

April 25, 2001

Mr. J. V. Parrish
Chief Executive Officer
Energy Northwest
P.O. Box 968 (Mail Drop 1023)
Richland, WA 99352-0968

SUBJECT: COLUMBIA GENERATING STATION - RELIEF REQUESTS 2ISI-21, 2ISI-22,
2ISI-23, 2ISI-24 AND COMMITMENT CHANGE (TAC NO. MB0686)

Dear Mr. Parrish:

By letters dated November 29, 2000, and April 9, 2001, you requested relief from certain requirements pertaining to ultrasonic testing (UT) performance qualification, personnel training, and volumetric examination for the second 10-year inservice inspection (ISI) interval at the Columbia Generating Station. Relief Request (RR) 2ISI-21 proposes the use of statistical length sizing tolerances for qualification flaw lengths measured by UT. Specifically, RR 2ISI-21 requested in part relief from Supplement 4, Subparagraph 3.2(b) of Appendix VIII to the 1995 Edition with 1996 Addenda of Section XI of the Code. This relief was requested due to an error in 10 CFR 50.55a(b)(2)(xv)(C)(1) that the staff has corrected and therefore relief is no longer required for Subparagraph 3.2(b). RR 2ISI-21 also requested relief from Subparagraph 3.2(c) of Appendix VIII to the 1995 Edition with 1996 Addenda of Section XI of the Code for which relief is still required. RR 2ISI-22 proposes delaying implementing ASNT CP-189 until after the Spring 2001 scheduled outage; RR 2ISI-23 proposes conducting annual training for UT according to 10 CFR 50.55a(b)(2)(xiv), and RR 2ISI-24 proposes using a reduced examination volume for nozzle-to-reactor pressure vessel (RPV) welds. In addition, a commitment change to the second 10-year ISI plan to use ASME, Section XI, Appendix VIII for UT of reactor vessel welds was submitted.

The staff's evaluation of the relief requests is enclosed. Based on the evaluation, the staff has concluded that the proposed alternatives will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the licensee's proposed alternatives described in RR 2ISI-21 (for Subparagraph 3.2(c)), 2ISI-22, 2ISI-23, and 2ISI-24 are authorized based on the alternatives providing an acceptable level of quality and safety.

The staff finds the licensee's commitment change from the recommendation in Regulatory Guide (RG) 1.150 to Appendix VIII acceptable. Generic Letter 83-15, "Implementation of Regulatory Guide 1.150, 'Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examinations, Rev. 1'," endorses the use of RG 1.150, Revision 1 as guidance for ultrasonic testing of reactor vessel welds during inservice examinations. The licensee currently uses this guidance for the second 10-year interval ISI program. In lieu of RG 1.150, the licensee proposes to revise the second 10-year interval ISI program to use ASME Section XI, Appendix VIII, 1995 Edition, 1996 Addenda as modified by the rule 64 FR 51370 for those reactor vessel components where Appendix VIII has become applicable through implementation of 10 CFR 50.55a. For those components where Appendix VIII is not applicable, the licensee

proposes to continue to conduct ultrasonic examination performance demonstrations "in the spirit of Appendix VIII." By letter dated April 9, 2001, the licensee clarified the meaning of "in the spirit of Appendix VIII" and identified the welds affected. The meaning of "in the spirit of Appendix VIII," is that the licensee will use personnel and procedures that have been qualified to Appendix VIII and are used for similar vessel welds (flange to vessel).

The regulations in 10 CFR 50.55a(g)(6)(ii)(C) prescribe an implementation schedule for Appendix VIII of the ASME Code Section XI, Division 1, 1995 Edition, 1996 Addenda. The licensee's proposed change in commitment for components within the scope of Appendix VIII follows the requirements imposed by 10 CFR 50.55a(g)(6)(ii)(C). The commitment to use personnel who have qualified to the specific Appendix VIII Supplement for examinations of welds where Appendix VIII is not required is equivalent to the prescriptive performance demonstration criteria in RG 1.150 and is acceptable.

