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

November 20, 2017

Mr. Mark E. Reddemann
Chief Executive Officer
Energy Northwest
P.O. Box 968 (Mail Drop 1023)
Richland, WA 99352-0968

SUBJECT: COLUMBIA GENERATING STATION – RELIEF REQUEST NO. 3ISI-17 FROM THE REQUIREMENTS OF THE ASME CODE, SECTION XI FOR THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL (CAC No. MF8923; L-2016-LLR-0005)

Dear Mr. Reddemann:

By letter dated December 7, 2016, Energy Northwest (the licensee) submitted a relief request to the U.S. Nuclear Regulatory Commission (NRC) with regard to the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI requirements for ASME Class 1 and 2 volumetric and surface inspection requirements at Columbia Generating Station (Columbia).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(5)(iii), the license requested relief for the third inservice inspection interval (ISI) concerning this impracticality.

The NRC staff has reviewed the subject request and concludes, as set forth in the enclosed safety evaluation, that the licensee adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(5)(iii). Therefore, the NRC staff grants Relief Request, 3ISI-17, pursuant to 10 CFR 50.55a(g)(6)(i), at Columbia for the third 10-year ISI interval, which began on December 13, 2005, and ended on December 12, 2015.

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

If you have any questions regarding this matter, please contact the Project Manager, John Klos at (301) 415-5136 or via e-mail at John.Klos@nrc.gov.

Sincerely,

Robert J. Pascarelli, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosure:
Safety Evaluation

cc: 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. 3ISI-17

FOR THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL

COLUMBIA GENERATING STATION

ENERGY NORTHWEST

DOCKET NO. 50-397

1.0 INTRODUCTION

By letter dated December 7, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16343B035), Energy Northwest (the licensee) submitted Relief Requests (RRs) 3ISI-16, 3ISI-17, 3ISI-18, and 3ISI-19, which requested relief from performing the essentially 100 percent volumetric and surface inspection requirements specified in Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) during the third 10-year inservice inspection (ISI) interval, for certain ASME Class 1 and 2 components at the Columbia Generating Station (Columbia). This safety evaluation is for the licensee's RR 3ISI-17, which is related to volumetric examinations for certain ASME Code Class 1 piping welds.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(5)(iii), "ISI program update: Notification of impractical ISI Code requirements," the licensee requested relief from the ASME Code required examination coverage for ISI of the subject welds on the basis that the ASME Code requirements are impractical.

2.0 REGULATORY EVALUATION

Pursuant to 10 CFR 50.55a(g), "Preservice and inservice inspection requirements," ISI of the ASME Code, Class 1, 2, and 3, components is to be performed in accordance with the latest edition and addenda of Section XI of the ASME Code, except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i), "Impractical ISI requirements: Granting of relief." Additionally, pursuant to 10 CFR 50.55a(g)(4), "Inservice inspection standards requirements for operating plants," 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, "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 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 incorporated by reference in 10 CFR 50.55a(a)(1)(ii), 12 months prior to the start of the 120-month interval, subject to the conditions listed in 10 CFR 50.55a(b).

Paragraph 50.55a(g)(5)(iii) of 10 CFR states, that,

> If the licensee has determined that conformance with a Code requirement is impractical for its facility the licensee must notify the NRC [U.S. Nuclear Regulatory Commission] and submit, as specified in § 50.4, information to support the determinations. Determinations of impracticality in accordance with this section must be based on the demonstrated limitations experienced 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 no later than 12 months after the expiration of the initial or subsequent 120-month inspection interval for which relief is sought.

The third 10-year ISI interval for Columbia began on December 13, 2005, and ended on December 12, 2015.

Paragraph 50.55a(g)(6)(i), of 10 CFR states,

> 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 are authorized by law, will not endanger life or property or the common defense and security, and are 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.

Pursuant to 10 CFR 50.55a(g)(5)(iii), Energy Northwest has requested relief from the requirements of 10 CFR 50.55a, "Codes and standards," for the third 10-year ISI interval for Columbia, on the basis that compliance with the ASME Code requirements is impractical due to physical obstructions and limitations due to design and geometry of the subject weld joints.

Based on the above, and subject to the following technical evaluation, the NRC staff finds that there is a regulatory basis for the licensee to request, and the NRC to authorize, the proposed relief request.

3.0 TECHNICAL EVALUATION

3.1 Applicable ASME Code Requirements

The ASME Code of Record for Columbia during the third 10-year ISI interval was the 2001 Edition through the 2003 Addenda of the ASME Code, Section XI. The third 10-year ISI interval for Columbia started on December 13, 2005, and ended on December 12, 2015. The examination requirements for the pressure retaining piping welds are delineated in ASME Code, Subarticle IWB-2500, "Examination and Pressure Test Requirements," Table IWB-2500-1, Examination Category B-J, which requires essentially 100 percent volumetric and surface examinations. "Essentially 100 percent," as clarified by ASME Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1" is greater than

90 percent coverage of the examination volume, or surface area, as applicable. ASME Code Case N-460 is an unconditionally approved Code Case by the NRC, per Regulatory Guide (RG) 1.147, Revision 17, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," dated August 2014 (ADAMS Accession No. ML13339A689). For Examination Category B-J, Item Number B9.11, the examination volume is defined in Figure IWB-2500-8.

