

From: Tam, Peter
Sent: Monday, April 02, 2012 3:10 PM
To: Jack Gadzala (jack.gadzala@dom.com); Craig Sly (craig.d.sly@dom.com)
Cc: Feintuch, Karl; Rezai, Ali; McLellan, Thomas
Subject: Kewaunee - Formal RAI re. Relief Request RR-G-5-1 to -40 (TAC ME7378)

Jack, Craig:

During the conference call today, NRC and Kewaunee participants agreed that there is no need to revise any question in the draft Request for Additional Information (RAI) previously transmitted by Karl Feintuch's 3/27/2012 e-mail (below). On such basis, we understand that you accept the subject draft RAI as formal RAI.

Peter S. Jam, Senior Project Manager
(for D.C. Cook and Monticello)
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Tel. 301-415-1451

From: Feintuch, Karl [<mailto:Karl.Feintuch@nrc.gov>]
Sent: Tuesday, March 27, 2012 2:17 PM
To: Jack Gadzala (Generation - 4); Craig D Sly (Generation - 6)
Cc: Rezai, Ali; McLellan, Thomas
Subject: FW: ME7378 - Kewaunee - Relief Req RR-G-5-1 to -40 Request for Additional Information (RAI)

This message is the same as that of 2:25 PM ET except that it corrects the format of "Endnotes 1, 2, 3)" that appear in section 2.6.

From: Feintuch, Karl
Sent: Tuesday, March 27, 2012 2:25 PM
To: Jack Gadzala; 'Craig D Sly'
Cc: Rezai, Ali; McLellan, Thomas
Subject: ME7378 - Kewaunee - Relief Req RR-G-5-1 to -40 Request for Additional Information (RAI)

DRAFT REQUEST FOR ADDITIONAL INFORMATION
ON THE FOURTH TEN YEAR 10-YEAR INSERVICE INSPECTION INTERVAL
REQUEST FOR RELIEF RR-G-05
DOMINION ENERGY KEWAUNEE, INC.
KEWAUNEE POWER STATION
DOCKET NUMBER: 50-305

1.0 SCOPE

By letter dated September 28, 2011, the licensee, Dominion Energy Kewaunee, Inc. (DEK), submitted Request for Relief (RR) RR-G-05 from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, *Rules for Inservice Inspection of Nuclear Power Plant Components* for Kewaunee Power Station (KPS). The request for relief applies to the fourth 10-year inservice inspection (ISI) interval, in which the licensee adopted the 1998 Edition through the 2000 Addenda of ASME Code Section XI as the code of record.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(5)(iii), the licensee has submitted the subject requests for relief for limited examinations in multiple ASME Code Examination Categories. The ASME Code requires that 100 percent of the examination volumes, or surface areas, described in ASME Code, Section XI, Tables IWB-2500 and IWC-2500 be performed during each interval. The licensee stated that 100 percent of the ASME Code-required volumes, or surface areas, are impractical to obtain at KPS.

10 CFR 50.55a(g)(5)(iii) states that when licensees determine that conformance with ASME Code requirements is impractical at their facility, they shall submit information to support this determination. The U.S. Nuclear Regulatory Commission (NRC) will evaluate such requests based on impracticality, and may impose alternatives, giving due consideration to public safety and the burden imposed on the licensee.

The NRC staff has reviewed the information submitted by the licensee, and based on this review, determined the following information is required to complete the evaluation. For clarity, the licensee's requests have been evaluated according to ASME Code Examination Category and corresponding request for relief and have been labeled alphabetically.

The request for information (RAI) is structured into 7 items (RAI1). Each item is assigned a tracking number in the format:

[TAC] – RAI1 – [Technical Branch] – [Primary Reviewer] – [Serial #] – [requested by year-month-day {nominally 30 days pending confirmation}]. For this request the assigned tracking numbers are listed in Section 2.0 below.

A clarification conference call is offered for any of the items. Some personnel attending for the NRC are in the Pacific Time Zone (PT). Therefore, phone calls are best held (Monday-Thursday afternoons ET) Please confirm the need for a clarification call any items by March 29, 2012, to facilitate scheduling of calls. These draft items become firm after clarification is confirmed by discussion prior to or at a clarification conference call.