Sincerely,

/RA/ L. Raghavan for

Stephen Dembek, Chief, Section 2
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosure: Safety Evaluation

cc w/encl: See next page

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NAME	JCushing:am	EPeyton	JDavis JAD*	NLO w/changes RHoeffling*	LRaghavan for:SDembek
DATE	4/24/01	4/23/01	4/16/01	4/17/01	4/25/01

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Columbia Generating Station

cc:

Mr. Greg O. Smith (Mail Drop 927M)
Vice President, Generation
Energy Northwest
P. O. Box 968
Richland, WA 99352-0968

Mr. Rodney L. Webring (Mail Drop PE08)
Vice President, Operations Support/PIO
Energy Northwest
P. O. Box 968
Richland, WA 99352-0968

Mr. Albert E. Mouncer (Mail Drop 1396)
Chief Counsel
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

Thomas C. Poindexter, Esq.
Winston & Strawn
1400 L Street, N.W.
Washington, DC 20005-3502

Ms. Deborah J. Ross, Chairman
Energy Facility Site Evaluation Council
P. O. Box 43172
Olympia, WA 98504-3172

Mr. Bob Nichols
Executive Policy Division
Office of the Governor
P.O. Box 43113
Olympia, WA 98504-3113

Mr. D. W. Coleman (Mail Drop PE20)
Manager, Regulatory Affairs
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

Ms. Lynn Albin
Washington State Department of Health
P.O. Box 7827
Olympia, WA 98504-7827

Mr. Paul Inserra (Mail Drop PE20)
Manager, Licensing
Energy Northwest
P.O. Box 968
Richland, WA 99352-0968

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
Harris Tower & Pavilion
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

Chairman
Benton County Board of Commissioners
P.O. Box 69
Prosser, WA 99350-0190

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 69
Richland, WA 99352-0069

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO INSERVICE INSPECTION PROGRAM RELIEF REQUESTS

ENERGY NORTHWEST

COLUMBIA GENERATING STATION

DOCKET NO. 50-397

1.0 INTRODUCTION

The inservice inspection (ISI) of Class 1, Class 2, and Class 3 components of the American Society of Mechanical Engineering (ASME) Boiler and Pressure Vessel Code (Code) will be performed in accordance with Section XI of the ASME Code and its applicable edition and addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Section 50.55a(a)(3) states, in part, that alternatives to the requirements of Paragraph (g) may be used when authorized by the Nuclear Regulatory Commission (NRC) if the licensee demonstrates that (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.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) will meet the requirements, except the design and access provisions and the pre-service 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(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The ISI Code of record for the Columbia Generating Station's second 10-year ISI interval is the 1989 Edition of Section XI of the ASME Boiler and Pressure Vessel Code. The 10-year interval for the Columbia Generating Station began December 13, 1994.

By letter dated November 29, 2000, Energy Northwest, the licensee, requested relief from certain requirements pertaining to ultrasonic testing (UT) performance qualification, personnel training, and volumetric examination for the second 10-year ISI interval at the Columbia Generating Station. Specifically, Relief Request (RR) 2ISI-21 proposes the use of statistical length sizing tolerances for qualification flaw lengths measured by UT; RR 2ISI-22 proposes delaying implementing ASNT CP-189 until after the Spring 2001 scheduled outage; RR 2ISI-23 proposes conducting annual training for UT according to 10 CFR 50.55a(b)(2)(xiv), and RR 2ISI-24 proposes using a reduced examination volume for nozzle-to-reactor pressure vessel

(RPV) welds. In addition, the licensee submitted a commitment change to the second 10-year ISI plan to use ASME, Section XI, Appendix VIII for UT of reactor vessel welds.

