

March 8, 2007

Mr. J. V. Parrish
Chief Executive Officer
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SUBJECT: COLUMBIA GENERATING STATION - RELIEF REQUEST NOS. 3ISI-03 AND
3ISI-04 FOR THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL
(TAC NOS. MC9578, MD1166, AND MD1167)

Dear Mr. Parrish:

By letter dated December 15, 2005, as supplemented by letter dated April 27, 2006, Energy Northwest (the licensee) submitted requests for relief 3ISI-01 and 3ISI-03 through 3ISI-07 from certain requirements of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (Code), Section XI, for the third 10-year inservice inspection (ISI) interval at Columbia Generating Station (CGS). The ASME Code, Section XI, of record for CGS for the third 10-year ISI interval is the 2001 Edition with 2003 Addenda. The third 10-year ISI interval at CGS began on December 13, 2005, and ends on December 12, 2015.

By letter dated November 15, 2006 (ADAMS Accession No. ML063260244), the licensee withdrew relief request 3ISI-01. Based on the information provided in the submittal, the U.S. Nuclear Regulatory Commission (NRC) staff concluded that relief requests 3ISI-03 and 3ISI-04 were acceptable. Relief requests 3ISI-05, 3ISI-06, and 3ISI-07 will be addressed by separate NRC correspondence.

For relief requests 3ISI-03 and 3ISI-04, the licensee's proposed alternatives are authorized for the third 10-year ISI interval pursuant to paragraph 50.55a(a)(3)(ii) of Title 10 of the *Code of Federal Regulations* based on the determination that compliance with the specified ASME Code requirements results in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The NRC staff concluded that the licensee's proposed alternatives provide reasonable assurance of structural integrity.

The above relief requests are authorized for the third 10-year interval ISI program at CGS. All other requirements of the ASME Code, Section XI, for which relief has not been specifically requested remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

J. V. Parrish

-2-

The detailed results of the NRC staff's review are provided in the enclosed safety evaluation. If you have any questions concerning this matter, please call Mr. Fred Lyon of my staff at 301-415-2296.

Sincerely,

/RA/

David Terao, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosure: Safety Evaluation

cc w/encl: See next page

J. V. Parrish

-2-

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**Previously concurred

*memos dated 2/8/07, 2/14/07

ADAMS Accession No.: ML070510521

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August 2006

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM

REQUESTS FOR RELIEF NOS. 3ISI-03 AND 3ISI-04

ENERGY NORTHWEST

COLUMBIA GENERATING STATION

DOCKET NO. 50-397

1.0 INTRODUCTION

By letter dated December 15, 2005 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML053620391), as supplemented by letter dated April 27, 2006 (ADAMS Accession No. ML061250154), Energy Northwest (the licensee) submitted relief requests pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(6)(i) associated with its third 10-year interval inservice inspection (ISI) program at Columbia Generating Station (CGS). The third 10-year ISI interval began on December 13, 2005, and is scheduled to end on December 12, 2015. The American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (Code), Section XI, 2001 Edition with 2003 Addenda is the ISI code of record for the CGS third 10-year interval ISI program.

The licensee submitted relief request 3ISI-03 based on the hardship that would exist if the licensee had to disassemble certain pumps for the sole purpose of performing the ASME Code, Section XI, required ISI. Specifically, the licensee requested relief from Category C-G pump casing weld inspection requirements for residual heat removal (RHR) pumps RHR-P-2A, -2B, and -2C, high-pressure core spray (HPCS) system pump HPCS-P-1, and low-pressure core spray (LPCS) system pump LPCS-P-1. The licensee stated that the same relief request was approved by the Nuclear Regulatory Commission (NRC) for the second 10-year interval ISI program (ADAMS Accession No. 9708250204, dated August 18, 1997) and that there have been no changes to the examination requirements for ASME Code, Section XI, Category C-G.

The licensee submitted relief request 3ISI-04 based on the hardship that would exist if the licensee had to perform surface examinations on certain pumps. Specifically, the licensee requested relief from Category C-G pump casing weld inspection requirements for RHR pumps RHR-P-2A, -2B, and -2C, HPCS system pump HPCS-P-1, and LPCS system pump LPCS-P-1. Instead of the ASME Code-required surface examination, the licensee proposed to perform remote visual (VT-1) examination on the internal surface of the pump casing welds after the pump is disassembled for maintenance. The licensee stated that the same relief request was approved by the NRC for the second 10-year interval ISI program (ADAMS Accession No. 9908040036, dated July 30, 1999) and that there have been no changes to the examination requirements for ASME Code, Section XI, Category C-G.

