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

September 20, 2012

David A. Heacock
Dominion Energy Kewaunee, Inc.
Innsbrook Technical Center
5000 Dominion Blvd.
Glen Allen, VA 23060-6711

SUBJECT: KEWAUNEE POWER STATION – EVALUATION OF RELIEF REQUEST NUMBER RR-G-5 REGARDING FOURTH 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM (TAC NO. ME7378)

Dear Mr. Heacock:

Pursuant to the provisions of 10 CFR 50.55a(g)(5)(iii), Dominion Energy Kewaunee, Inc. (DEK, the licensee) submitted a letter dated September 28, 2011, as supplemented by letters dated May 9, and July 12, 2012, to the U.S. Nuclear Regulatory Commission (NRC) that requested relief from inspecting those areas that could not be examined in accordance with American Society of Mechanical Engineers (ASME) Section XI Code requirements without significant modifications to the plant.

The NRC staff has reviewed and evaluated the information provided by DEK and finds, as set forth in the enclosed safety evaluation, that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i).

This closes the NRC staff's action on the above submittal. If you have any questions, please contact Dr. Karl Feintuch at (301) 415-3079 or via e-mail at Karl.Feintuch@nrc.gov.

Sincerely,

Istvan Frankl, Acting Chief
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-305

Enclosure: Safety Evaluation

cc w/encl: Distribution via ListServ

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST NO. RR-G-5 REGARDING THE

FOURTH 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM

DOMINION ENERGY KEWAUNEE, INC.,

KEWAUNEE POWER STATION

DOCKET NUMBER 50-305

1.0 INTRODUCTION

By letter dated September 28, 2011, (Agencywide Documents Access and Management System (ADAMS) Accession Number ML11284A193), Dominion Energy Kewaunee, Inc., (DEK, the licensee) requested relief from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI, for Kewaunee Power Station (KPS). Request for Relief No. RR-G-5 covers several welds where the licensee was not able to achieve essentially 100 percent inspection coverage due to materials and geometrical limitations. Additionally, in response to two Nuclear Regulatory Commission (NRC) requests for additional information, the licensee submitted additional information in its letters dated May 9, 2012 (ADAMS Accession Number ML12136A461), and July 12, 2012 (ADAMS Accession Number ML12205A007).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(6)(i), the licensee requested relief and to use alternative requirements (if necessary), for in-service inspection items on the basis that the ASME Code requirement is impractical.

2.0 REGULATORY REQUIREMENTS

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, to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination 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, which was 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.

10 CFR 50.55a(g)(5)(iii), states in, part that, that licensees may determine that conformance with certain ASME Code requirements is impractical and that the licensee shall notify the Commission and submit information in support of the determination. Determination of Impracticality in accordance with this section must be based on the demonstrated limitations that licensees experience when attempting to comply with the code requirements during the inservice inspection interval for which the request is being submitted. Requests for relief made in accordance with this section must be submitted to the NRC no later than 12 months after the expiration of the initial 120-month inspection interval or subsequent 120-month inspection interval for which relief is sought.

10 CFR 50.55a(g)(6)(i), states that the Commission will evaluate determinations under paragraph (g)(5) of this section that code requirements are impractical. The Commission may grant such relief and may impose such alternative requirements as it determines is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

The licensee has requested relief from ASME Code requirements pursuant to 10 CFR 50.55a(g)(6)(i). The ASME Code of record for KPS fourth 10-year interval inservice inspection program is the 1998 Edition, including the 2000 Addenda, of Section XI of the ASME Boiler and Pressure Vessel Code. The fourth 10-year inservice inspection (ISI) interval for KPS is scheduled to end on June 16, 2014.

3.0 TECHNICAL EVALUATION

"The information provided by KPS in support of Request for Relief RR-G-5 from ASME Code requirements has been evaluated and the bases for disposition are documented below. For clarity, Request for Relief RR-G-5-1 through 40 have been evaluated in several parts according to ASME Code Examination Category."

