Dominion Nuclear Connecticut, Inc.
5000 Dominion Boulevard, Glen Allen, Virginia 23060
Web Address: www.dom.com

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U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Serial No. 09-474
NLOS/WDC R0
Docket No. 50-336
License No. DPR-65

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 2
ALTERNATIVE REQUEST RR-89-67 FOR THE P40A RCP SEAL COOLER RETURN TUBING

A partial penetration weld and tube/base metal repair was recently completed at Millstone Power Station Unit 2 (MPS2) on the P40A Reactor Coolant Pump (RCP) seal cooler return tubing. Dominion Nuclear Connecticut, Inc. (DNC) submits Alternative Request RR-89-67 for the use of an alternative to the repair examination requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, used for that repair activity. Specifically, this request is submitted in accordance with 10 CFR 50.55a(a)(3)(ii) to support DNC's determination that a significant hardship exists without a compensating increase in the level of quality and safety in performing the required Radiographic Test (RT) examination.

If you have any questions regarding this submittal, please contact Ms. Wanda D. Craft at (804) 273-4687.

Sincerely,

J. A. Price
Vice President – Nuclear Engineering

Attachments: (1)

1. Alternative Request RR-89-67 for the P40A RCP Seal Cooler Return Tubing

Commitments made in this letter: None

A047
NRR

cc: U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406-1415

Ms. C. J. Sanders
Project Manager - Millstone Power Station
U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Mail Stop O-8B3
Rockville, MD 20852-2738

NRC Senior Resident Inspector
Millstone Power Station

ATTACHMENT 1

ALTERNATIVE REQUEST RR-89-67 FOR THE P40A RCP SEAL COOLER RETURN TUBING

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ALTERNATIVE REQUEST RR-89-67 FOR THE P40A RCP SEAL COOLER RETURN TUBING

Proposed Alternative in Accordance with 10 CFR 50.55a(a)(3)(ii)

-- Hardship or Unusual Difficulty without a Compensating Increase in the Level of Quality and Safety --

1.0 ASME CODE COMPONENT(S) AFFECTED

Millstone Power Station Unit 2 (MPS2) - 1½ inch ASME Class 1 tubing located on the seal cooler return side of the P40A Reactor Coolant Pump (RCP) as depicted in the sketch below. Weld is now designated as RCPA-RC-95-W-4 and classified as the following:

Code Class	=	1
Risk-Informed	=	High Safety Significant (HSS)
Category	=	R-A
Item No.	=	R1.12

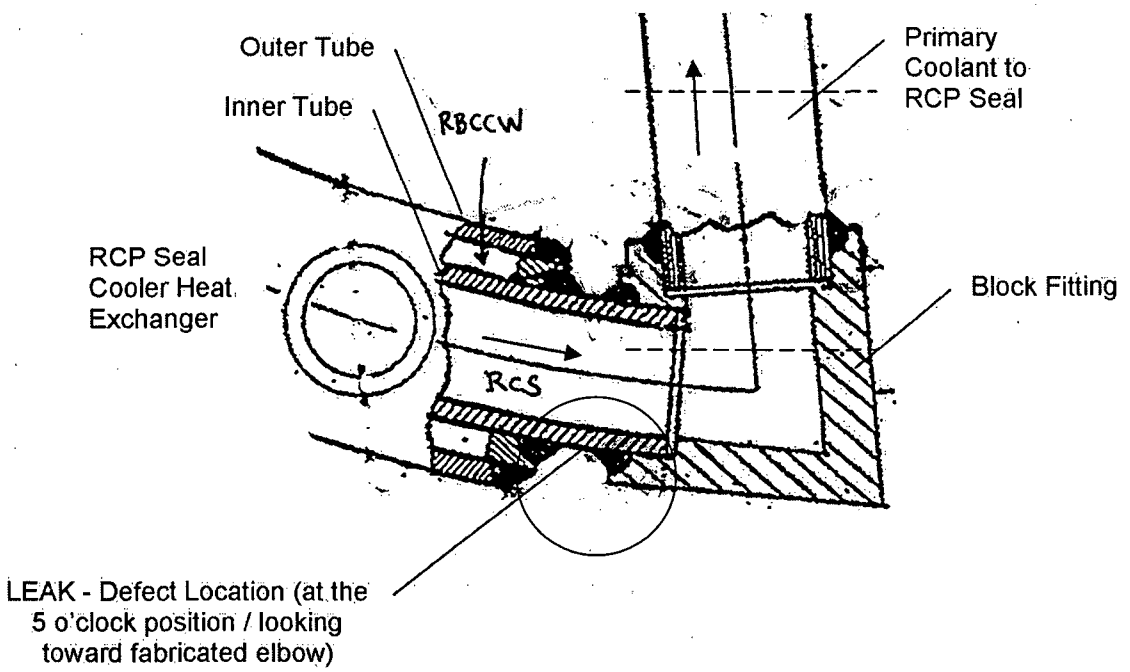

Figure 1: Sketch of Leak

Design Information

Component: P40A RCP Cover/Heat Exchanger Assembly (Tubing Welds) Manufactured 1992