Additionally, pursuant to 10 CFR 50.55a(b)(2)(xv)(A)(1) and 10 CFR 50.55a(b)(2)(xv)(A)(2), piping must be examined in two axial directions, and when examination in the circumferential direction is required, the circumferential examination must be performed in two directions, provided access is available. Dissimilar metal welds must be examined axially and circumferentially. Where examination from both sides is not possible for austenitic or dissimilar metal welds, full coverage credit from a single side weld may be claimed only after completing a successful single-sided Appendix VIII demonstration using flaws on the opposite side (far side) of the weld.

Components for which relief is requested are provide in the table below, along with a description of the limitation and the actual percentage of the ASME Code required examination coverage obtained.

Table 1

ASME	**Pressure Retaining Welds with Limited Volumetric Coverage**				
Examination Category / Item No.	**Weld Number (System)**	**Limitation/Coverage**	**Size (inch)**	**Material 1 (Component)**	**Material 2 (Component)**
B-J, B9.11	4RRC(4)A-11 RRC-108 (Reactor Water Cleanup System)	Safe-End to Valve Configuration, 45% coverage obtained	4	ASME SA-312, Grade 304, Stainless Steel (Pipe)	ASME SA-105, Carbon Steel (Valve)
B-J, B9.11	4RRC(4)B-12 RRC-109 (Reactor Water Cleanup System)	Safe-End to Valve Configuration, 30% coverage obtained	4	ASME SA-312, Grade 304, Stainless Steel (Pipe)	ASME SA-105, Carbon Steel (Valve)
B-J, B9.11	10LPCS(1)-3 LPCS-101-2 RPV-109 (Low Pressure Core Injection System)	Safe-End Extension to Safe-End Configuration, 77% coverage obtained	10	ASME SA-508, Class 1 Alloy Steel (Safe-End Extension)	ASME SB-166, Nickel Alloy (Safe-End)

3.2 Licensee's Reason for Request

As stated by the licensee and summarized by the above table Energy Northwest was not able to achieve the required examination coverage (i.e., greater than 90 percent) for the above ASME Examination Category B-J pressure retaining welds. The licensee stated that for the welds listed above due to limitations imposed by the components design and configuration, the archived examination coverage ranged from 30 to 77 percent. The licensee also stated that the subject welds were examined to the maximum extent practical using qualified procedures specific to dissimilar metal piping welds. Specifically, for these dissimilar metal welds the licensee used procedures qualified in accordance with ASME Section XI, Appendix VIII as implemented by the Performance Demonstration Initiative (PDI), specific to dissimilar metal piping welds.

The dissimilar metal welds identified in Table 1, above, specificity welds 4RRC(4)A-11 and 4RRC(4)B-12, consist of stainless steel safe-end to low alloy steel valve welds with SFA 5.1 and SFA 5.4 filler metals. The dissimilar metal weld 10LPCS(1)-3, identified in Table 1, above, consists of low alloy steel safe-end extension welded to a nickel alloy safe-end using Inconel 82/182 filler metal. The volumetric examinations for weld 4RRC(4)A-11 resulted in credited ultrasonic examination coverage of 45 percent. While the volumetric examinations of weld 4RRC(4)B-12, resulted in credited ultrasonic examination coverage of 30 percent. The volumetric examinations of weld 10LPCS(1)-3 resulted in credited examination coverage of 77 percent. These examinations did not reveal any recordable indications attributed to service-related degradation. The licensee further stated that obtaining significantly greater coverage for these welds would require modification and/or replacement of the subject components, and requested its proposed relief request be authorized pursuant to 10 CFR 50.55a(g)(6)(i).

3.3 NRC Staff Evaluation

The ASME Code, Section XI, Table IWB-2500-1, Examination Category B-J, requires essentially 100 percent volumetric and surface examinations. However, as stated by the licensee, complete volumetric examinations were restricted by component design, materials and weld configurations. These conditions precluded the licensee from obtaining full volumetric examinations from both sides of these welds. To gain access for greater examination coverage of the subject welds would require modifications and/or replacements. This would place a burden on the licensee, therefore, obtaining essentially 100 percent of ASME Code-required volumetric examinations for the subject welds is considered impractical.

Additionally, the licensee indicated that since it had not identified outside diameter degradation for these welds, surface examinations were not performed, as permitted by ASME Code Case N-663, "Alternative Requirements for Class 1 and 2 Surface Examinations, Section XI, Division I." The use of this Code Case is permitted by NRC RG 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," Revision 14, identified ASME Code Case N-663 as an approved alternative that licensees may use without requesting authorization from the NRC.