3.1 Request for Relief RR-G-5, Part A, ASME Code, Section XI, Table IWB-2500-1, Examination Category B-D, Item B3.90, Full Penetration Welded Nozzles in Vessels

ASME Code Requirement

ASME Code, Section XI, Table IWB-2500-1, Examination Category B-D, Item B3.90 requires 100 percent volumetric examination, as defined by Figures IWB-2500-7 (a) through (d), as applicable, of full penetration Class 1 reactor pressure vessel (RPV) nozzle-to-vessel welds. ASME Code Case N-460, "*Alternative Examination Coverage for Class 1 and Class 2 Welds, Division 1,*" as an alternative approved for use by the NRC in Regulatory Guide (RG) 1.147, Revision 16, "*Inservice Inspection Code Case Acceptability,*" states that a reduction in examination coverage due to part geometry or interference for any Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent, i.e., greater than 90 percent examination coverage is obtained.

Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examinations for RPV Primary Outlet Nozzle-to-Vessel Welds RV-W7 and RV-W10.

Licensee's Basis for Relief Request (as stated)

> 0.88 percent of the Remote Ultrasonic [(UT)] Perpendicular Scan and 44.44 percent of the Remote UT Parallel Scan for a combined remote [UT] scan of 22.66 percent of the Reactor Vessel Outlet Nozzle to Vessel Welds RV-W7 and RV-W10 were inaccessible due to the Outlet protrusion and saddle geometry of the nozzle along the inside surface, thus restricting Ultrasonic examination.
>
> To provide for access to the 0.88 percent Perpendicular Scan and 44.44 percent of the parallel scan of the Reactor Vessel Outlet Nozzle to Vessel Welds RV-W7 and RV-W10 would require modification of the original design of Reactor Vessel Outlet Nozzle.

Licensee's Proposed Alternative Examination:

The licensee did not propose any alternative examinations for the subject welds. However, the licensee's examinations were performed to the maximum extent practical.

NRC Staff Evaluation

The ASME Code requires 100 percent volumetric examination of ASME Code Class 1 nozzle-to-vessel welds. However, the geometric configuration of the subject welds and adjacent appurtenances limit access for ultrasonic scanning. In order to effectively increase the examination coverage, the RPV outlet nozzle-to-vessel welds and adjacent appurtenances would require design modifications. This would place a burden on the licensee; thus, 100 percent ASME Code-required volumetric examinations are considered impractical.

The RPV outlet nozzle-to-vessel welds are constructed of carbon steel material with stainless steel inside diameter cladding. The welds on the subject nozzles extend the full thickness of the vessel head. These nozzles are of the "set-in" design which essentially makes the welds concentric rings aligned parallel with the nozzle axes in the through-wall direction of the vessel. This nozzle design geometry limits ASME Code-required UT angle beam examinations to be performed primarily from the vessel side of the welds. Additionally, the outlet nozzle protrusions and saddle geometries on the inside surface limit portions of the scans from the vessel side of the welds.

As shown on the sketches and technical descriptions included in the licensee's submittals, examinations of the subject RPV outlet nozzle-to-vessel welds have been completed to the extent practical with the licensee obtaining approximately 77.3 percent volumetric coverage of the ASME Code-required volume. The examination volumes included the weld and base materials near the inside surface of the weld joint, which are the highest regions of stress, and where one would expect degradation sources to be manifested should they occur. The RPV

outlet nozzle-to-vessel weld examinations were conducted with equipment, procedures and personnel that were qualified to a performance demonstration process outlined in ASME Code, Section XI, Appendix VIII. The welds were examined using 45-degree shear and longitudinal waves. There were 15 indications detected on the RPV nozzles that were all evaluated to be acceptable per ASME Code.

Although UT scans were primarily limited to the vessel side, studies have found that inspections conducted through carbon steel are equally effective whether the ultrasonic waves have only to propagate through the base metal, or have to also propagate through the carbon steel weldment[1].

Therefore, it is expected that the UT techniques employed by the licensee would detect structurally significant flaws that might occur on either side of the subject welds due to the fine-grained carbon steel microstructures.

The licensee has shown that it is impractical to meet the ASME Code-required 100 percent volumetric examination coverage for the subject nozzle-to-vessel welds due to the outlet protrusion and saddle geometry of the nozzles along the inside surface. Based on the volumetric coverage obtained for the subject welds, and considering the licensee's performance of UT techniques employed to maximize this coverage, it is reasonable to conclude that if significant service-induced degradation had occurred, evidence of it would have been detected by the examinations that were performed. Based on the above evaluation the NRC staff determined that the examinations performed to the extent practical on the subject welds provide reasonable assurance of structural integrity of the subject welds.