Manufacturer:	BW/IP International, Inc. Pump Division, Los Angeles Operations, Vernon, CA
Design Requirements:	Heat Exchanger Stress Report for Combustion Engineering
Purchase Order No.:	9002750-18767
Byron Jackson Order No.:	681-N-0449 thru 0452, Approved 07/23/1973

Design Conditions:

Design Pressure:	2,500 psia
Design Temperature:	650° F

Operating Conditions:

Operating Pressure:	2,250 psia
Maximum Operating Temperature:	550° F
Typical Operating Temperature:	100° F

From the 1992 Form N-2 Certificate Holders' Data Report:

Design Pressure:	2,500/150 psi
Temperature:	650/250° F
Hydrostatic Test Pressure:	3,125 psig/225 psig/60° F

Heat Exchanger Tubing:	1-1/2" outside diameter. x 0.112" Wall ASME SA-213 Type 316, Heat No. D141705
Fitting:	ASME SA-479 Tp. 316, Heat No. 460035
Elbow:	ASME SA-479 Tp. 316, Heat No. A12147
Fabrication Process:	As shown in Figure 1, the inner tube is attached to the block fitting with a J-groove weld reinforced with a fillet. Also, the inner tube is attached to a centering spacer with a J-groove weld reinforced with a fillet weld. The centering spacer is joined to the outer tube with a single bevel groove weld with a reinforcing fillet.

2.0 APPLICABLE CODE EDITION AND ADDENDA

The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code) Section XI of record for the ASME Section XI Repair/Replacement Program for the MPS2 third 10-year inservice inspection (ISI) interval is the 1998 Edition, No Addenda, Reference 1.

3.0 APPLICABLE CODE REQUIREMENT

•IWA-4422.2.2(e) "Defect Removal Followed by Welding or Brazing," refers to IWA-4520 "Examination" and paragraph (a) "Welding or brazing areas and welded joints made for installation of items shall be examined in accordance with the Construction Code identified in the Repair/Replacement plan."

The Construction Code identified in the repair/replacement plan is the 1968 Edition with the Winter 1970 Addenda of ASME Section III, Reference 2. This Code has two requirements that apply to this repair. The first requirement is for partial penetration welds under N-462.4(d)(1). For this material, this portion of the Code requires a progressive liquid penetrant test (PT) at the lesser of one-third the thickness of the joint or each ½ inch of thickness. Requirements for a weld of this thickness are to PT the root and final layer. The other requirement that applies is related to the repair of the tube material and is found in N-324.9 (Repair of Tubular Products by Welding). The applicable examination requirement is found in paragraph (g) which states the following:

> "(g) The repaired area is examined by radiography in accordance with N-324.7 and by a second method of examination which is selected so as to be applicable to the material being inspected."

This alternative request is from the requirement in N-324.9(g) to radiographic test (RT) the repair area of the tube

•IWA-4540(a), "After welding on a pressure retaining boundary or installation of an item by welding or brazing, a system hydrostatic test shall be performed in accordance with IWA-5000."

4.0 REASON FOR THE REQUEST

On July 13, 2009 prior to start-up from a forced shutdown with MPS2 in mode 3 (hot standby) at 0% reactor power, a Reactor Coolant System (RCS) pressure boundary leak in and around the MPS2 'A' Reactor Coolant Pump (RCP) seal cooler region was identified by a technician conducting a system walk-down at normal operating pressure/normal operating temperature (NOP/NOT). The through-wall leak was located in the weld and went through the weld and through the base metal of the tube. The failure was attributable to a weld defect from original construction.

Weld and base metal repair activities were performed in accordance with ASME Code Section XI, however, due to the close proximity of the repair area to surrounding obstructions and the component configuration, performance of a complete weld replacement was not possible. See Figure 1 and the pictures of the RCP seal cooler in Supplement 1. Because of these restrictions, the required RT was done as a best effort examination and was not in compliance with the image quality requirements of the Construction Code or the 1992 Edition of Section III that was needed to comply with requirements in Code Case N-416-3, Reference 3. Also, because of these same restrictions, an Ultrasonic Test (UT) examination, as an alternative to the RT, was not possible.

Additionally, following repair welding, a hydrostatic test per IWA-5000 is required by the ASME Code, Section XI per IWA-4540(a). This Class 1 hydrostatic test would require pressurization at a pressure higher than that associated with normal startup and operations and would involve most of the RCS since there are no local isolation valves to limit the test area. The alternative in Code Case N-416-3, Reference 3, allows a system leakage test in lieu of a hydrostatic test, but the nondestructive examination methods and acceptance criteria must be in accordance with ASME Code Section III, 1992 Edition with No Addenda, Reference 4. In ASME Section III, repair of defects in tubular products are to be examined in accordance with NB-2539.4 (1992 Edition), which also requires radiography of the repair area. Since an RT cannot be accomplished, the alternative provided in Code Case N-416-3 cannot be used in this repair.