2.0 REQUEST FOR ADDITIONAL INFORMATION (RAI)

The request consists of seven items:

ME7378-RAI1-EPNB-McL-2.1-2012-04-27
ME7378-RAI1-EPNB-McL-2.2-2012-04-27
ME7378-RAI1-EPNB-McL-2.3-2012-04-27
ME7378-RAI1-EPNB-McL-2.4-2012-04-27
ME7378-RAI1-EPNB-McL-2.5-2012-04-27
ME7378-RAI1-EPNB-McL-2.6-2012-04-27
ME7378-RAI1-EPNB-McL-2.7-2012-04-27

In these tracking numbers:

EPNB = Piping and NDE Branch

McL = Reviewers McLellan and , who is coordinating RAI traffic for TAC ME7378

2.n = 2.1 through 2.7 corresponding to the RAI shown in below.

2012-04-27 = April 27, 2012, which is subject to confirmation with DEK that referenced items (RAI) are clear for response.

In your response please associate this tracking number and the RAI that follow (items 2.1 to 2.7) with each of your answers.

2.1 General Information Required on Request for Relief RR-G-05

In Attachment 1 of the licensee's submittal, DEK provided a general summary of the relief request. Under a section entitled ASME Code Requirements and the Basis for Relief, the licensee states the following:

Volumetric and surface examinations of welds and base material will be examined in accordance with the applicable [ASME Code, Section XI,] Examination Category and Item Number and as required by the [KPS] Risk Informed Program.

During the performance of scheduled examinations, there were numerous instances where examiners reported some type of interference. DEK personnel evaluated every instance where this situation was reported, and when possible, alternative examination areas were selected to avoid having to examine restricted areas.

Piping welds that were selected that still necessitated limited examination (i.e. less than or equal to 90% coverage) were those included in the KPS Fourth Ten-Year Inservice Inspection program to ensure examinations were performed on a representative sample of piping welds and piping welds that were not previously examined during the first 30 years of plant operation.

There are two risk informed program methodologies that are generally accepted for use by the NRC; they have been developed by the Electrical Power Research Institute (EPRI) and the Westinghouse Owners Group (WOG) and are documented in Topical Report TR-112657, *Revised Risk-Informed Inservice Inspection Evaluation Procedure, Revision B-A*, and Topical Report WCAP-14572, *Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report, Revision 1-NP-A*, respectively. The two programs use either ASME Code Case N-578-1(Endnote 1) *Risk-Informed Requirements for Class 1, 2 or 3 Piping, Method B Section XI*, or Code Case N-577 (Endnote 1), *Risk-Informed Requirements for Class 1, 2 or 3 Piping, Method A*, both of which assign a new Examination Category R-A, listing welds, or other elements, according to expected forms of degradation.

The ASME Categories and Item numbers included in the licensee's current request for relief appear to be for a conventional ISI program, not a risk-informed program. However, as shown in the licensee's statements above and in the data sheets provided for the specific welds listed under Category B-F, B-J, C-F-1, and C-F-2, the reviewer is lead to believe that these welds are part of a risk-informed program.

Please clarify the type, either conventional ISI program or a RI-ISI program, to which each of the welds submitted for relief are included. If a RI-ISI program is being implemented, provide a reference to the NRC Safety Evaluation (SE) approving this program and to which methodology (WOG or EPRI) was followed. If a RI-ISI program is not being implemented, state why alternative piping welds that have not been previously examined during the first 30 years of plant operation were selected for examination during the fourth interval.

Confirm the correct RI-ISI Examination Category and Item Numbers for each of the welds listed in Table 2.1.1 below. Specifically, if a RI-ISI program is being implemented, please list the RI-ISI R-A Item Numbers in accordance with the appropriate ASME Code Case or if KPS has an unique identifying RI-ISI system based on either RI-ISI ASME Code Case clarify how to identify the welds examined.