3.2 Request for Relief RR-G-5, Part B, ASME Code, Section XI, Table IWC-2500-1 Examination Category C-A, Items C1.10, C1.20, and C1.30, Pressure Retaining Welds in Pressure Vessels

ASME Code Requirement

ASME Code, Section XI, Table IWC-2500-1, Examination Category C-A, Items C1.10, C1.20, and C1.30, require essentially 100 percent volumetric examination, as defined by Figures IWC-2500-1 and -2, of the length of Class 2 circumferential shell and head, and tubesheet-to-shell welds. "Essentially 100 percent", as clarified by ASME Code Case N-460, is greater than 90 percent coverage of the examination volume, or surface area, as applicable. ASME Code Case N-460 has been approved for use by the NRC in RG 1.147, Revision 16.

Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the ASME Code-required volumetric examinations of Class 2 circumferential shell and head welds, and tubesheet-to-shell welds shown in Table 3.2.1 below.

---

1 P. G. Heasler, and S. R. Doctor, 1996. Piping Inspection Round Robin, NUREG/CR-5068, PNNL-10475, U. S. Nuclear Regulatory Commission, Washington, DC.

Table 3.2.1 ASME Code Section XI, Table IWC-2500-1 Examination Category C-A			
ASME Code Item	**Weld ID**	**Weld Type**	**Percent Coverage Obtained**
C1.10	AHRS1-W1	Residual Heat Exchanger AHRS1-1A Shell Circumferential Weld	28.3
C1.10	AHNR-W1	Letdown Heat Exchanger AHLD Shell Circumferential Weld	22.5
C1.20	AHRS1-W2	Residual Heat Exchanger AHRS1-1A Head Circumferential Weld	25.0
C1.20	AFSI-W2	Seal Water Injection Filter AFSI-1A Head Circumferential Weld	57.0
C1.30	ARG-W10	Regenerative Heat Exchanger Tube Sheet-to-Shell Circumferential Weld	84.0

Licensee's Basis for Relief Request (as stated)

Weld AHRS1-W1 was inaccessible due to configuration of the Residual Heat Exchanger Flange-to-Shell, two (2) Welded Supports and the 8-inch Inlet Nozzle and the 8-inch Outlet Nozzle thus restricting Ultrasonic Examination.

Weld AHNR-W1 was inaccessible due to configuration of the Letdown Heat Exchanger Flange-to-Shell, two (2) Welded Supports, and the 2-inch Inlet Nozzle and the 2-inch Outlet Nozzle thus restricting Ultrasonic Examination.

Weld AHRS1-W2 was inaccessible due to configuration of the Residual Heat Exchanger 2 Welded Supports and the 8-inch Inlet Nozzle and the 8-inch Outlet Nozzle thus restricting Ultrasonic Examination.

Weld AFSI-W2 was inaccessible due to configuration of the Seal Water Injection Filter 1A - 3 Welded Supports and the 2-inch Inlet Nozzle thus restricting Ultrasonic Examination.

Weld ARG-W10 was inaccessible due to a rigid support clamp on the Regenerative Heat Exchanger thus restricting ultrasonic examination.

Licensee's Proposed Alternative Examination:

The licensee did not propose any alternative examinations for the subject welds. However, the licensee's examinations were performed to the maximum extent practical.

NRC Staff Evaluation

The ASME Code requires essentially 100 percent volumetric examination of pressure retaining welds on selected Class 2 pressure vessels. However, for the subject welds on the Residual and Regenerative Heat Exchangers, Letdown Storage Tank, and Seal Water Injection Filter, complete examinations are limited due to their design configurations and adjacent components such as welded supports, nozzles, and support clamps. In order to achieve greater volumetric coverage, the subject pressure vessels and adjacent components would have to be redesigned and modified. This would place a burden on the licensee, therefore, the ASME Code examinations are considered impractical.

