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

May 9, 2013

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. 2 - RELIEF REQUEST RR-04-13 FROM THE REQUIREMENTS OF ASME BOILER AND PRESSURE VESSEL CODE, SECTION XI FOR A DEGRADED FLANGE IN THE SERVICE WATER SYSTEM (TAC NO. ME9820)

Dear Mr. Heacock:

By letter dated October 18, 2012, Dominion Nuclear Connecticut, Inc., the licensee, submitted a request for relief from the Article IWA-4000 requirements of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code for the Millstone Power Station, Unit No. 2 (Millstone). Specifically, the licensee requested authorization of a proposed alternative to allow deferral of a repair to the 10-inch, light weight, slip-on flange, 10"JGD-4 spool SK-2963, in the service water supply line to the Facility 2 emergency diesel generator heat exchangers until the end of the refueling outage, which started on October 6, 2012.

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(a)(3)(ii), the licensee requested to use an alternative on the basis that complying with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The NRC staff has concluded that the licensee's proposed alternative provides reasonable assurance of structural integrity or leak tightness of the flange, 10"JGD-4 spool SK-2963, and that complying with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Accordingly, the NRC staff concluded that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(ii). Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the NRC staff authorizes the licensee's proposed alternative, RR-04-13, at Millstone for a period of time not to extend beyond the end of the refueling outage which started Oct 6, 2012.

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

If you have any questions, please contact the Project Manager, Nadiyah Morgan, at (301) 415-1016 or via e-mail at Nadiyah.Morgan@nrc.gov.

Sincerely,

Sean Meighan, Acting Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-336

Enclosure:
Safety Evaluation

cc w/encl: Distribution via Listserv

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST RR-04-13

REGARDING SERVICE WATER SYSTEM FLANGE, 10" JGD-4 SPOOL SK-2963

DOMINION NUCLEAR CONNECTICUT, INC.

MILLSTONE POWER STATION, UNIT NO. 2

DOCKET NUMBER 50-336

1.0 INTRODUCTION

By letter dated October 18, 2012 (Agencywide Documents Access and Management System Accession No. ML12297A333), Dominion Nuclear Connecticut, Inc., the licensee, submitted a request for relief from the Article IWA-4000 requirements of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code for the Millstone Power Station, Unit No. 2 (MPS-2). Specifically, the licensee requested authorization of a proposed alternative to allow deferral of a repair to the 10-inch, light weight, slip-on flange, 10"JGD-4 spool SK-2963, in the service water supply line to the Facility 2 emergency diesel generator heat exchangers until the end of the refueling outage, which started on October 6, 2012.

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(a)(3)(ii), the licensee requested to use an alternative on the basis that complying with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.0 REGULATORY EVALUATION

Adherence to Article IWA-4000 of Section XI of the ASME Code is mandated by 10 CFR 50.55a(g)(4) which states, in part, that throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components, including supports, which are classified as ASME Code Class 1, Class 2, and Class 3 must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of editions and addenda of the ASME Boiler and Pressure Vessel Code.

Paragraph 10 CFR 50.55a(a)(3) states, in part, that alternatives to the requirements of paragraph (g) of 10 CFR 50.55a may be used, when authorized by the NRC, if the licensee demonstrates (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.

3.0 TECHNICAL EVALUATION

3.1 Components for Which Relief is Requested

Component: Service Water System 10-inch Light Weight Slip-on Flange (10"JGD-4 spool SK-2963)

Code Class: Class 3

3.2 Applicable Code Edition and Addenda

Repair and Replacement:	ASME Boiler and Pressure Vessel Code, Section XI, 2004 Edition, No Addenda
Construction:	American National Standards Institute (ANSI) B31.1, 1967 Edition through the summer of 1973 Addendum
Fittings:	ANSI B16.5, 1968

3.3 Reason for Request

The licensee stated that the component under consideration is a lined carbon steel flange which is connected to an unlined superaustenitic stainless steel flange (6% Molybdenum). On September 12, 2012, an ultrasonic thickness examination of the component under consideration was conducted. This examination identified areas of local degradation in the flange. The licensee stated that a code compliant repair is necessary to repair the identified areas of degradation. The licensee also stated that online repairs of this component could not be completed unless service water temperature was less than 58 °F, which it was not at the time of the request, and could not be completed within the 72 hour time frame permitted by plant technical specifications (TSs). The licensee concluded that making ASME Code compliant repairs would require a plant shutdown, which was viewed as a hardship and, accordingly, requested relief from the ASME Code requirement to immediately repair the component.

3.4 Proposed Alternative

In its request, the licensee stated that while the degraded component remains in service until an ASME Code compliant repair is completed, an ultrasonic examination will be conducted of the component to track the progression of the degradation on a daily basis. The licensee also stated that if (1) the circumferential extent of corrosion increased to greater than 50% of the circumference of the flange, (2) the radial extent of the worst area of degradation indicates a greater than acceptable rate of corrosion, or (3) a through wall leak develops, appropriate actions in accordance with technical specifications will be taken. The licensee also stated that, "It should be noted that the expected corrosion rate is less than 20% of the allowable to maintain operability until the refueling outage plus 30-day mission time."