2.0 REGULATORY EVALUATION

Paragraph 50.55a(g) of 10 CFR specifies that ISI of nuclear power plant components shall be performed in accordance with the requirements of the ASME Code, Section XI, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Paragraph 50.55a(a)(3) of 10 CFR states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Paragraph 50.55a(g)(5)(iii) of 10 CFR states that if the licensee has determined that conformance with certain ASME Code requirements is impractical for its facility, the licensee shall notify the Commission and submit, as specified in Section 50.4, information to support the determinations.

The information provided by the licensee in support of its request has been evaluated by the NRC staff and the bases for disposition are documented below.

3.0 TECHNICAL EVALUATION

3.1 Relief Request 3ISI-03

3.1.1 Component Identification

ASME Code, Section XI, Examination Category C-G, item number C6.10, pump casing weld inspection requirements for pumps RHR-P-2A, -2B, and -2C, pump HPCS-P-1 and pump LPCS-P-1.

3.1.2 Applicable Code Requirement

Section XI, Table IWC-2500-1, Examination Category C-G, item C6.10 requires a surface examination of the weld and adjacent base metal. The examination can be performed from either the inside or outside of the pump casing. Per subarticle IWC-2400, "Inspection Schedule," the required examinations in each Examination Category shall be completed each inspection interval in accordance with Table IWC-2412-1. The table requires that approximately one-third of the items in each category be examined each inspection period (3 to 4-year intervals).

3.1.3 Code Requirements from which Relief is Requested

Relief is requested from the requirements of IWC-2400 for Examination Category C-G welds of pumps HPCS-P-1, LPCS-P-1, RHR-P-2A, RHR-P-2B, and RHR-P-2C. IWC-2400 requires that approximately one-third of the welds be examined each inspection period.

3.1.4 Licensee's Basis for Relief

Relief is requested on the basis that examination of these welds subject to the schedule required by IWC-2400 places a hardship on the plant. The subject pumps were designed prior to the requirement to perform Class 2 component examinations for ISI. The pump casings are

embedded in a pump pit which allows no access to the outside surface for any nondestructive examination method. The upper flange is at floor level. The welds are accessible for examination from the pump internal surfaces. To meet the requirements of IWC-2400, the pump would require disassembly and the pump impeller would have to be removed. One pump would require disassembly each inspection period. Disassembly of the pump would require a large expenditure of man-hours and accompanying personnel exposure. This requirement is considered a hardship for the plant solely for the purpose of performing nondestructive examination of the pump casings.

3.1.5 Licensee's Alternative Examinations

The welds identified in this relief request as "partially accessible from the outside surface" will be examined per the IWC-2400 schedule. The inaccessible portions of these welds will be examined when the pump is disassembled for maintenance. When pumps HPCS-P-1, LPCS-P-1, RHR-P-2A, RHR-P-2B, and RHR-P-2C are disassembled for maintenance to the degree that the welds are assessable for examination, the requirements of ASME Code Examination Category C-G will be implemented for the disassembled pumps. The examination will be performed on accessible areas of the welds as defined in ASME Code, Section XI, Figure IWC-2500-8.

3.1.6 Licensee's Justification for Relief

This relief request should be granted for the following reasons:

1. It is estimated to take at least 3 days to disassemble a pump and at least another 4 days to reassemble it. The dose on the inside of the pipe and pump is calculated to be 200 mrem/hr [millirem per hour] general area. A large expenditure of manhours and personnel dose would be required to perform this task.
2. The accessible portions of the welds will be examined when the pumps are disassembled for maintenance. This sample of weld and base metal should detect generic degradation of the pump casing welds if it is occurring.
3. A sample of category C-G welds that are accessible will be examined from the outside each inspection period.
4. The pumps are routinely tested for operability per plant Technical Specifications and are subject to periodic system pressure tests per the requirements of ASME Section XI.
5. Pump operating conditions (i.e., flow, pressure) are available to the control room operators. Control room annunciators are provided to alert plant operators to abnormal operating conditions.
6. Procedures are in place for the operators to respond to abnormal pump conditions (i.e., pump failure).