As shown on the sketches and technical descriptions included in the licensee's submittal, examinations of the welds listed in Table 3.2.1 above have been performed to the extent practical, with the licensee obtaining coverage ranging from approximately 22.5 to 84.0 percent of the ASME Code-required inspection volumes. The Residual Heat Exchanger AHRS1-1A circumferential shell and head Welds AHRS1-W1 and AHRS1-W2 were restricted by two welded support brackets and the 8-inch inlet and outlet nozzles which are located directly below and above the circumferential welds, respectively. The Letdown Heat Exchanger AHLD circumferential shell Weld AHNR-W1 examination was limited due to the Letdown Heat Exchanger flange-to-shell, the two welded supports, and the 2-inch inlet and outlet nozzles directly below the circumferential weld. For the Seal Water Injection Filter AFSI-1A circumferential head Weld AFSI-W2, the configuration of the seal water injection filter 1A-3 welded supports, and the 2-inch inlet nozzle restricted coverage of the ASME Code required volumes. In the case of the Regenerative Heat Exchanger tube sheet-to-shell circumferential Weld ARG-W10 limitations were due to a rigid support clamp parallel to the weld. The subject Class 2 pressure vessels are fabricated of stainless steel material. The licensee examined these welds using 0-degree longitudinal wave, 45- and 60-degree shear waves, and 45-degree longitudinal wave, as applicable, to achieve partial coverage along the weld lengths. There were two indications found during examinations of Weld AHNR-W1 and three indications found during examinations of Weld AFSI-W2; these indications were interpreted as inside diameter (ID) geometry, and subsurface (fabrication) indications acceptable per ASME Code, Section XI, Table IWB-3514-2.

The licensee has shown that it is impractical to meet the ASME Code-required volumetric examination coverage for the subject welds due to the physical limitations of their design geometries, welded supports, adjacent nozzles, and support clamps. However, based on the volumetric coverage obtained, and the UT techniques employed, it is reasonable to conclude that, if significant service-induced degradation had occurred in the subject welds, evidence of it would have been detected by the examinations performed.

Based on the above evaluation the NRC staff determined that the examinations performed to the extent practical on the subject welds provide reasonable assurance of structural integrity of the subject welds.

3.3 Request for Relief RR-G-5, Part C Risk Informed Inservice Inspection, Examination Category R-A, Items R1.11, R1.16 and R1.20, Risk Informed Piping Examinations

ASME Code Requirement

The examination requirements for the subject piping welds at KPS are governed by a Risk-Informed Inservice Inspection (RI-ISI) program that was approved by the NRC in a Safety Evaluation (SE) dated September 23, 2005 (ADAMS Accession No. ML052660057). The RI-ISI program was developed in accordance with the Electric Power Research Institute Topical Report TR-112657, Rev. B-A, *Revised Risk-Informed Inservice Inspection Evaluation Procedure*. As part of the NRC-approved program, the licensee has implemented inspection requirements listed in ASME Code Case N-578[2], "*Risk-Informed Requirements for Class 1, 2 or 3 Piping, Method B, Section XI, Division 1*", with more detailed provisions contained in Topical Report TR-112657. The topical report includes a provision for requesting relief from volumetric examinations if 100 percent of the required volumes cannot be examined.

Table 1 of ASME Code Case N-578 assigns Examination Category R-A, Items R1.11, R1.16, and R1.20, to piping inspection elements subject to thermal fatigue, intergranular stress corrosion cracking (IGSCC), and elements not subject to a known damage mechanism, respectively. Table 1 of Code Case N-578 requires 100 percent of the examination location volume, as described in Figures IWB-2500-8(c), 9, 10, 11, or IWC-2500-7(a), as applicable, including an additional ½-inch of base metal adjacent to the ASME Code volume, be completed for selected Class 1 and 2 piping welds. ASME Code Case N-460, as an alternative approved for use by the NRC in RG 1.147, Revision 16, states that a reduction in examination coverage due to part geometry or interference for any ASME Code, Class 1 and 2 weld is acceptable provided that the reduction is less than 10 percent, (i.e., greater than 90 percent examination coverage is obtained).

Licensee's ASME Code Relief Request

In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from 100 percent volumetric examination of ASME Code, Class 1 and 2 circumferential piping welds shown in Table 3.3.1 below.