2.0 RR 2ISI-21: UT SIZING TOLERANCE FOR REACTOR PRESSURE VESSEL PERFORMANCE DEMONSTRATIONS

2.1 Code Requirements from Which Relief is Requested

Section 50.55a(g)(6)(ii)(C) requires implementation of Appendix VIII to the 1995 Edition with 1996 Addenda of Section XI of the Code. The implementation schedule for Supplement 4 to Appendix VIII is November 22, 2000. Supplement 4, Subparagraph 3.2(b), length sizing qualification criterion requires that flaw lengths estimated by UT be the true length $-\frac{1}{4}$ inch +1 inch. However, 10 CFR 50.55a(b)(2)(xv)(C)(1) modifies the length sizing qualification criterion to a depth sizing acceptance criterion of 0.15 inch root mean square (RMS) and specifies that this be used in lieu of the requirements of Subparagraph 3.2(b). The NRC staff intended to publish 0.75 inch RMS length sizing criterion in 10 CFR 50.55a(b)(2)(xv)(C)(1), but mistakenly published the value of 0.15 inch RMS for depth sizing tolerance in place of the existing length sizing tolerance. The omission of the length sizing tolerance of 0.75 inch RMS in the rule was an oversight and the inclusion of the depth sizing tolerance in Subparagraph 3.2(b) was an error. The error was corrected and published in the *Federal Register* on March 26, 2001 (66 *FR* 16390), and the relief is no longer needed. The new wording of 10 CFR 50.55a(b)(2)(xv)(C)(1) is:

"A depth sizing requirement of 0.15 inch RMS shall be used in lieu of the requirement in Subparagraph 3.2(a), and a length sizing requirement of 0.75 inch RMS shall be used in lieu of the requirement in Subparagraph 3.2(b)."

Supplement 4, Subparagraph 3.2(c), requires that the UT performance demonstration results be plotted on a two-dimensional plot with the measured depth plotted along the ordinate axis and the true depth plotted along the abscissa axis. For qualification, the plot must satisfy the following statistical parameters: (1) slope of the linear regression line is not less than 0.7; (2) the mean deviation of flaw depth is less than 0.25 inches; and (3) correlation coefficient is not less than 0.70.

2.2 Licensee's Proposed Alternative

In accordance with 10 CFR 50.55a(a)(3)(i), the licensee proposed using a length sizing qualification criteria of 0.75 inch RMS error in lieu of Appendix VIII, Supplement 4, Subparagraph 3.2(b). However, due to the staff correcting the rule to specify 0.75 RMS, relief is no longer required. The licensee plans to use the RMS error calculations of Appendix VIII, Supplement 4, Subparagraphs 3.2(a) and 3.2(b) in lieu of Subparagraph 3.2(c) for which relief is still required.

2.3 Evaluation

The licensee proposed eliminating the use of Supplement 4, Subparagraph 3.2(c) which imposes three statistical parameters for depth sizing. The first parameter, 3.2(c)(1), pertains to the slope of a linear regression line. The linear regression line is the difference between actual

versus true value plotted along a through-wall thickness. For Supplement 4 performance demonstrations, a linear regression line of the data is not applicable because the performance demonstrations are performed on test specimens with flaws located in the inner 15% through-wall. The differences between actual versus true value produce a tight grouping of results which resemble a shot gun pattern. The slope of a regression line from such data is extremely sensitive to small variations, thus making the parameter of Subparagraph 3.2(c)(1) an inappropriate acceptance criterion. The second parameter, 3.2(c)(2), pertains to the mean deviation of flaw depth. The value used in the code is too lax with respect to evaluating flaw depths within the inner 15 percent of wall thickness. Therefore, the licensee proposes to use the more appropriate criterion of 0.15 inch RMS of 10 CFR 50.55a(b)(2)(xv)(C)(1), which modifies Subparagraph 3.2(a), as the acceptance criterion. The third parameter, Subparagraph 3.2(c)(3), pertains to a correlation coefficient. The value of the correlation coefficient in Subparagraph 3.2(c)(3) is inappropriate for this application since it is based on the linear regression from Subparagraph 3.2(c)(1).

The Performance Demonstration Initiative (PDI) was aware of the inappropriateness of Subparagraph 3.2(c) early in the development of their program. They brought the issue before the appropriate ASME committee which formalized eliminating the use of Supplement 4, Subparagraph 3.2(c) in Code Case N-622. The NRC staff representatives participated in the discussions and consensus process of the code case. Based on the above, the NRC staff believes that the use of Subparagraph 3.2(c) requirements in this context is inappropriate and that the proposed alternative to use the RMS value of 10 CFR 50.55a(b)(2)(xv)(C)(1), which modifies the criterion of Appendix VIII, Supplement 4, Subparagraph 3.2(a), in lieu of Subparagraph 3.2(c), will provide an acceptable level of quality and safety¹.