7. Redundant safety systems exist if a pump were to become inoperable.
8. The casing welds of pumps RHR-P-2A, RHR-P-2B, and RHR-P-2C received a preservice inspection magnetic particle examination from the internal surface when the pumps were disassembled prior to plant startup. Pumps HPCS-P-1 and LPCS-P-1 did not require preservice inspection.

The alternative examinations and the routinely scheduled surveillance and tests identified above ensure plant safety is maintained if the alternative examinations are implemented.

3.1.7 NRC Staff Evaluation

The ASME Code, Section XI, requires 100-percent surface examination of the RHR pumps RHR-P-2A, RHR-P-2B, and RHR-P-2C, the HPCS system pump HPCS-P-1, and the LPCS system pump LPCS-P-1. A portion of the subject pump welds are accessible only by disassembly of the pumps because the pumps are positioned within concrete pits. Based on the information provided, the NRC staff determined that disassembly of the pumps for the sole purpose of performing ISI on welds accessible only from the inside surface is a major effort and could potentially result in additional wear or damage to the internals of the pump. In addition, requiring the disassembly would result in personnel receiving significant amounts of unnecessary radiation exposure.

The licensee proposes, as an alternative to the ASME Code requirement, to perform examinations on a percentage of welds accessible from the outside surface in accordance with the ASME Code. Examination areas accessible from within the pumps only will be examined when the pumps are disassembled for maintenance.

The licensee's proposal to examine the accessible welds on the outside of the pumps each period in conjunction with the examination of welds accessible from inside the pump casings when disassembled assures that significant degradation, if occurring, will be detected.

The disassembly of a pump for the sole purpose of performing the surface examinations results in hardship without a compensating increase in the level of quality and safety. Disassembly of the pumps for the sole purpose of performing ISI on welds accessible only from the inside surface is a major effort and could potentially result in additional wear or damage to the internals of the pump and would result in personnel receiving significant amounts of unnecessary radiation exposure. Based on the licensee's proposed alternative, in combination with the pressure tests performed on these components, the NRC staff concludes that reasonable assurance of structural integrity will be provided.

3.1.8 NRC Staff Conclusion

The NRC staff has reviewed the information provided by the licensee in support of Relief Request 3ISI-03 for the third 10-year interval ISI program for CGS. Based on its evaluation, the staff concludes that requiring the licensee to disassemble the subject pumps for the sole purpose of performing ISI results in a hardship without a compensating increase in the level of quality and safety.

The licensee's proposed alternative to perform the surface examinations for areas accessible from the outside surface in accordance with the ASME Code, and the examination of welds internal to pumps when disassembled for maintenance, provides reasonable assurance of structural integrity. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee's proposed alternative is authorized for the third 10-year interval ISI program.

3.2 Relief Request 3ISI-04

3.2.1 Component Identification

ASME Code, Section XI, Examination Category C-G, Code item number C6.10, pump casing weld inspection requirements for pumps RHR-P-2A, -2B, and -2C, pump HPCS-P-1 and pump LPCS-P-1.

3.2.2 Applicable Code Requirement

Section XI, Table IWC-2500-1, Examination Category C-G, item C6.10 requires a surface examination of 100 percent of the pressure retaining pump casing welds and adjacent base metal of one (1) pump in each group of multiple pumps (of similar design, size, function, and service) during the inspection interval. The examination can be performed from either the inside or outside of the pump casing.

3.2.3 Code Requirements from which Relief is Requested

Examination of the pump welds by a surface method.

3.2.4 Licensee's Basis for Relief

Relief from the above requirement is requested under 10 CFR 50.55a(a)(3)(ii), in that the high dose from performing these examinations will present a hardship to the plant.

3.2.5 Licensee's Alternative Examinations

In support of the CGS's as low as reasonably achievable (ALARA) program, a remote VT-1 examination may be performed on the internal surface of the pump casing welds in lieu of the surface examination. The examination method, either a surface or VT-1, will be determined by CGS based on radiation data at the time welds become accessible for examination.

