director, Division of Radiation
Department of Environmental
Protection
79 Elm Street
Hartford, CT 06106-5127

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

First Selectmen
Town of Waterford
15 Rope Ferry Road
Waterford, CT 06385

Charles Brinkman, Director
Washington Operations Nuclear Services
Westinghouse Electric Company
12300 Twinbrook Pkwy, Suite 330
Rockville, MD 20852

Senior Resident Inspector
Millstone Power Station
c/o U.S. Nuclear Regulatory Commission
P. O. Box 513
Niantic, CT 06357

Mr. J. W. "Bill" Sheehan
Co-Chair NEAC
19 Laurel Crest Drive
Waterford, CT 06385

Ms. Nancy Burton
147 Cross Highway
Redding Ridge, CT 00870

Mr. Evan W. Woollacott
Co-Chair
Nuclear Energy Advisory Council
128 Terry's Plain Road
Simsbury, CT 06070

Mr. Joseph Roy
Director of Operations
Massachusetts Municipal Wholesale
Electric Company
P.O. Box 426
Ludlow, MA 01056

Mr. William D. Bartron
Licensing Supervisor
Dominion Nuclear Connecticut, Inc.
Building 475, 5th Floor
Roper Ferry Road
Waterford, CT 06385

Mr. J. Alan Price
Site Vice President
Dominion Nuclear Connecticut, Inc.
Building 475, 5th Floor
Rope Ferry Road
Waterford, CT 06385

Mr. Chris L. Funderburk
Director, Nuclear Licensing and
Operations Support
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

Mr. David A. Sommers
Dominion Resources Services, Inc.
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

Mr. David A. Christian
President and Chief Nuclear Officer
Virginia Electric and Power Company
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060-6711