2.4 Conclusion

The licensee proposed using a length sizing qualification criteria of 0.75 inch RMS error in lieu of Appendix VIII, Supplement 4, Subparagraph 3.2(b). However, due to the staff correcting the rule to specify 0.75 RMS, the relief is no longer required. The staff has concluded that the alternative proposed in RR 2ISI-21 for Supplement 4, Subparagraph 3.2(c) will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative is authorized for the second 10-year ISI interval.

3.0 RR 2ISI-22: DELAY IMPLEMENTATION OF CP-189

3.1 Code Requirements for Which Relief is Requested

The regulations in 10 CFR 50.55a(g)(6)(ii)(C) impose implementation of Appendix VIII to the 1995 Edition with 1996 Addenda of Section XI of the Code. The implementation schedules for the Supplements to Appendix VIII are May 22, 2000, for Supplements 1, 2, 3, and 8; November 22, 2000, for Supplements 4 and 6; November 22, 2001, for Supplement 11; and November 22, 2002, for Supplements 5, 7, 10, 12, and 13. Appendix VIII references Appendix VII which references Subarticle IWA-2300 of Section XI of the 1995 Edition with 1996

¹ The information which would have been required for Appendix VIII, Supplement 4, Subparagraph 3.2(c)(1) is still required and valid for the sizing qualification of Appendix VIII, Supplement 6.

Addenda of the Code. Subarticle IWA-2310 requires qualification of nondestructive (NDE) examiners according to the 1991 Edition of CP-189 as amended by the requirements of Division 1 of the Code.

Subarticle IWA-2300 to Section XI of the 1989 Edition of the Code requires qualification of NDE examiners outside the scope of Appendix VIII be conducted according to SNT-TC-1A, 1984 and the additional requirements of Division 1, including Appendix I to Section XI of the Code.

3.2 Licensee's Proposed Alternative to Code

The licensee's proposed alternative is to continue initial certification and re-certification of UT personnel in accordance with the requirements of 10 CFR 50.55a(a)(3)(i) and those contained in the 1989 Edition of ASME Section XI. This alternative would apply until August 31, 2001. Personnel performing UT examinations shall also meet the requirements specified in 10 CFR 50.55a(b)(xv), as amended by the rule 64 *FR* 51370, for the qualification of personnel by demonstration.

3.3 Evaluation

The staff performed a detailed comparison of SNT-TC-1A and CP-189. CP-189 contains essentially everything that is in SNT-TC-1A and some additional requirements. CP-189 has a larger definition of terms which are applicable to performance demonstrations than SNT-TC-1A. CP-189 requires written procedures detailing the program for qualifying and certifying UT personnel. CP-189 requires Level III personnel to answer more questions in the method specific examination (questions on specifications, equipment, techniques, and procedures) and to pass a performance demonstration.

Except for Level III examiners, the changes from SNT-TC-1A to CP-189 are mostly programmatic and do not affect UT personnel skills. The CP-189 requirement that Level III examiners demonstrate proficiency in UT is addressed by the licensee in the submittal. The licensee committed all personnel performing UT examinations to demonstrate their proficiency with a UT performance demonstration as set forth by 10 CFR 50.55a, as amended by the rule 64 *FR* 51370, thereby, satisfying the demonstration criterion in CP-189.

The ASME Code has provided for an orderly transition from SNT-TC-1A to CP-189 with the continued recognition of certifications until re-certification is required. For Level I and II examiners, re-certification is every three years, and for Level III examiners, re-certification is every five years. The orderly transition by the Code does not consider licensee-specific difficulties. The licensee is requesting a delay in implementing CP-189 to accommodate a planned refueling outage scheduled for spring 2001. The delay would provide the licensee with an opportunity to perform an orderly transition to CP-189 after the outage. The licensee will implement CP-189 after August 31, 2001. The programmatic differences between SNT-TC-1A and CP-189 should not affect the proficiency of UT personnel over the short time that this relief is being requested. Therefore, the staff concludes that the proposed alternative would provide an acceptable level of quality and safety.

3.4 Conclusion

Based on the discussion above, the staff concludes that the alternative proposed in RR 2ISI-22, until August 31, 2001, for the second 10-year ISI interval will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative is authorized until August 31, 2001.