The licensee stated that volumetric examinations were performed using an Appendix VIII qualified procedure specific to dissimilar metal piping welds. These techniques have been qualified through the industry's PDI, which meets the intent of the ASME Code, Section XI, Appendix VIII requirements for flaws located on the near-side of the welds; far-side detection of flaws is considered to be a "best effort." Because the subject welds consist of austenitic stainless steel welds (i.e., 4RRC(4)A-11 and 4RRC(4)B-12) and nickel alloy (i.e., 10LPCS(1)-3)

dissimilar metal welds, there are currently no PDI qualified single-side examination procedures that demonstrate equivalency to two-sided examination on austenitic or dissimilar metal welds. Therefore, the NRC staff finds that the licensee's claim that it examined the subject welds to the extent practical constitutes a "best effort," and is considered justified.

As shown in the sketches and technical descriptions included in the licensee's submittal, examinations of the subject welds have been completed to the maximum extent practical. The volumetric coverage ranged from to 30 to 45 percent for the austenitic dissimilar welds of the ASME Code-required volumes as shown in Table 1 above. The examination volume was limited because these welds could not be completely examined from both sides of the weld due to the geometric configuration of these components (i.e., valve or safe-end). The ultrasonic techniques employed for these welds meets the ASME Code, Section XI, Appendix VIII requirements for dissimilar metal welds. These techniques have been qualified for flaws located on the near-side, not the far-side, of the welds; far-side detection of flaws is considered to be a "best effort." However, L-waves have been shown to provide some detection on the far-side of austenitic stainless steel welds. Therefore, while the licensee has only taken credit for obtaining limited volumetric coverage of only 30 and 45 percent for the two austenitic dissimilar metal welds, the NRC staff expects that the techniques employed by the licensee would have provided some coverage beyond the near-side, into the far-side for these welds.

The NRC staff also notes that in addition to the ultrasonic examinations, Examination Category B-J welds are also subject to system leakage testing requirements of ASME Code, Section XI, IWB-2500 (Table IWB-2500-1, Examination Category B-P, All Pressure Retaining Components) during each refueling outage. The NRC staff finds that the licensee's system leakage testing provides additional assurance that significant degradation, if present, would be detected and corrected.

The licensee has demonstrated that due to geometric limitations it was impractical to meet the ASME Code-required "essentially 100 percent" volumetric examination coverage for the subject piping welds during its third 10-year ISI interval. Although the ASME Code-required coverage could not be obtained, the ultrasonic techniques employed provided nearly full volumetric coverage from the near-side of the welds, which also provides some limited volumetric coverage for the weld materials on the opposite (far) side of these welds. Based on the aggregate coverage obtained for the subject welds, the extent of the examinations, it is reasonable to conclude that if significant service-induced degradation was present in these welds, some evidence of degradation would have been detected by these examinations.

Based on its review, the NRC staff determined that obtaining the ASME Code-required examination volume is impractical because it would imposes a burden upon the licensee. The NRC staff also determined that the ultrasonic examinations performed, despite the limited coverage obtained by the licensee, provide reasonable assurance of the structural integrity for welds 4RRC(4)A-11, 4RRC(4)B-12, and 10LPCS(1)-3.

4.0 CONCLUSION

As set forth above, the NRC staff determines 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 giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(g)(5)(iii). Therefore, the NRC staff grants

relief for the subject examinations of the components contained in RR 3ISI-17 at Columbia for the third 10-year ISI interval, which began on December 13, 2005, and ended on December 12, 2015.

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

Principal Contributor: R Kalikian

Date: November 20, 2017

SUBJECT: COLUMBIA GENERATING STATION – RELIEF REQUEST NO. 3ISI-17 FROM THE REQUIREMENTS OF THE ASME CODE, SECTION XI FOR THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL (CAC NO. MF8923; EPID L-2016-LLR-0005) DATED NOVEMBER 20, 2017

DISTRIBUTION:
PUBLIC
PM File Copy
RidsACRS_MailCTR Resource
RidsNrrPMColumbia Resource
RidsNrrLAPBlechman Resource
RidsRgn4MailCenter Resource
RidsNrrDmlrMphb Resource
RKalikian, NRR
JBowen, OEDO
RidsNrrDorlLpl4 Resource

ADAMS Accession No. ML17318A042 * via memo

OFFICE	NRR/DORL/LPL4/PM	NRR/DORL/LPL4/LA	NRR/DE/EPNB/BC*	NRR/DORL/LPL4/BC	NRR/DORL/LPL4/PM
NAME	JKlos	PBlechman	DAlley	RPascarelli	JKlos
DATE	11/14/2017	11/14/2017	7/15/2017	11/17/2017	11/20/2017

OFFICIAL RECORD COPY