2 ASME Code Case N-578 has not been 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-578.

Table 3.3.1 – RI-ISI Examination Category R-A			
ASME Code Item	**Weld ID**	**Weld Type Nominal Pipe size (NPS)**	**Percent Coverage Obtained**
R1.11	RC-W67DM	PZR 14 inch Nozzle-to-Safe End	26.0
R1.11	RC-W60	6 inch Reactor Coolant Circumferential Weld	50.0
R1.11 and R1.16	SI-W74	12 inch Safety Injection Circumferential Weld	50.0
R1.20	PR-W1DM	PZR 6 inch Nozzle-to-Safe End	68.0
R1.20	PR-W26DM	PZR 6 inch Nozzle-to-Safe End	37.0
R1.20	PR-W27	6 inch PZR Relief Circumferential Weld	50.0
R1.20	SI-W51	6 inch Safety Injection Circumferential Weld	86.7
R1.20	RHR-W9	8 inch Residual Heat Removal Circumferential Weld	50.0
R1.20	ICS-W180	6 inch Containment Spray Circumferential Weld	50.0
R1.20	ICS-W181	6 inch Containment Spray Circumferential Weld	50.0
R1.20	RHR-W419	6 inch Residual Heat Removal Circumferential Weld	50.0
R1.20	ICS-W45	8 inch Containment Spray Circumferential Weld	50.0
R1.20	SI-W429	6 inch Safety Injection Circumferential Weld	50.0
R1.20	SI-W249	3 inch Safety Injection Circumferential Weld	50.0
R1.20	AFW-W148	3 inch Auxiliary Feedwater Circumferential Weld	50.0
R1.20	AFW-W151	3 inch Auxiliary Feedwater Circumferential Weld	50.0
R1.20	AFW-W152	3 inch Auxiliary Feedwater Circumferential Weld	50.0
R1.20	AFW-W155	3 inch Auxiliary Feedwater Circumferential Weld	50.0
R1.20	AFW-W156	3 inch Auxiliary Feedwater Circumferential Weld	68.0
R1.20	AFW-W171	3 inch Auxiliary Feedwater Circumferential Weld	85.0
R1.20	AFW-W172	3 inch Auxiliary Feedwater Circumferential Weld	63.0
R1.20	AFW-W178	3 inch Auxiliary Feedwater Circumferential Weld	83.0
R1.20	AFW-W189	3 inch Auxiliary Feedwater Circumferential Weld	87.0
R1.20	AFW-W190	3 inch Auxiliary Feedwater Circumferential Weld	87.0
R1.20	AFW-W191	3 inch Auxiliary Feedwater Circumferential Weld	85.0
R1.20	AFW-W192	3 inches Auxiliary Feedwater Circumferential Weld	83.0
R1.20	AFW-W195	3 inch Auxiliary Feedwater Circumferential Weld	85.0

Note: In the licensee's response dated May 9, 2012, to the NRC Request for Additional Information (RAI), KPS withdrew the 3-inch Auxiliary Feedwater Circumferential Welds AFW-194, AFW-196, AFW-197, and AFW-198 from Request for Relief RR-G-5, Examination Category R-A, Item R1.20. These welds were removed in conjunction with a modification of the

auxiliary feed water system and no longer exist. In the licensee's response dated July 12, 2012, to the NRC RAI, KPS withdrew the 6-inch and 8-inch Reactor Coolant Pipe Branch Connection Welds RC-W3BC and RC-W22BC from Request for Relief RR-G-5, Examination Category R-A, Item Numbers R1.11 and R1.20. These welds will be the subject of a future relief request due to re-examination with ASME Code Section XI, Appendix VIII requirements.

Licensee's Basis for Relief Request (as stated)