4.0 RR 2ISI-23: PARAGRAPH VII-4240 OF ASME CODE APPENDIX VII ANNUAL TRAINING FOR UT PERSONNEL

4.1 Code Requirements from Which Relief is Requested

The licensee is requesting relief from the 1995 Edition with 1996 Addenda, Appendix VII to Section XI of the Code, Subarticle VII-4240 for Appendix VIII qualified personnel. Subarticle VII-4240 requires a minimum of 10 hours of annual UT training.

4.2 Licensee's Proposed Alternative

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposes conducting annual UT training for Appendix VIII qualified UT personnel, in accordance with 10 CFR 50.55a(b)(2)(xiv) requirements in lieu of Subarticle VII-4240 to Appendix VII of Section XI of the Code.

4.3 Evaluation

Subarticle VII-4240, Appendix VII of Section XI of the Code requires ten hours of annual training to impart knowledge of new developments, material failure modes, and any pertinent technical topics as determined by the licensee. No hands-on training or practice is required to be included in the ten hours of training. This training is required of all UT personnel qualified to perform examinations of ASME Code Class 1, 2, and 3 systems. Independent of the ASME Code, 10 CFR 50.55a(b)(2)(xiv) imposes the requirement that eight hours of hands-on training with flawed specimens containing cracks be performed no earlier than six months prior to performing examinations at a licensee's facility. The licensee contends that maintaining two separate UT annual training programs creates redundant systems and the use of 10 CFR 50.55a(b)(2)(xiv) will simplify recordkeeping and satisfy the needs for maintaining skills.

As part of the staff's rulemaking effort to revise 10 CFR 50.55a(b)(2), the issue of UT annual training requirements was reviewed. This review was included in the summary of comments to the rule 64 *FR* 51370. In the review, the staff determined that the ten hours of annual training requirement specified in the ASME Code was inadequate for two reasons. The first reason was that the training does not require practice with flawed specimens. Practice with flaws is necessary because signals can be difficult to interpret. The second reason is related to the length of training and its frequency. Studies have shown that an examiner's capability begins to diminish within six months if skills are not maintained. Therefore, examiners must practice on a frequent basis to maintain their capability for proper interpretation of flaws.

Based on resolution of public comments for the above rulemaking, the staff accepted an industry initiative advanced by the Electric Power Research Institute (EPRI), which proposed eight hours of hands-on practice with flawed specimens containing cracks. The practice would

occur no earlier than six months prior to performing examinations at a licensee's facility. The initiative was adopted in 10 CFR 50.55a(b)(2)(xiv) for personnel maintaining their Appendix VIII qualifications. The staff believes that the proposed alternative to use 10 CFR 50.55a(b)(2)(xiv) in lieu of Subarticle VII-4240 will maintain the skill and proficiency of UT personnel at or above the level provided in the Code for annual UT training, thereby, providing an acceptable level of quality and safety.

4.4 Conclusion

Based on the discussion above, the staff has concluded that the alternative proposed in RR 2ISI-23 will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative is authorized for the second 10-year ISI interval.

5.0 RR 2ISI-24: EXAMINATION CATEGORY B-D, FULL PENETRATION WELDS OF NOZZLES IN VESSELS, ITEM B3.90

5.1 Code Requirements from Which Relief is Requested

The licensee is requesting relief from the nozzle-to-vessel examination volume shown in Figures IWB-2500-7(a) and (b) of the 1989 Edition of Section XI of the Code and ASME Section V, Article 4 for the performance of the required volumetric examinations as specified in Table IWB-2500-1 Category B-D, Item B3.90.

5.2 Licensee's Proposed Alternative

Pursuant to 10 CFR 50.55a(a)(3)(i), the licensee proposes reducing the examination volume to one-half ($\frac{1}{2}$) inch from each side of the weld crown in lieu of the one-half ($\frac{1}{2}$) through-wall thickness from each side of the weld crown required by Figures IWB-2500-7(a) and (b).

The licensee proposes using the above examination volume in lieu of the examination volume specified in the 1989 Edition, Section XI, Table IWB-2500-1, Examination Category B-D, Item B3.90.

The licensee proposed performing the examination in accordance with the 1995 Edition with 1996 Addenda, Appendix VIII, Supplement 7, as modified by 10 CFR 50.55a(b)(2)(xv)(K).

