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

February 4, 2010

Mr. David A. Heacock
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 NO. 3 – ISSUANCE OF RELIEF REQUESTS IR-3-06 AND IR-3-07 REGARDING USE OF AMERICAN SOCIETY OF MECHNICAL ENGINEERING CODE, SECTION XI, 2004 EDITION (TAC NOS. ME1258 AND ME1259)

Dear Mr. Heacock:

By letter dated April 28, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML091310666), Dominion Nuclear Connecticut, Inc. (DNC or the licensee) submitted relief requests for the third 10-year in-service inspection (ISI) interval at Millstone Power Station, Unit No. 3 (MPS3). The licensee requested the use of alternatives to certain American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, 2004 Edition, no addenda requirements. Relief Request IR-3-06 proposed an alternate method of performing pressure tests for the Class 2 quench spray (QSS), safety injection (SI), and auxiliary feedwater (AFW) systems buried piping. Relief Request IR-3-07 proposed an alternate method of performing pressure tests for the Class 3 service water (SW) system buried piping.

The results of the Nuclear Regulatory Commission (NRC) staff's review, as contained in the enclosed Safety Evaluation, indicate that DNC's compliance with ASME Code-required pressure test for isolable buried piping would result in hardship or unusual difficulty without a compensating increase in the 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)(ii), DNC's request for relief is authorized for the remainder of the third 10-year ISI interval for MPS3 on the basis that the proposed pressure tests for the QSS, SI, AFW, and SW system buried piping, as an alternative to the requirements of ASME Code, Section XI, 2004 Edition, are acceptable because they provide reasonable assurance of structural integrity of the buried piping. The third 10-year ISI interval for MPS3 began on April 23, 2009, and is scheduled to be completed on April 22, 2019.

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

Sincerely,

Harold Chernoff, Chief
Plant Licensing Branch 1-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosure:
As stated

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION

RELIEF REQUESTS IR-3-06 AND IR-3-07

FOR THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL

DOMINION NUCLEAR CONNECTICUT, INC.

MILLSTONE POWER STATION, UNIT NO. 3

DOCKET NUMBER 50-423

1.0 INTRODUCTION

By letter dated April 28, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML091310666), Dominion Nuclear Connecticut, Inc., (DNC or the licensee), submitted for review and approval Relief Requests IR-3-06 and IR-3-07 to perform alternate system pressure tests on the quench spray (QSS), safety injection (SI), auxiliary feedwater (AFW), and service water (SW) system buried piping for Millstone Power Station, Unit No. 3 (MPS3) during the third 10-year in-service inspection (ISI) interval. The April 28, 2009, letter requested relief from certain requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, 2004 Edition, no addenda. The third 10-year ISI interval, which began April 23, 2009, is scheduled to be completed on April 22, 2019.

DNC requests relief from performing the ASME Code, Section XI required pressure test for isolable components. The ASME code requires pressure tests to be done by measuring the 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 periodic pump testing under in-service test (IST) program surveillance procedures. These surveillance procedures require flow to be measured, recorded and compared to established acceptance criteria to provide assurance that flow is not impaired during operation. During each flow test, the pump draws suction through the associated buried sections of piping.

The NRC staff has reviewed the licensee's proposed alternative pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(a)(3)(ii), and finds compliance to the ASME Code requirement, for the QSS, SI, AFW, and SW systems buried piping pressure test, would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.0 REGULATORY REQUIREMENTS

10 CFR Section 50.55a(g) specifies that ISI of nuclear power plant components shall be performed in accordance with the requirements of the ASME Code, Section XI, except where specific written relief has been granted by the Commission 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 NRC, if (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 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 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 Code of Record for the third 10-year ISI program and its evaluation at MPS3 is the ASME Code, Section XI, 2004 Edition with no addenda.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Evaluation

3.1.1 System/Component(s) for Which Relief is Requested

Buried Class 2 Piping of the Quench Spray (QSS), Safety Injection (SI), Auxiliary Feed Water (AFW) Systems and the buried Class 3 piping of the Service Water (SW) System.

3.1.2 ASME Code Requirements

As applicable to MPS3, the 2004 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. C7.10 requires a system leakage test and a VT-2 visual examination.

Subsection IWA-5244(b) states:

> For buried components where a VT-2 visual examination cannot be performed, the examination requirement is satisfied by the following:
>
> (1) The system pressure test for buried components that are isolable by means of valves shall consist of a test that determines the rate of pressure loss. Alternatively, the test may determine the change in flow between the ends of the

buried components. The acceptable rate of pressure loss or flow shall be established by the Owner.

(2) The system pressure test for nonisolable buried components shall consist of a test to confirm that flow during operation is not impaired.

(3) Test personnel need not be qualified for VT-2 visual examination.

3.1.3 Licensee's Basis for Requesting Relief

A VT-2 visual exam cannot be performed on the buried piping segments of the Class 2 QSS, SI, and AFW systems or on the Class 3 SWS without excavation.