> Circumferential Welds PR-W1DM, PR-W26DM, and RC-W67DM were inaccessible due to the Carbon Steel Nozzle Configuration and Nozzle [Out Side Diameter] OD Taper Configuration thus restricting Ultrasonic Examination.
>
> Circumferential Weld PR-W27 was inaccessible due to the Safe End-to-Elbow Configuration thus restricting Ultrasonic Examination.
>
> Circumferential Weld RC-W60 was inaccessible due to the Pipe-to-Branch Connection Configuration thus restricting Ultrasonic Examination.
>
> Circumferential Weld SI-W249 was inaccessible due to the 4-inch x 4-inch x 3-inch Reducing Tee Configuration thus restricting Ultrasonic Examination.
>
> Circumferential Welds RHR-W9, SI-W74, ICS-W180, ICS-W181, RHR-W419, ICS-W45, SI-W429, AFW-W156, AFW-171, AFW-172, AFW-178, and AFW-195 were inaccessible due to Valve-to-Pipe Configuration restricting Ultrasonic Examination.
>
> Circumferential Welds AFW-148, AFW-151, AFW-152, AFW-155, AFW-189, AFW-190, AFW-191, and AFW-192 were inaccessible due to Flange-to-Pipe Configuration restricting Ultrasonic Examination.

Licensee's Proposed Alternative Examination

The licensee did not propose any alternative examinations for the subject welds. However, the licensee's examinations were performed to the maximum extent practical.

NRC Staff Evaluation

Examination requirements for the subject piping welds at KPS are governed by a RI-ISI program that was approved by the NRC in a SE dated September 23, 2005. This program assigns RI-ISI, Examination Category R-A, Items R1.11, R1.16 and R1.20 to piping inspection elements subject to thermal fatigue, IGSCC, and piping elements not subject to a known damage mechanism, respectively. The program requires inspection of 100 percent of the defined examination volumes for the ASME Code Class 1 and 2 circumferential piping welds. However, the design configurations and materials of the subject welds limit volumetric examinations. In order to increase coverage, the welds would have to be re-designed and modified. This would place a burden on the licensee, therefore, the ASME Code-required volumetric examinations are considered impractical.

As shown in the technical descriptions and sketches provided in the licensee's submittals, examinations of the subject welds have been performed to the extent practical, with the licensee obtaining volumetric coverage of approximately 26 to 87 percent of the required inspection volumes (see Table 3.3.1 above). The limitations encountered during the performance of the UT examinations were caused by austenitic stainless steel materials and existing tapers in the nozzle-to-safe end, safe end-to-elbow, valve-to-pipe, pipe-to-tee, flange-to-pipe, and pipe-to-branch connection weld configurations. These configurations limit UT scan access primarily to one side of the welds. The licensee stated that selection of one-sided examinations (e.g., pipe-to-valve welds) would normally be avoided for these risk-informed piping examinations, but in some cases, no other choices were available. The licensee also noted that only the subject 27 of the total 137 welds in the risk-informed program had limited examinations due to their configurations, with 65 welds being examined to the full ASME Code extent and the remaining 45 Class 1 and 2 risk-informed welds are being scheduled for the third inspection outage. In addition to ASME Code volumetric examinations, the licensee performed surface examinations on the subject welds with no limitations and no unacceptable indications being detected. These surface examinations are not required under a RI-ISI program.

Volumetric examinations on the subject welds were conducted with equipment, procedures and personnel that were qualified to a performance demonstration process outlined in ASME Code, Section XI, Appendix VIII. These techniques have been qualified for flaws located on the near-side of the welds for austenitic stainless steel materials and far-side detection of flaws for carbon steel materials. For these reasons along with the above physical limitations, the licensee has only taken partial credit for the ASME Code-required inspection volumes on the subject austenitic piping welds. The licensee's ultrasonic techniques included 45-, 60- and 70-degree shear waves and 35-, 42-, 45-, and 60-degree refracted longitudinal waves (L-waves), as applicable. For equal to or less than 0.50-inch thick austenitic stainless steel piping, procedures that include a 70-degree shear wave are the Performance Demonstration Initiative (PDI) approved techniques for flaw detection in piping welds[3, 4, 5]. For greater than 0.50-inch thick piping, longitudinal wave search units that provide supplemental coverage of the far-side of the weld are included in the PDI approved techniques for flaw detection in austenitic stainless steel welds. L-waves have been shown to provide enhanced detection on the far-side of austenitic stainless steel welds. While the licensee has only taken credit for limited volumetric coverage obtained from primarily one side, it is expected that the techniques employed would have provided coverage beyond the near-side of the welds. The UT examinations did not reveal any unacceptable indications.

---

3 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.

4. 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.

5. 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.