The Code repair examination and testing requirements, including a system leakage test per Code Case N-416-3, were completed. The only exception was the required Code RT examination. The weld repair cavity and every layer of the applied weld repair was PT examined. The lack of access and configuration of the partial penetration weld makes it impossible to perform an acceptable Code required RT, or a UT examination. Not being able to perform the Code RT also does not allow the use of Code Case N-416-3, and coupled with the difficulties in meeting increased pressure requirements to perform an acceptable hydrostatic test, DNC is requesting this alternative to use a best effort RT in conjunction with progressive PT in lieu of the Code required RT. If approved, this will also allow the system leakage test per Code Case N-416-3 to be used in lieu of the required hydrostatic test.

DNC has determined there is no way to comply with the RT requirement for this weld and tube repair and a replacement of the weld is not possible due to the access involved. Because of this Code non-compliance, an operability determination has concluded that the RCP seal cooler is operable but not fully qualified with this repair. Replacement of the MPS2 P40A RCP rotating element including the P40A RCP Cover/Heat Exchanger Assembly would restore full qualification of the component. However, the original welds that are on the replacement cooler did not receive RT examination during original fabrication and this replacement would provide no better assurance of structural integrity and safety than the cooler that is in place. A significant personnel radiation exposure estimated at 17.630 person rem would result if a replacement was performed, and no increase in safety would be expected from such a replacement

5.0 PROPOSED ALTERNATIVE AND BASIS FOR USE

The repair area had a progressive (i.e., after each weld pass) PT performed and a best effort RT. Due to the thin wall of the tubing being repaired, the PTs were comprised of a surface examination of the defect removal cavity, the root pass, the second layer, and the final layer with a best effort RT of the final weld. The surface examinations and the best effort RT were performed in accordance with the 1992 Edition of Section III, Reference 4.

Radiography in accordance with the 1992 Edition of ASME Section V, Reference 5, Article 2 requirements for the volumetric examination of the RCP seal cooler return tubing weld and tube repair was performed to the extent possible to obtain the best possible image of

the area of repair. Complete Code compliance could not be achieved based on access constraints of surrounding components and the configuration of the return tubing adjacent fittings, which restrict both source and film placement. The geometric unsharpness Code requirements were met. Only the Code sensitivity requirements were unable to be obtained.

The configuration of the return tubing with the adjacent fittings does not provide adequate scan surface to apply UT examination techniques to perform volumetric examination of this area.

Additionally, a visual VT-2 examination was performed on the repaired area during a Class 1 system leakage test prior to startup. This inservice leak test assured that there was no leak path and that the repair did not introduce major flaws.

The integrity of the repair is assured by the Code qualified and controlled welding process employed. In addition, the repaired weld and tube area received nondestructive examination as described above. The weld repair procedure included progressive PT examinations, similar to and exceeding those required by the Construction Code N-462.4(d)(1) and the 1992 Edition of Section III, Reference 4, for partial penetration welds. The multiple surface examinations performed provided additional assurance that no defects were introduced by the weld repair process. Therefore the level of the quality of the repair is equal to or better than the original fabrication partial penetration weld immediately adjacent to it. Although the examination of the repair does not satisfy all Code requirements, the structural integrity of the weld repair is assured. In addition, DNC has determined that the action that has been taken is the only alternative available without creating a hardship or unusual difficulty without a compensating increase in the level of quality or safety.

6.0 DURATION OF PROPOSED ALTERNATIVE

This proposed alternative to the ASME Code is applicable for this repair only and will remain in place for the life of the 'A" RCP seal cooler.

7.0 PRECEDENTS

No precedent similar to this repair situation is known.

8.0 REFERENCES

1. ASME Code Section XI, 1998 Edition with No Addenda.
2. ASME Code Section III, 1968 Edition, with the Winter 1970 Addenda.
3. ASME Code Case N-416-3, "Alternative Pressure Test Requirement for Welded or Brazed Joints for Replacement Parts and Piping Subassemblies, or Installation of Replacement Items by Welding or Brazing, Classes 1, 2, and 3, Section XI Division 1," September 7, 2001.
4. ASME Code Section III, 1992 Edition with No Addenda.
5. ASME Code Section V, 1992 Edition with No Addenda.

9.0 CONCLUSION

DNC has determined and concluded that limitations associated with accessibility due to the configuration of the P40A RCP Cover/Heat Exchanger Assembly and this particular weld precludes performance of a full Code compliant repair. For this situation, the repair that has been completed is considered to be at least at a level consistent with initial fabrication and therefore of quality and safety necessary to ensure structural and leak tight integrity. Therefore, it is requested that the NRC approve this alternative request under the provisions of 10 CFR 50.55a(a)(3)(ii).

SUPPLEMENT TO ATTACHMENT 1

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INFORMATIONAL PHOTOGRAPHS

Informational Photographs