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 tank boundary valve could not be detected. A pressure decay test on these buried piping segments, which 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 systems and blind flanges installed.

The buried piping segments of the Class 3 SW system piping 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, and extensive maintenance or system modification would be required to conduct this test. For example, the valves would need to be replaced with valves that have better leakage control characteristics, 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.

3.1.4 Licensee's Proposed Alternative

As an alternative to the requirements of IWA-5244(b)(1), DNC proposes to verify in accordance with IWA-5244(b)(2), that flow during operation is not impaired for non-isolable buried piping. For each segment of the buried pipe, periodic flow testing will be performed in accordance with Inservice Test (IST) Program surveillance procedures. These surveillance procedures require flow to be measured, recorded and compared to established acceptance criteria to provide assurance that flow is not impaired during operation. The acceptance criteria for pressure testing of the associated buried segment of piping will be based on the following minimum flow rates, as established by the Owner:

- 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 3950 gallons per minute (gpm).

- The flow testing of the two residual heat removal system pumps is performed during each refueling outage 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 4000 gpm.

- The flow testing of the three AFW pumps is performed each refueling outage 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 the four SW system 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 SW system buried piping segments. The flow rate is currently specified to be 8820 gpm.

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

In addition, the following will occur:

- The level in the RWST and the DWST are monitored periodically to satisfy Technical Specification requirements. In the case of the DWST, monitoring is performed once every 12 hours and in the case of the RWST, monitoring is performed once every week. The RWST and DWST also have a low level alarm in the control room. The existing tank isolation valves are administratively locked open during all modes of operation, thus the buried sections of piping are continuously exposed to the static head pressure of their respective storage tanks. Tank level losses due to leakage from buried piping would be promptly identified.

- For the SW system, internal visual inspection is performed for the accessible buried pipe segments, that are 18 inches or greater in diameter, periodically during plant refueling outages to ensure that the piping is not experiencing unacceptable degradation.

4.0 STAFF EVALUATION

The Code of Record requires a system pressure test for the buried portion of the QSS, SI, AFW, and SW systems piping, when VT-2 visual examinations cannot be performed, that will determine either a rate of pressure loss or a change in flow at the ends of the buried piping. Due to the configuration of the QSS, SI, AFW, and SW systems piping at MPS3, a VT-2 visual examination can not be performed without excavation. The buried QSS, SI, and AFW systems do not have double isolation valves, therefore boundary valve seat leakage can not be differentiated from external pressure boundary leakage. The buried SW system piping at MPS3 uses butterfly valves which were not designed for pressure isolation and therefore, are unsuitable to determine meaningful rate of pressure loss. The configuration of the piping does not allow for a flowmeter to be properly installed; therefore, measuring the change in flow at the ends of the buried pipe is not possible. Therefore, the ASME Code-required test cannot be performed. In order to comply with the ASME Code requirement, extensive maintenance of system modification needs to be installed in the buried piping which would result in hardship to the licensee. The ASME 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 residual heat removal 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 NRC 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 Condition Report initiated in accordance with the Millstone Corrective Action Program, 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-3-06 for MPS3 would provide a reasonable assurance of operational readiness.

For the SW system piping at MPS3, the licensee will confirm that flow during operation is not impaired during IST surveillance of SW system pumps. Unlike the QSS, residual heat removal, and AFW pumps, it is the SW system pump discharge piping that is 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 SW system 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 SW 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 Condition Report will be generated in accordance with the Millstone Corrective Action Program 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 accessible buried pipe segments of the SW system periodically during plant refueling outages to ensure that the piping is not experiencing unacceptable degradation. For MPS3, the visual inspection will be performed on 18-inch diameter piping or greater during refueling outages. The visual inspection will further ensure structural integrity of buried SW system piping.

The NRC staff has determined that the licensee's proposed alternative to test the buried portion of service water piping in conjunction with quarterly testing of SW pumps would detect significant through-wall leakage if present in the subject line and would provide a reasonable assurance of operational readiness. Compliance with the Code requirement would require extensive maintenance or system modification which results in hardship without a compensating increase in the level of quality and safety.

5.0 CONCLUSION

On the basis of the above review, the NRC staff concludes that for the buried portion of the QSS, SI, AFW and SW systems piping, compliance with 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 NRC staff also concludes that the proposed pressure tests in Relief Requests IR-03-06 and IR-03-07, as an alternative to the ASME Code pressure test for isolable buried piping, is acceptable because it provides reasonable assurance of the structural integrity of the buried piping. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the NRC staff authorizes the proposed alternatives in Relief Requests IR-3-06 and IR-3-07 for MPS3 for the remainder of the third 10-year ISI interval.

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

Principal Contributor: P. Patnaik

Date: February 4, 2010

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

Sincerely,

/ra/

Harold Chernoff, Chief
Plant Licensing Branch 1-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosure:
As stated

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