Table 2.1.1 – Class 1 and 2 Piping Welds			
ASME Category	Code Item	Weld ID	Weld Type
B-F	B5.40	PR-W1DM	PZR 6" Nozzle-to-Safe End
B-F	B5.40	PR-W26DM	PZR 6" Nozzle-to-Safe End
B-F	B5.40	RC-W67DM	PZR 14" Nozzle-to-Safe End
B-J	B9.11	PR-W27	6" PZR Relief Circumferential Weld
B-J	B9.11	RC-W60	6" Reactor Coolant Circumferential Weld
B-J	B9.11	SI-W51	6" Safety Injection Circumferential Weld
B-J	B9.11	RHR-W9	8" Residual Heat Removal Circumferential Weld
B-J	B9.11	SI-W74	12" Safety Injection Circumferential Weld
B-J	B9.31	RC-W3BC	8" Reactor Coolant Pipe Branch Connection
B-J	B9.31	RC-W22BC	6" Reactor Coolant Pipe Branch Connection
C-F-1	C5.13	ICS-W180	6" Containment Spray Circumferential Weld
C-F-1	C5.13	ICS-W181	6" Containment Spray Circumferential Weld
C-F-1	C5.13	RHR-W419	6" Residual Heat Removal Circumferential Weld
C-F-1	C5.13	ICS-W45	8" Containment Spray Circumferential Weld
C-F-1	C5.14	SI-W429	6" Safety Injection Circumferential Weld
C-F-1	C5.21	SI-W249	3" Safety Injection circumferential Weld
C-F-1	C5.21	AFW-W148	3" Auxiliary Feedwater Circumferential Weld
C-F-1	C5.21	AFW-W151	3" Auxiliary Feedwater Circumferential Weld
C-F-1	C5.21	AFW-W152	3" Auxiliary Feedwater Circumferential Weld
C-F-1	C5.21	AFW-W155	3" Auxiliary Feedwater Circumferential Weld
C-F-2	C5.61	AFW-W156	3" Auxiliary Feedwater Circumferential Weld
C-F-2	C5.61	AFW-W171	3" Auxiliary Feedwater Circumferential Weld
C-F-2	C5.61	AFW-W172	3" Auxiliary Feedwater Circumferential Weld
C-F-2	C5.61	AFW-W178	3" Auxiliary Feedwater Circumferential Weld
C-F-2	C5.61	AFW-W189	3" Auxiliary Feedwater Circumferential Weld
C-F-2	C5.61	AFW-W190	3" Auxiliary Feedwater Circumferential Weld
C-F-2	C5.61	AFW-W191	3" Auxiliary Feedwater Circumferential Weld

Table 2.1.1 – Class 1 and 2 Piping Welds			
ASME Category	Code Item	Weld ID	Weld Type
C-F-2	C5.61	AFW-W192	3" Auxiliary Feedwater Circumferential Weld
C-F-2	C5.61	AFW-W194	3" Auxiliary Feedwater Circumferential Weld
C-F-2	C5.61	AFW-W195	3" Auxiliary Feedwater Circumferential Weld
C-F-2	C5.61	AFW-W196	3" Auxiliary Feedwater Circumferential Weld
C-F-2	C5.61	AFW-W197	3" Auxiliary Feedwater Circumferential Weld
C-F-2	C5.61	AFW-W198	3" Auxiliary Feedwater Circumferential Weld

In addition, if the welds listed in Table 2.1.1 above were examined under a RI-ISI program:

- a) Please state the total number of Class 1 and Class 2 piping welds included in the overall risk-informed program so that the 33 limited examinations can be assessed within the scope of all examinations being implemented.
- b) Please confirm whether the ultrasonic (UT) examination methods for all piping welds listed in Table 2.1.1 were conducted in accordance with the performance demonstration requirements of ASME Code, Section XI, Appendix VIII.
- c) Further discuss whether additional welds could have been examined to augment the reduced volumetric coverage resulting from the limited examinations of the subject welds.
- d) Please state whether any alternative examination such as full surface examination was performed on each of the ASME Code Class 1 and Class 2 piping welds. The staff notes that surface examination is not required for most of the damage mechanisms listed in Table 1 of ASME Code Case N-577 or N-578. Also, please state whether any indications were discovered as a result of surface examinations.

2.2 Request for Relief RR-G-05, Part A, ASME Code, Section XI, Examination Category B-D, Item B3.90, Full Penetration Welded Nozzles in Vessels

Confirm that the UT examination methods used have been qualified in accordance with the performance demonstration requirements of ASME Section XI, Appendix VIII.

2.3 Request for Relief RR-G-5, Part B, ASME Code, Section XI, Examination Category B-F, Item B5.40, Pressure Retaining Dissimilar Metal Welds In Vessel Nozzles

The coverage percentages provided in the licensee's submittal appear to be only from the 45- and 60-degree UT scans performed on the welds. Please state whether any additional "best effort" coverage was obtained using the 35-, 42-, and 50-degree L-wave scans, as applicable.