3.5 Licensee's Technical Basis

In support of its request, the licensee provided the following information:

a. The service water system at MPS-2 consists of sections of lined carbon steel piping joined to sections of unlined superaustenitic stainless steel (6% Molybdenum). This unit has, in the past, experienced other instances of localized corrosion at flanges where lined pipe joined was joined to the superaustenitic stainless steel pipe. Examination of these flanges has revealed the following:

   1. The degradation was in the form of localized corrosion; no cracking was observed.

   2. Degradation occurred at areas of local coating degradation.

   3. Degradation was increased due to galvanic corrosion when the lined flange was in contact with a superaustenitic stainless steel flange and the flanges were not fully electrically isolated.

b. Ultrasonic examinations of the component under consideration will be conducted on a daily basis to evaluate the progress of degradation and to confirm projected corrosion rates

c. Electrical isolation of the flange under consideration from the adjoining superaustenitic stainless steel flange was not satisfactory at the time of the discovery of the degradation. Electrical isolation was achieved by removing one bolt at a time from the flanges and installing isolating sleeves and washers. This is expected to substantially reduce the corrosion rate of the flange under consideration.

d. Currently, there is no NRC-approved structural analysis approach for flanges. The licensee developed and implemented an approach for localized corrosion based on finite element analysis, cracking was not considered. This approach included all applicable loading modes. This analysis revealed that stresses in the component were less than 10% of allowable stresses. The licensee stated that significant structural margin remains in the component even if 50% of the circumference of the component is degraded.

e. Both measured corrosion rates from this event and historical were utilized to project loss of material during the time of interest to determine that sufficient material would remain so that through wall leakage would not occur.

f. Spray, flooding, and flow margin were considered by the licensee, but given that no leakage is occurring, were found not to be of significance.

g. Extent of condition examinations are currently being conducted. Areas of degradation will be repaired and the cause of the degradation (typically coating defects and/or improper galvanic isolation) will be corrected prior to returning the

unit to service from the fall 2012 refueling outage. Efforts are underway to reduce galvanic attack.

3.6 NRC Staff Evaluation

Prior to authorizing the proposed alternative under 10 CFR 50.55a(a)(3)(ii), the NRC staff must find that the technical information provided in support of the proposed alternative is sufficient to demonstrate that compliance with ASME Code Section XI, IWA-4000 would result in a hardship or unusual difficulty; and would not provide a compensating increase in the level of quality and safety when compared to the proposed alternative.

The NRC staff has reviewed the procedures, as described by the licensee, required to complete an ASME Code compliant repair to the component under consideration. The NRC staff agrees with the licensee's contention that completion of these procedures and the repair would require longer than the 72 hours provided by TSs. The NRC staff also agrees with the licensee's contention that repairs to this component which require longer than the time period allowed by TS would require the plant to be shut down. The NRC staff further agrees with the licensee's contention that a plant shut down for the purpose of making these repairs constitutes a hardship. This satisfies the first condition of 10 CFR 50.55a(a)(3)(ii).

In considering the second condition of 10 CFR 50.55a(a)(3)(ii), whether adherence to the ASME Code requirement would provide an increase in quality and safety commensurate with the hardship or unusual difficulty imposed by meeting the ASME Code requirement, the NRC staff evaluated the technical basis for the alternative as proposed by the licensee and described in items a – g in Section 3.5 above. With the exception of item f, the NRC staff finds no reason to object to the technical accuracy and/or sufficiency of any of these statements.

Item f addresses spray, flooding and flow margin. The licensee proposed that these items are not an issue due to the current absence of leakage. This approach is generally not acceptable in that the purpose of considering these items is to determine the effect of observed or potential leakage on other components. However, in the present case, due to the short time duration of the requested relief, the performance of daily ultrasonic test exams to monitor the progress of degradation, and the absence of any known mechanism, which would corrode the pipe at a rate sufficient to cause leakage from the pipe prior to replacement, the NRC staff finds that additional analysis concerning spray, flooding and flow margin to be unnecessary.

The NRC staff concurs with the licensee's contention that degradation of the component under consideration will be in the form of localized corrosion and that cracking need not be considered. Therefore, the NRC staff concurs with the licensee's approach to evaluate the structural integrity of the component. Given that stresses in the component are less than 10% of allowable, the NRC staff agrees with the licensee's contention that adequate structural margin exists in the component when degradation is present in 50% of the circumference of the component. Given that the licensee has indicated that additional actions will be taken in accordance with TS should degradation exceed 50% of the circumference of the component, the NRC staff has reasonable assurance that the component will retain adequate structural strength during the period for which relief has been requested.

Given that the licensee has provided sufficient information to the NRC staff to provide reasonable assurance of the structural and leak tight integrity of the component during the

period for which relief has been requested, the NRC staff finds that adherence to the ASME Code requirement does not provide a compensating increase in the level of quality and safety when compared to the proposed alternative. Therefore, the second criterion in 10 CFR 50.55a(a)(3)(ii) is met.

Based on the above analysis, the NRC staff finds that the technical requirements of 10 CFR 50.55a(a)(3)(ii) have been met and, therefore, that the licensee's proposed alternative provides reasonable assurance of structural and leak tight integrity of the subject components. Therefore, the NRC staff finds no technical basis that would preclude it from authorizing the licensee's proposed alternative to Article IWA-4000 of Section XI of the ASME Code.

4.0 CONCLUSION

As set forth above, the NRC staff has concluded that the licensee's proposed alternative provides reasonable assurance of structural integrity or leak tightness of the flange, 10"JGD-4 spool SK-2963, and that complying with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Accordingly, the NRC staff concluded that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(ii). Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the NRC staff authorizes the licensee's proposed alternative, RR-04-13, at Millstone for a period of time not to extend beyond the end of the refueling outage which started Oct 6, 2012.

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Principle Contributor: D. Alley

Date: May 9, 2013

If you have any questions, please contact the Project Manager, Nadiyah Morgan, at (301) 415-1016 or via e-mail at Nadiyah.Morgan@nrc.gov.

Sincerely,

/ra/

Sean Meighan, Acting Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-336

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