3.2.6 Licensee's Justification for Relief

In order to perform the surface examination it is necessary that an individual enter the pump casing. The VT-1 examination can be performed remotely with personnel standing outside the pump casing. The diameter of the pump casing for the low-pressure core spray (LPCS) system pump and residual heat removal (RHR) pumps is 36 inches and 54 inches for the high-pressure core spray (HPCS) system pump. The approximate pump casing lengths are RHR 9-1/2 feet, LPCS 10-1/2 feet and HPCS 12 feet. The pump with the highest dose estimate is RHR-P-2B. The estimated dose rates while examining this pump are 500-750 mrem/hour inside the pump casing and

120 mrem at floor level at the top of the pump casing. Estimated dose rates for the other pumps in this Code Category are lower than for RHR-P-2B. Cleaning and surface examination of the welds is estimated to take five (5) hours. The expected dose for performing the surface examination of the RHR-P-2B welds, including the surface preparation is approximately 2500 to 3750 mrem. Performing the surface preparation and remote VT-1 examination of these same welds is estimated to take three (3) hours and has an expected dose of 360 mrem.

This relief request should be granted for the following reasons:

1. The alternate examination will be used when the dose to perform the surface examination is substantial. The alternate examination will only be used if justified by an ALARA review at the time the welds are made accessible.
2. The VT-1 examination method is the Code method for the reactor pressure vessel internal attachment welds (Code Category B-N-2). The VT-1 method provides, in the situation where substantial dose creates a hardship to perform the Code specified surface examination of the Code Category C-G pump welds, adequate safety and quality.

3.2.7 NRC Staff Evaluation

The ASME Code, Section XI, requires 100-percent surface examination of the RHR pumps RHR-P-2A, RHR-P-2B, and RHR-P-2C, the HPCS system pump HPCS-P-1, and the LPCS system pump LPCS-P-1. A portion of the subject pump welds are accessible only by disassembly of the pumps because the pumps are positioned within concrete pits. Based on the information provided, the staff determined that the internal surfaces of the pumps are accessible only when the pumps are disassembled for maintenance. In order to perform the surface examination, it is necessary that an individual enter the pump casing. The estimated dose rates while examining this pump are 500-750 mrem/hour inside the pump casing and 120 mrem at floor level at the top of the pump casing. Cleaning and surface examination of the welds is estimated to take 5 hours. Performing the surface preparation and remote VT-1 examination of these same welds is estimated to take 3 hours and has an expected dose of 360 mrem. Thus, a substantial reduction on personnel exposure would be achieved. In addition, the VT-1 examination method is the ASME Code-specified method for the examination of reactor pressure vessel internal attachment welds and, as such, has provided an acceptable alternative where substantial dose creates a hardship to perform the ASME Code-specified surface examination. The licensee also stated that the alternate examination will only be used if justified by an ALARA review at the time the welds are made accessible. Therefore, the NRC staff finds that the licensee's proposed alternative to use remote VT-1 examination instead of the ASME Code-required surface examination on Category C-G pump welds is acceptable.

The licensee's proposal to examine the pump casing welds from the internal surfaces of the pumps using remote VT-1 examination method when disassembled assures that degradation, if occurring, will be detected. Imposing the ASME Code requirements to perform the surface examinations would result in a hardship without a compensating increase in the level of quality and safety, because the examination personnel would incur additional exposure to radiation. Requiring unnecessary radiation exposure would be contrary to 10 CFR 20.1101(b), which

requires that the licensee use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses that are ALARA. In addition, disassembly of the pumps for the sole purpose of performing ISI on welds accessible only from the inside surface is a major effort and could potentially result in additional wear or damage to the internals of the pump. The staff concludes that the proposed alternate examination method would provide reasonable assurance of structural integrity.

3.2.8 NRC Staff Conclusion

The NRC staff has reviewed the information provided by the licensee in support of Relief Request 3ISI-04 for the third 10-year interval for CGS. Based on this evaluation, the staff concludes that requiring the licensee to perform surface examination on pump casing welds results in a hardship without a compensating increase in the level of quality and safety. The licensee's proposed alternative to perform remote VT-1 examinations of pump casing welds internal to pumps when disassembled for maintenance provides reasonable assurance of structural integrity. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee's proposed alternative is authorized for the third 10-year interval ISI program.

Principal Contributor: G. Georgiev

Date: March 8, 2007