5.3 Evaluation

The licensee proposed reducing the examinations volume to one-half ($\frac{1}{2}$) inch from each side of the weld crown in lieu of the one-half ($\frac{1}{2}$) through-wall thickness from each side of the weld required by Figures IWB-2500-7(a) and (b). The acceptability of this reduced volume examination is based on prior examinations of the base metal and internal stress distribution near the weld. The base metal was extensively examined during manufacture, pre-service inspection, and prior inservice inspections. These examinations show the ASME Code volume to be free of flaws. The creation of flaws during plant service in the volume excluded from the proposed reduced examination is unlikely because of the low stress in the base metal away from the weld. The stresses caused by welding are concentrated at and near the weld.

Cracks, should they initiate, will occur in the high-stressed area of the weld. The high stressed areas are within the volume included in the reduced examination volume proposed by the licensee. The prior thorough examination of the base metal and the examination of the high stressed areas of the weld provides an acceptable level of quality and safety.

The licensee's application of Supplement 7 to Appendix VIII of the 1995 Edition with 1996 Addenda of the Code as modified by 10 CFR 50.5a(b)(2)(xv)(K) becomes mandatory November 22, 2002. The licensee's proposal to perform the examination using Appendix VIII before the mandatory implementation date will also provide an acceptable level of quality and safety.

5.4 Conclusion

Based on the above discussion, the staff concludes that the alternative proposed in RR 2ISI-24 will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative is authorized for the second 10-year ISI interval.

6.0 CONCLUSION

RR 2ISI-21 requested in part relief from Supplement 4, Subparagraph 3.2(b) of Appendix VIII to the 1995 Edition with 1996 Addenda of Section XI of the Code. This relief was requested due to an error in 10 CFR 50.55a(b)(2)(xv)(C)(1) that the staff corrected and relief is no longer required for Subparagraph 3.2(b). RR 2ISI-21 also requested relief from Subparagraph 3.2(c) of Appendix VIII to the 1995 Edition with 1996 Addenda of Section XI of the Code for which relief is still required. Based on the evaluations discussed above, the staff concludes the relief requests 2ISI-21 (for Subparagraph 3.2(c)), 2ISI-22, 2ISI-23, and 2ISI-24 will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the staff authorizes the four proposed alternatives.

Attachment: Summary of Relief Requests

Principal Contributor: April Smith

Date: April 25, 2001

Second 10-Year ISI Interval				COLUMBIA GENERATING STATION			
SUMMARY OF RELIEF REQUESTS							
Relief Request Number	System or Component or Personnel	Exam Category	Item No.	Volume or Area to be Examined	Required Method	Licensee Proposed Alternative	Relief Request Status
2ISI-21	Reactor Pressure Vessel	B-A	B1.10 B1.20 B1.30 B1.40 B1.50	Longitudinal and Circumferential Shell Welds Head Welds Subject to Appendix VIII, Supplement 4, Examination Shell-to-Flange Weld Head-to-Flange Weld Repair Welds, Beltline Region	Length sizing qualification criteria -¼ in. + 1 in.	Length sizing qualification criteria to be 0.75 inch Root Mean Square Error	Rule changed on 3/26/01. Relief not needed for Subparagraph 3.2(b). Relief required for Appendix VIII, subparagraph 3.2(c) Authorized 10 CFR 50.55a(a)(3)(i)
2ISI-22	Qualification of Examination Personnel	ASME '95/'96 Add. IWA-2300	N/A	Components subject to UT with Appendix VIII	Use of CP-189	Continued use of ASNT SNT-TC-1A until August 31, 2001	Authorized 10 CFR 50.55a(a)(3)(i)
2ISI-23	Components Subject to UT	Subarticle VII-4240	N/A	Components subject to UT	10 hours of annual training	10CFR50.55a(b)(2) (xiv) 8 hours of hands-on training no earlier than 6 months prior to performing UT	Authorized 10 CFR 50.55a(a)(3)(i)
2ISI-24	Reactor Pressure Vessel	B-D	B3.90	Pressure retaining nozzle-to-vessel weld	IWB-2500-7(a) and (b)	Reduce examination volume to ½ in. from each side of the weld crown.	Authorized 10 CFR 50.55a(a)(3)(i)

Columbia Generating Station