2.4 Request for Relief RR-G-5, Part C, ASME Code, Section XI, Examination Category B-J, Items B9.11 and B9.31, Pressure Retaining Welds in Piping

The licensee's submittal states that the subject weld areas in ASME Code, Section XI, Category B-J, Item B9.31 were interrogated with a combination of 34-, 45- and 60-

degree shear waves. The licensee's submittal further states that examinations were performed as single-sided examinations from the pipe side of the welds.

Confirm the insonification angles and wave modalities used to examine each of the subject welds in ASME Code, Section XI, Category B-J, Item B9.31. If only shear wave techniques were used to examine the subject stainless steel welds, please explain why refracted longitudinal wave techniques were not used as part of a "best effort" examination. The L-wave method has been shown capable of detecting planar inside diameter (ID) surface-breaking flaws on the far-side of wrought stainless steel welds. Recent studies (Endnotes 2, 3, 4) recommend the use of both shear and L-waves to obtain the best detection results, with minimum false calls, in austenitic welds. If both shear and L-waves were used please state the "best effort" coverage achieved on the near- and far-side of the subject weld volumes.

2.5 Request for Relief RR-G-5, Part D, ASME Code, Section XI, Examination Category C-A, Items C1.10, C1.20, and C1.30, Pressure Retaining Welds in Class 2 Pressure Vessels

State the materials of construction and the wall thickness for the pressure vessel welds submitted under ASME Code Category C-A.

2.6 Request for Relief RR-G-5, Part E, ASME Code, Section XI, Examination Category C-F-1, Items C5.13, C5.14, and C5.21, Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping

On the area where the required ISI examination coverage was not achieved, state whether any indications were discovered as a result of ASME Code-required preservice (ASME Code, Section XI, Category C-F-1, Item C5.21) volumetric (e.g., radiography) and surface examinations that were performed on the ASME Code Class 2 piping welds.

State the wall thickness for the subject ASME Code Class 2 piping welds.

Provide volumetric coverage sketches detailing the insonification angles and coverage each angle provides on each weld.

The licensee's submittal states that the subject weld areas were interrogated with a combination of 45-, 60-, and/or 70-degree shear waves. The licensee's submittal further states that examinations were performed as single-sided examinations from the pipe side of the welds.

Confirm the insonification angles and wave modalities used to examine each of the subject welds. If only shear wave techniques were used to examine the subject stainless steel welds and the pipe thickness were greater than 0.50-inches, please explain why refracted longitudinal wave techniques were not used as part of a "best effort" examination. The L-wave method has been shown capable of detecting planar inside diameter (ID) surface-breaking flaws on the far-side of wrought stainless steel welds. Recent studies (Endnotes 1, 2, 3) recommend the use of both shear and L-waves to obtain the best detection results, with minimum false calls, in austenitic welds. If both shear and L-waves were used please state the "best effort" coverage achieved on the near- and far-side of the subject weld volumes.

2.7 Request for Relief RR-G-5, Part F, ASME Code, Section XI, Examination Category C-F-2, Item C5.51, Pressure Retaining Welds in Carbon or Low Alloy Steel Piping

On the area where the required ISI examination coverage was not achieved, state whether any indications were discovered as a result of ASME Code-required preservice volumetric (e.g., radiography) and surface examinations that were performed on the carbon steel piping welds.

Endnotes

1. ASME Code Cases N-577-1 or N-578-1 are not approved for use in RG-1.147, Revision 16. Licensees base their RI-ISI inspection sample size and examination methodology on Table 1 of ASME Code Case N-577-1 or N-578-1.
2. F.V. Ammirato, X. Edelmann, and S.M. Walker, *Examination of Dissimilar Metal Welds in BWR Nozzle-to-Safe End Joints*, 8th International Conference on NDE in the Nuclear Industry, ASM International, 1987.
3. P. Lemaitre, T.D. Koble, and S.R. Doctor, *PISC III Capability Study on Wrought-to-Wrought Austenitic Steel Welds: Evaluation at the Level of Procedures and Techniques, Effectiveness of Nondestructive Examination, Systems and Performance Demonstration*, PVP-Volume 317, NDE-Volume 14, ASME, 1995.
4. M.T. Anderson, A.A. Diaz, A.D. Cinson, S.L. Crawford, S.E. Cumblidge, S.R. Doctor, K.M. Denslow, and S. Ahmed, 2011. *An Assessment of Ultrasonic Techniques for Far-Side Examinations of Austenitic Stainless Steel Piping Welds*, NUREG/CR-7113, PNNL-19353, U. S. Nuclear Regulatory Commission, Washington, DC.