The licensee has shown that it is impractical to meet the ASME Code-required volumetric examination coverage for the subject welds due to the design geometry of the welds and materials of construction. Based on the UT results and coverage obtained, and the results of surface examinations performed, it is reasonable to conclude that, if significant degradation was present in the subject welds, evidence of it would have been detected by the examinations performed.

4.0 CONCLUSIONS

As set forth above, the NRC staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest given due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. Furthermore, the NRC staff concluded that the examinations performed to the extent practical provide reasonable assurance of structural integrity of the subject components. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i). Therefore, the NRC staff grants relief for the subject examinations of the components contained in RR-G-5, Parts A, B, and C for the KPS fourth 10-year ISI interval. The granted relief requests are summarized below in the attached Table 1

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.

Principal Contributors: Tom McLellan
Ali Rezai

Dated: September 20, 2012

KEWAUNEE POWER STATION
Fourth 10-Year ISI Interval

TABLE 1

SUMMARY OF RELIEF REQUESTS

Relief Request Number	TLR RR Sec.	System or Component	Exam. Category	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Disposition
RR-G-5, Part A,	3.1	Full Penetration Welded Nozzles in Vessels	B-D	B3.90	100% of RPV nozzle-to-vessel welds	Volumetric	Use volumetric coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
RR-G-5, Part B,	3.2	Pressure Retaining Welds in Class 2 Pressure Vessels	C-A	C1.10 C1.20 C1.30	100% of circumferential shell and head welds, and tubesheet-to-shell welds	Volumetric	Use volumetric coverage achieved	Granted 10 CFR 50.55a(g)(6)(i)
RR-G-5, Part C	3.3	Risk Informed Piping Examinations	R-A	R1.11 R1.16 R1.20	100% of Piping subject to specified damage mechanisms	Volumetric	Use volumetric coverage obtained	Granted 10 CFR 50.55a(g)(6)(i)

Attachment

David A. Heacock
Dominion Energy Kewaunee, Inc.
Innsbrook Technical Center
5000 Dominion Blvd.
Glen Allen, VA 23060-6711

September 20, 2012

SUBJECT: KEWAUNEE POWER STATION – EVALUATION OF RELIEF REQUEST NUMBER RR-G-5 REGARDING FOURTH 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM (TAC NO. ME7378)

Dear Mr. Heacock:

Pursuant to the provisions of 10 CFR 50.55a(g)(5)(iii), Dominion Energy Kewaunee, Inc. (DEK, the licensee) submitted a letter dated September 28, 2011, as supplemented by letters dated May 9, and July 12, 2012, to the U.S. Nuclear Regulatory Commission (NRC) that requested relief from inspecting those areas that could not be examined in accordance with American Society of Mechanical Engineers (ASME) Section XI Code requirements without significant modifications to the plant.

The NRC staff has reviewed and evaluated the information provided by DEK and finds, as set forth in the enclosed safety evaluation, that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(6)(i).

This closes the NRC staff's action on the above submittal. If you have any questions, please contact Dr. Karl Feintuch at (301) 415-3079 or via e-mail at Karl.Feintuch@nrc.gov.

Sincerely,

/RA/

Istvan Frankl, Acting Chief
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-305

Enclosure: Safety Evaluation

cc w/encl: Distribution via ListServ

DISTRIBUTION:

PUBLIC	RidsAcrsAcnw_MailCTR Resource	RidsOgcRp Resource
LPL3-1 r/f	RidsNrrPMKewaunee Resource	RidsNrrDeEvib Resource
RidsNrrDorlLpl3-1 Resource	RidsRgn3MailCenter Resource	RidsNrrDorlDpr Resource
RidsNrrLABTully Resource	SKennedy, OEDO	TMcLellan, NRR/DE/EVIB
RidsNrrDeEPNB Resource	ARezai, NRR/DE/EPNB	

ADAMS Accession Number: ML12249A441 *SE transmitted by memo dated August 21, 2012

OFFICE	NRR/LPL3-1/PM	NRR/LPL3-1/LA	NRR/DE/EPNB/BC	NRR/DE/EVIB/BC	NRR/LPL3-1/ BC(A)
NAME	KFeintuch	BTully	TLupold*	SRosenberg*	IFrankl
DATE	09/19/12	09/19/12	08/21/12	08/21/12	09/20/12

OFFICIAL RECORD COPY