



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

December 15, 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-18 FROM  
THE REQUIREMENTS OF THE ASME CODE, SECTION XI FOR THE THIRD  
10-YEAR INSERVICE INSPECTION INTERVAL (CAC NO. MF8924;  
EPID L-2016-LLR-0006)**

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).

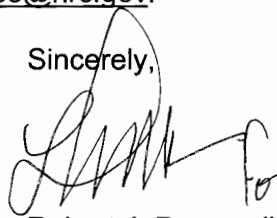
Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) paragraph 50.55a(g)(5)(iii), the license requested relief for the third inservice inspection (ISI) interval concerning this impracticality.

The NRC staff has reviewed the subject request and concludes, 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)(5)(iii). Therefore, the NRC staff grants Relief Request 3ISI-18, 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](mailto:John.Klos@nrc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read 'R. Pascarelli', with a stylized flourish at the end.

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: Listserv



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST NO. 3ISI-18

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-18 related to ASME Code Class 1 piping welds.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) paragraph 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)(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, per 10 CFR 50.55a(g)(4)(iv) "Applicable ISI Code: Use of subsequent

code editions and addenda,” 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).

Paragraph 50.55a(g)(5)(iii), “ISI Program Update: Notification of Impractical ISI Code Requirements” of 10 CFR states:

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), “Impractical ISI Requirements: granting of relief,” 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), the licensee 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 of circumferential welds. “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 has been approved for use by the NRC as documented in Regulatory Guide 1.147, Revision 17, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1" (ADAMS Accession No. ML13339A689). The examination volume for Examination Category B-J, Item Number B9.11, is defined by ASME Code, Section XI, Figure IWB-2500-8. For Examination Category B-J, Item Number B9.31, the examination volume is defined by ASME Code, Section XI, Division 1, Figures IWB-2500-9, IWB-2500-10, and IWB-2500-11.

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. Where examination from both sides is not possible for austenitic welds, full coverage credit from a single side weld may be claimed only after completing a successful single-sided ASME Code Section XI, Appendix VIII demonstration using flaws on the opposite side of the weld.

Components for which the licensee is seeking relief are provided in the table below, along with a description of the limitation and the actual examination coverage obtained.

Table 1

<b>ASME Pressure Retaining Welds with Limited Volumetric Coverage</b>					
<b>Examination Category / Item No.</b>	<b>Weld Number (System)</b>	<b>Limitation/Coverage</b>	<b>Pipe Size (Inch)</b>	<b>Material 1 (Component)</b>	<b>Material 2 (Component)</b>
B-J, B9.11	12RRC(7)A-1 RRC-106 (RECIRC System)	Single side, Valve-to-Pipe, 50% coverage obtained	12	ASME SA-182, Grade F316, Stainless Steel (Valve)	ASME SA-358, Grade 304 Stainless Steel (Pipe)
B-J, B9.11	12RRC(7)B-1 RRC-107 (RECIRC System)	Single side, Valve-to-Pipe, 50% coverage obtained	12	ASME SA-182, Grade F316, Stainless Steel (Valve)	ASME SA-358, Grade 304 Stainless Steel (Pipe)
B-J, B9.11	20RRC(6)-1 RRC-105 (RECIRC System)	Single side, Tee-to-Pipe 50% coverage obtained	20	ASME SA-403, Grade WP 304 (24x24x20 Reducing Tee)	ASME SA-358, Grade 304 Stainless Steel (Pipe)
B-J, B9.11	24RRC(1)A-15 RRC-101-2 (RECIRC System)	Single side, Valve-to-Pipe, 50% coverage obtained	24	ASME SA-351, CF8M (Valve)	ASME SA-358, Grade 304 Stainless Steel (Pipe)
B-J, B9.31	24RRC(1)A-13/ 4RRC(8)-4S RRC-101-2 (RECIRC System)	Single side Pipe-to-Sweep-O-Let, 50% coverage obtained	24	ASME SA-358, Grade 304 Stainless Steel (Pipe)	ASME SA-403, Grade WP 304 (Sweep-O-Let)

### 3.2 Licensee's Reason for Request

As stated by the licensee and summarized in Table 1 above, the licensee 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 it was only able to achieve limited coverage due to the design and configuration of the components. The licensee also stated that due to the configuration of these welds coverage was limited to a single side of the weld. Specifically, the ultrasonic examinations were performed using procedures qualified in accordance with ASME Code Section XI, Appendix VIII as implemented by the Performance Demonstration Initiative (PDI) qualified procedures specific to austenitic stainless steel piping welds.

The welds identified in Table 1 above are austenitic stainless steel piping welds which, due to physical obstructions, were limited to examination from a single side. The volumetric examination coverage achieved for these welds was 50 percent with no recordable indications.

The licensee stated that it has examined other Examination Category B-J welds as part of its overall ISI program, also with no recordable indications. The licensee further stated that these piping welds have successfully passed to VT-2 visual examination during system pressure testing in accordance with the Examination Category B-P.

The licensee requested that the proposed relief request be authorized pursuant to 10 CFR 50.55a(g)(6)(i) for the third ten-year ISI interval at Columbia.

### 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 are 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 examination, the subject welds would require design modifications. This would place a burden on the licensee, therefore, obtaining 100 percent of ASME Code-required volumetric examinations for the subject welds is considered impractical.

The licensee stated that volumetric examinations of the subject welds were conducted with equipment, procedures and personnel that were qualified to a performance demonstration process outlined in the ASME Code, Section XI, Appendix VIII. 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, not the far-side; and far-side detection of flaws is considered to be a "best effort." Because the subject welds are wrought austenitic stainless steel, and there are currently no PDI qualified single-side examination procedures that demonstrate equivalency to two-sided examination on austenitic piping welds, the NRC staff finds that the licensee's claim that it achieved examination coverage to the maximum extent possible is justified.

As shown in the sketches and technical descriptions included in the licensee's submittal, examinations of the subject pipe-to-tee, pipe-to-valve, and pipe-to-elbow connection welds have been completed to the maximum extent practical. The volumetric coverage was 50 percent of the ASME Code-required volumes as shown in Table 1 above. The examination volume was limited because these welds could not be examined from both sides of the weld due to the

geometric configuration of these components (i.e., the tee side or near side). The ultrasonic techniques employed for these welds meets the ASME Code, Section XI, Appendix VIII requirements for austenitic stainless steel 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 enhanced detection on the far-side of austenitic stainless steel welds. Therefore, while the licensee has only taken credit for obtaining limited volumetric coverage, the NRC staff expects that the techniques employed by the licensee would have provided some coverage beyond the near-side, into the far-side of the welds.

The NRC staff notes that in addition to the ultrasonic examinations, Examination Category B-J and R-A 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 further 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 for its third 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 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, and considering the licensee's performance of essentially 100 percent examination coverage of similar accessible welds, it is reasonable to conclude that if significant service-induced degradation is present in these welds, some evidence of degradation would have been detected.

Based on its review, the NRC staff determined that obtaining the ASME Code-required examination volume is impractical and would impose 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 the welds listed in Table 1.

#### 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-18 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: December 15, 2017



SUBJECT: COLUMBIA GENERATING STATION – RELIEF REQUEST NO. 3ISI-18 FROM THE REQUIREMENTS OF THE ASME CODE, SECTION XI FOR THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL (CAC NO. MF8924; EPID L-2016-LLR-0006) DATED DECEMBER 15, 2017

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